



Autodesk Construction Cloud & Model Properties API

Forge Data Days

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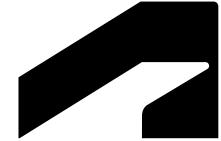
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アジェンダ

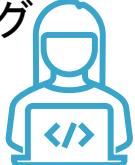
- Model Property API
- Data Connector API
- 今後の予定



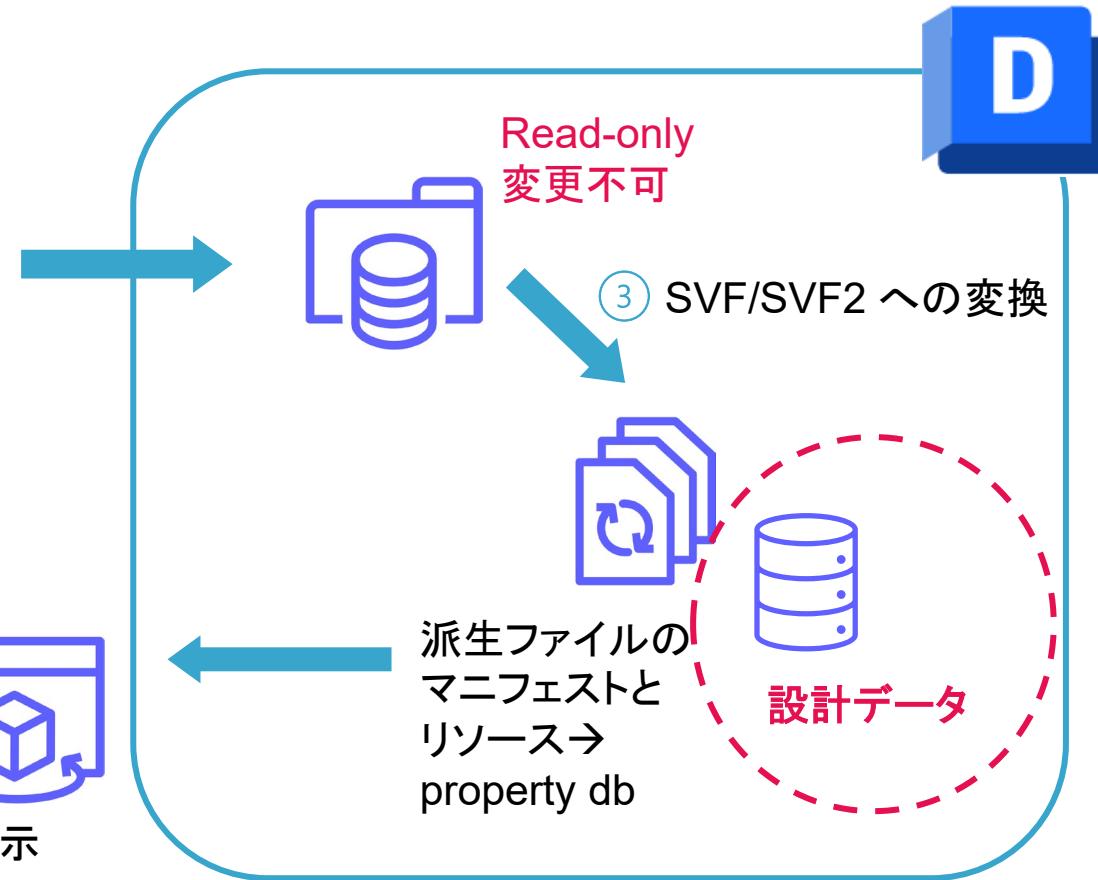
Model Properties API

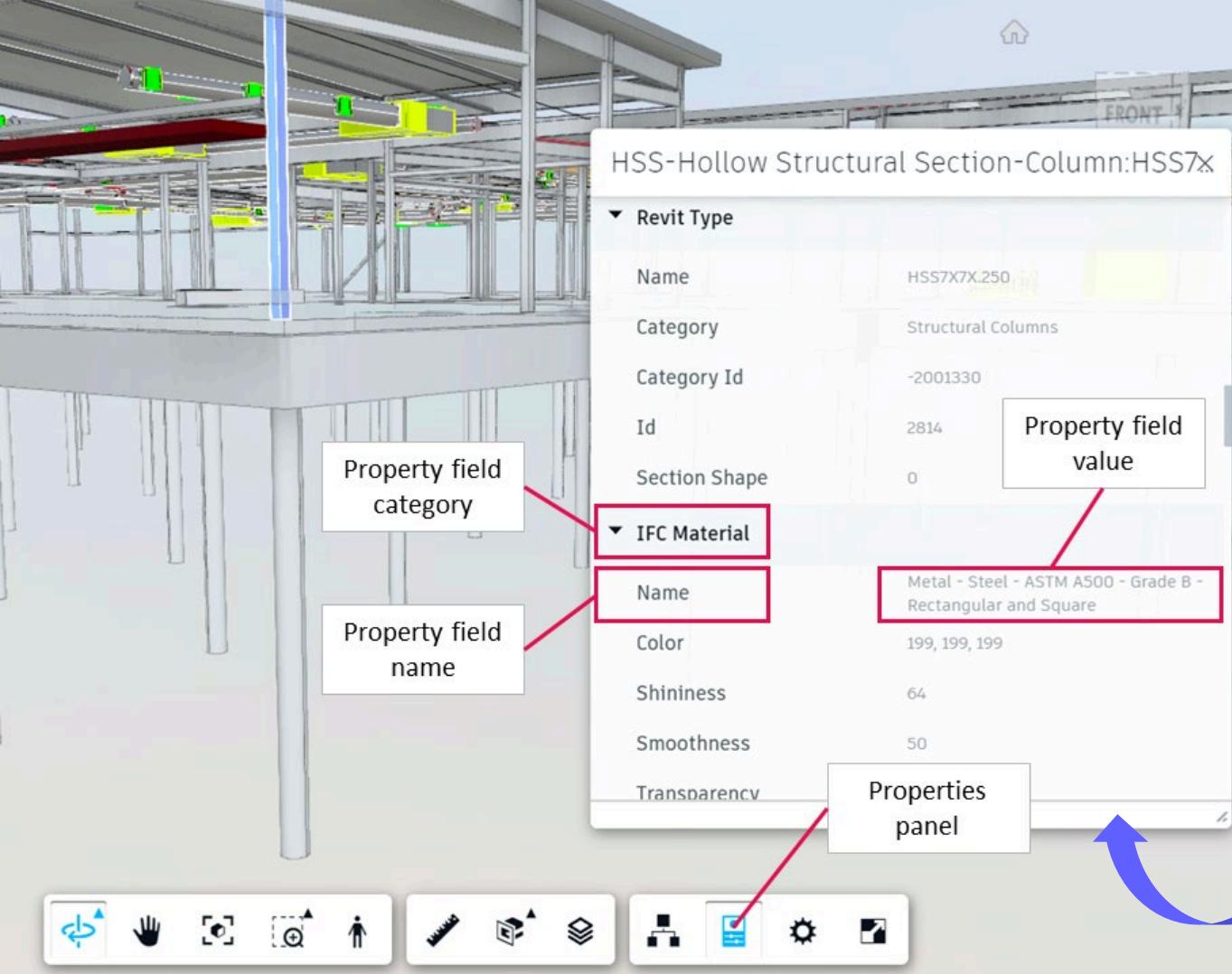
設計データファイル

ライフサイクル

- ① 設計のオーサリング
- 

- ② Web UI, Desktop Connector, API を
を通じたアップロード





SVF2 モデルプロパティの分類 (BIM)

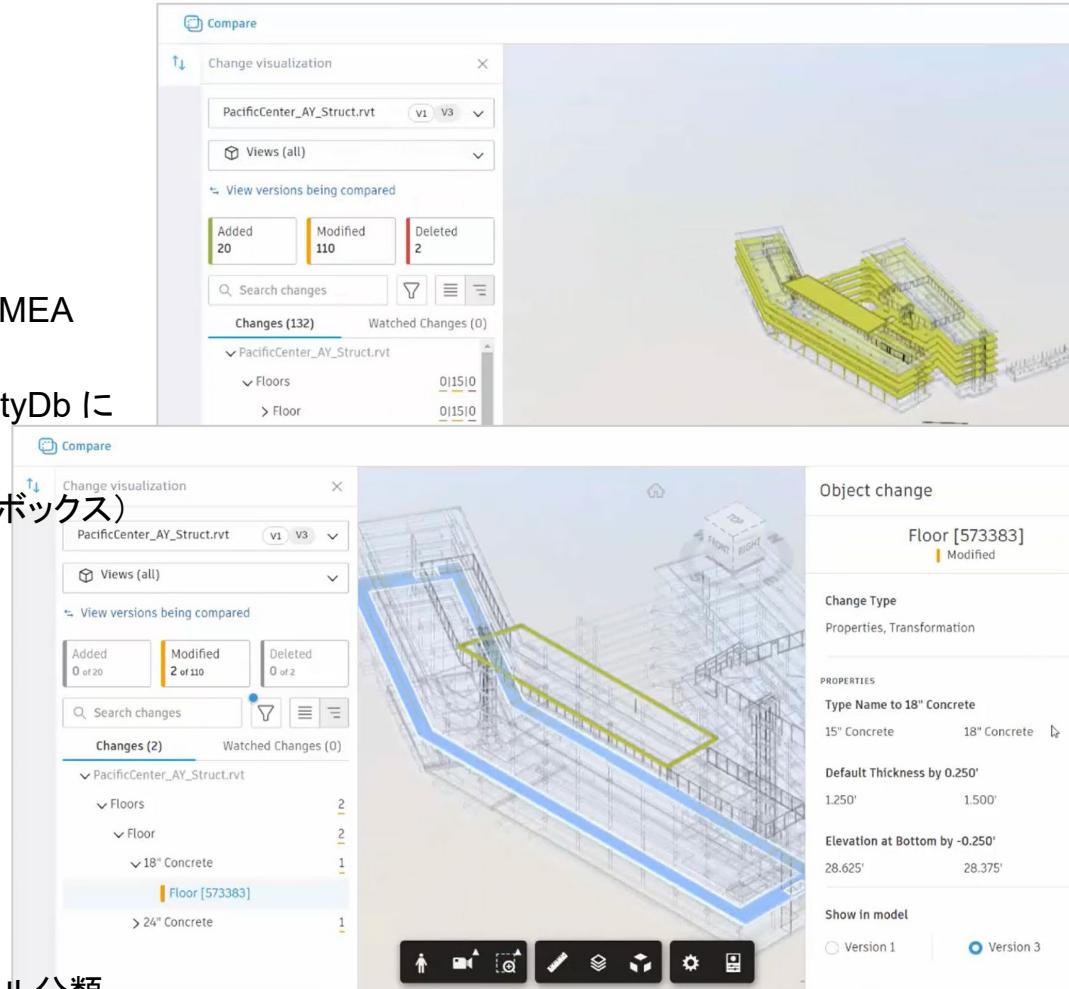
- カテゴリ
- 名前
- 型 (e.g., string, double)
- (オプショナル) 測定単位



propertyDb

Model Properties API

- 2022年2月リリース
- Autodesk/BIM 360 Docs 製品で動作。US と EMEA
- Model Derivative サービスで生成される PropertyDb に対して(svf2 変換後に)実行
 - **Index** – svf2 のプロパティ(+ バウンディングボックス)をクエリ、フィルタリング
 - **Diff** – Index + 2つのバージョンの比較
- 製品の機能でも利用されています。
 - Design Collaboration での変更内容の分析
- 今後のリリース予定
 - アセット – モデルとの統合
 - Model Coordination – 干渉チェック後のモデル分類

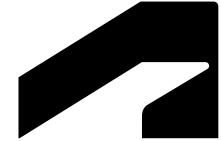


Model Properties API

サポートされているファイル形式

- **Index** – Model Derivative サービス/SVF2変換でサポートされているファイル
- **Diff** - 一意に識別可能な要素 ID が付与されていること
 - RVT
 - DWG
 - NWC:下記の製品から出力されたもの
 - Revit と AutoCAD ベースのバーチカル製品
 - IFC: 下記の製品から出力されたもの
 - AutoCAD Architecture, MEP, Civil 3D 2018+
 - ARCHICAD
 - Revit
 - MagiCAD for Revit
 - Tekla Structures

The screenshot displays the Autodesk Model Compare interface. On the left, a sidebar shows comparison statistics: Added 20, Modified 110, Deleted 2. Below this, a search bar and a 'Changes' tab (132) are visible. The main area shows a 3D building model with a yellow highlighted section. On the right, a detailed view of a floor slab is shown with a blue outline. A sidebar on the far right provides specific details about the selected object: 'Floor [573383]' (Modified), 'Change Type: Properties, Transformation', and 'Properties' including Type Name to 18" Concrete, Default Thickness by 0.250', and Elevation at Bottom by -0.250'. At the bottom, there are icons for camera, zoom, and other tools.



サンプル アプリケーション

Model Properties API

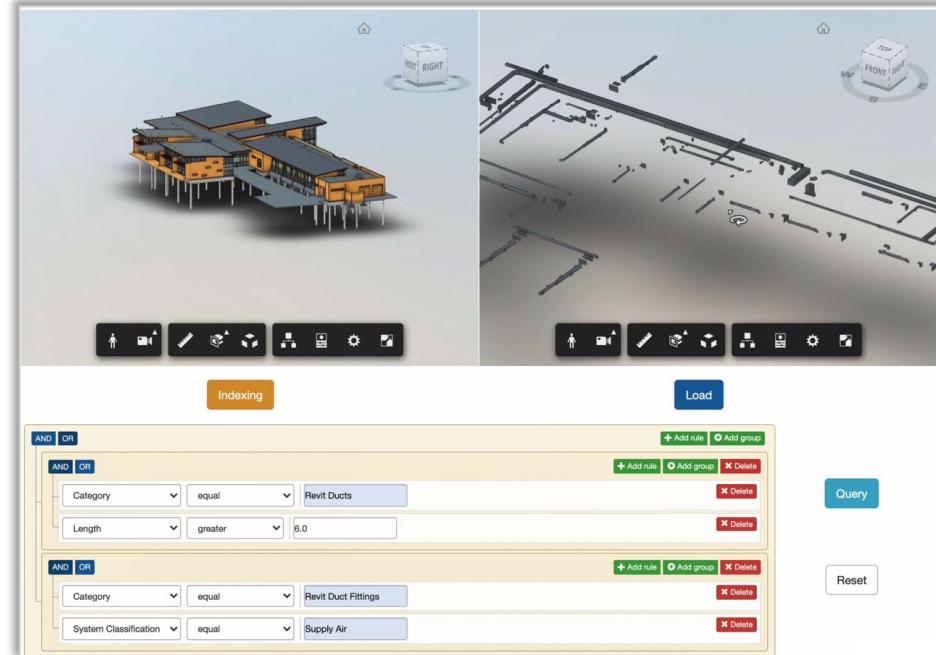
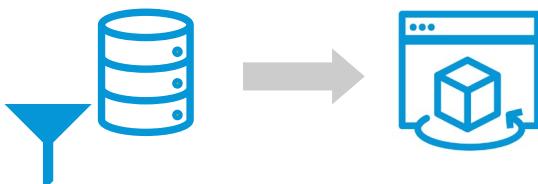
要素のフィルタリングとモデルの部分ロード

インデックス

概要: 要素をプロパティでフィルタリングします。プロパティは、長さや高さなどの幾何学的な情報も含みます。フィルタ条件は二項演算の形式で表現され、AND / ORで組み合わせることができます。結果はForge Viewerで可視化されます。

ソースコード: GitHub サンプル

開発者: Xiaodong Liang, Autodesk



Xiaodong Liang

- Forge Sandbox MH Indexing
- Pacific Center Hospital v2
- Xiaodong Tes & Patch
- Xiaodong-test-MC
 - Plans
 - Project Files
- xiaodong-new -project
 - Plans
 - Project Files
 - C4R
 - Indexing
 - Audubon-Merged.nwd
 - Audubon_Architecture-2022-Root.rvt
 - v1: 8/17/2021, 2:40:11 PM by Xiaodong Liang
 - Audubon_Mechanical-2022.rvt
 - Audubon_Structure-2022.rvt
 - BIM 360 Sample Assembly.rvt
 - Name Standards
 - Project Files.1
 - Project Files.4
 - non-C4R
 - Audubon_Architecture.rvt
 - Audubon_Mechanical.rvt
 - Audubon_Structure.rvt
 - Audubon_Structure_assembly.rvt
 - STEEL_TEST.nwd
 - rac_advanced_sample_project - Floor Plan - 01 - Entry
 - v1: 8/8/2021, 11:14:22 PM by Xiaodong Liang
 - rac_advanced_sample_project.rvt
 - rac_basic_sample_project.rvt
 - rme_basic_sample_project.nwd
 - xiaodong-old-project
 - xiaodong-test-asset
 - Developer Advocacy Support
 - AU ACC TakeOff Sample Project
 - For the Field
 - Project Files
 - Shared
 - Zhong
 - Consumed

Indexing

Load

Query

Reset

AND OR

+ Add rule + Add group × Delete

Level equal dummy

AND OR

+ Add rule + Add group × Delete

Category equal × Delete

Right Arrow equal False True × Delete

Free Size less 0.11 × Delete

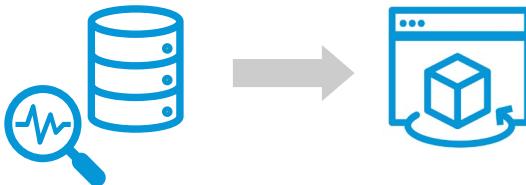
2つのバージョンの比較

差分比較

概要: モデルの2つのバージョンを比較し、違いをForge Viewer 上で可視化します。ジオメトリとプロパティの違いを抽出します。要素は、追加、削除、変更に分類されます。

ソースコード: GitHub サンプル

開発者: Xiaodong Liang, Autodesk



Added Items (25)					Removed Items (30)					Changed Items (284)		
name	category	level	RC	Free	name	category	level	RC	Free	name	geometry changed?	property ch.
Round Elbow [1187817]	Revit Duct Fittings	Arch-FIRST FLOOR	Duct Fittings	16"ø-	Round Elbow [853203]	Revit Duct Fittings	Arch-FIRST FLOOR	Duct Fittings	4"ø-	Round Elbow [839567]	yes	yes
Round Elbow [1187825]	Revit Duct Fittings	Arch-FIRST FLOOR	Duct Fittings	16"ø-	Round Elbow [914477]	Revit Duct Fittings	Arch-FIRST FLOOR	Duct Fittings	4"ø-	Round Elbow [839569]	yes	yes
Round Elbow [1187827]	Revit Duct Fittings	Arch-FIRST FLOOR	Duct Fittings	16"ø-	Round Elbow [914480]	Revit Duct Fittings	Arch-FIRST FLOOR	Duct Fittings	4"ø-	Round Elbow [839571]	yes	yes

Xiaodong Liang

- Autodesk Forge Partner Development
 - Daimler POC Project
 - Endymion
 - Flow Test
 - Forge Concert Hall
 - Forge Infraworks
 - Pacific Center Hospital v2
 - Xiaodong Tes & Patch
 - Xiaodong-test-MC
 - xiaodong-new -project
 - Plans
 - Project Files
 - C4R
 - Name Standards
 - Project Files.1
 - Audubon_Architecture.rvt
 - Audubon_Mechanical.rvt
 - v1: 8/4/2021, 7:16:41 PM by Xiaod
 - v2: 8/4/2021, 7:20:54 PM by Xiao
 - v3: 8/7/2021, 5:28:32 PM by Xiao
 - Audubon_Structure.rvt
 - v1: 5/27/2021, 8:27:30 PM by Xiac
 - v2: 8/9/2021, 3:43:06 PM by Xiao
 - STEEL_TEST.nwd
 - rac_advanced_sample_project.rvt
 - v1: 8/8/2021, 11:14:22 PM by Xiao
 - rac_basic_sample_project.rvt
 - v1: 8/9/2021, 11:57:47 AM by Xiao
 - v2: 8/9/2021, 12:02:38 PM by Xiao
 - v3: 8/9/2021, 12:38:16 PM by Xiao
 - rme_basic_sample_project.nwd
 - xiaodong-old-project
 - xiaodong-test-project

The screenshot shows the Autodesk Forge Partner Development interface. On the left is a file tree with various projects and files. The main area has three tabs at the bottom: 'Added Items' (green), 'Removed Items' (red), and 'Changed Items' (teal). Each tab has a table with columns for name, category, level, RC, Free Size, and Si. Below each table is a message: 'No matching records found'. Above the tables are three toggle buttons: 'All Added', 'All Removed', and 'All Changed'. A large orange icon with two overlapping document symbols is positioned above the tables.

name	category	level	RC	Free Size	Si
No matching records found					

name	category	level	RC	Free Size	Si
No matching records found					

name	geometry changed?	property change
No matching re		

Takeoff / Costでの変更の解析

積算における差分解析アプリケーション

概要: 積算の項目の変更を特定し、モデルの現在と以前のバージョンを比較し、Forge Viewerで違いを可視化します。Cost モジュールで予算のデータを更新します。

ソースコード: GitHub sample

開発者: Zhong Wu, Autodesk



The screenshot shows the Autodesk Construction Cloud interface with the 'AU ACC TakeOff Sample Project' selected. The top navigation bar includes 'Sheets & Models', 'Cost', 'Income', 'Expenditure', 'Change Order', 'Files', 'Reports', 'Members', and 'Settings'. The 'Cost' tab is active, displaying the 'Income' section with a table for 'Budget'.

Budget Code	Budget Name	Qty	Unit	Unit Cost	Amount	Internal Budget Transfer	Main Contract	Linked to Main Contract SOV
01651.600	Glass	6	nr	230.00	1,380.00	0.00	No	No
09716.997	Window	8	nr	553.00	4,424.00	0.00	No	No
14259.806	Door	2	nr	836.00	1,672.00	0.00	No	No
68081.172	Floor	88	m ²	136.00	11,968.00	0.00	No	No

The bottom section shows a 'Price Book (US)' table and a 'Takeoff Package Budget' table, both listing items like Door, Floor, Glass, Wall, and Window with their respective unit prices and amounts.

On the right side, there are three tabs: 'Added Items (1)', 'Removed Items (0)', and 'Changed Items (0)'. The 'Added Items' tab lists a single item: 'Single Window (1102696) Svt2d 6117'. The 'Removed Items' tab is empty. The 'Changed Items' tab lists four items: 'Single Wall (649032) Svt2d 597', 'Single Window (398853) Svt2d 597', 'M_Windows Tag (841201) Svt2d 529', and 'Railing (903440) Svt2d 406'. The 'Changed Items' table also includes columns for 'Current' and 'Latest' values.

Autodesk Takeoff < ACC Takeoff to Cost Sample < Income - Autodesk Cost

acc.autodesk.com/takeoff/packages/projects/2f38ddca-0bb2-4907-9047-85add2ba658a?contentSpaceId=9c2233f3-bc88-4e28-9123-46de0f969241&projectScopeId=107&lineageId=urn%3Adesk.wipprod%3Adm.lineage%3AwMYOC69YS... Update

Living Room < rac_basic_sample_project.rvt (V1) <

Takeoff Types

Search +

5 takeoff types

B - Shell

- Door 6 EA
- Glass
- Wall 116.53 M2
- Window

C - Interiors

- Floor

FRONT

Inventory Group by Takeoff type

Export

Name ^	Count	Quantity	Unit	Classification	Document	Wall	→
Door	2	2	EA	B2050.10 - Exterior Entrance Doors	A102		
Floor	1	88.05	M2	C2030.45 - Wood Flooring	A102		
Glass	6	6	EA	B2020.30 - Exterior Window Wall	rac_basic_sample_proj...		
Wall	4	116.53	M2	B2010.20 - Exterior Wall Construction	rac_basic_sample_proj...		
Window	8	8	EA	B2020.20 - Exterior Fixed Windows	A102		

Item count: 4

ACC Takeoff to Cost Sample < Packages - Autodesk Takeoff + acc.autodesk.com/takeoff/packages/projects/2f38ddca-0bb2-4907-9047-85add2ba658a

AUTODESK Construction Cloud

Takeoff AU ACC TakeOff Sample Project ? Zhong Wu Update

Home Packages Sheets & Models Files Members Settings

Packages

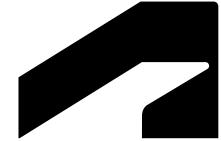
Work in progress Apr 27, 2022

+ Create package

Name ^ Updated by Last updated

	Name	Updated by	Last updated
<input type="checkbox"/>	3rd Concrete	Zhong Wu	Dec 30, 2021 12:33 PM
<input type="checkbox"/>	Living Room Sample ⚠️ Updates	Zhong Wu	Apr 27, 2022 8:09 PM
<input type="checkbox"/>	Sample Package ⚠️ Updates	Zhong Wu	Feb 25, 2022 11:48 AM
<input type="checkbox"/>	Windows Level 1	Mikako Harada	Jan 19, 2022 5:30 AM
<input type="checkbox"/>	Windows Level 2 ⚠️ Updates	Zhong Wu	Aug 4, 2021 8:32 AM

Show 1 - 5 of 5 < < 1 of 1 > >>



仕組みの解説

Model Properties API

Model Properties API の仕組み

基本的なワークフロー

Model Derivative



DM/Docs

UI, Desktop Connector
または API を通じてファイルを Docs にアップロード

Model Derivative

ファイルは svf/svf2 に変換されます。
Docs では変換は自動的にトリガされます。

設計データ

PropertyDb

プロパティのデータベース、マニフェスト、リソース

Model Properties API の仕組み

基本的なワークフロー



DM/Docs

UI, Desktop Connector
または API を通じてファイルを Docs にアップロード

Model Derivative

ファイルは svf/svf2 に変換されます。
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設計データ

PropertyDb

プロパティのデータベース、マニフェスト、リソース

Index

インデックスを作成する
と3つのダウンロード可能な JSON データが生成されます：
▪ Manifest
▪ Fields
▪ Properties

Query

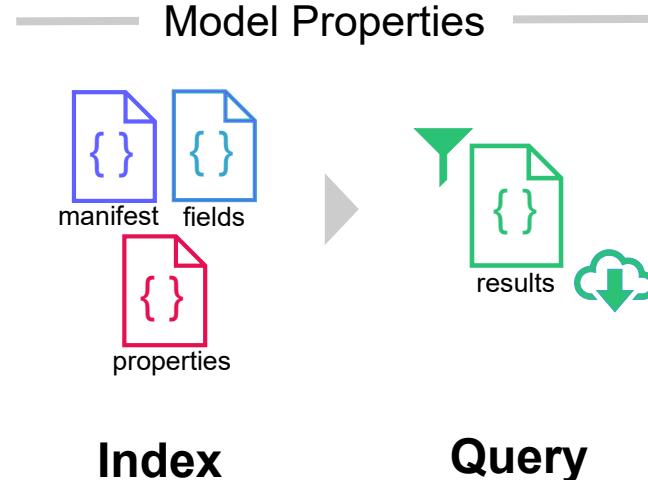
結果: クエリフィルタにマッチする JSON データが生成されます。

Model Properties API の仕組み

生成されるリソース

リソース	型	説明
manifest	JSON	シードファイルの詳細と、インデックス行の生成に使用される svf2 propertyDb の情報を含む、インデックスまたはクエリのためのマニフェスト
fields	NDJSON	インデックスやクエリのために抽出された一意のフィールド(プロパティタイプ)のセット
properties	NDJSON	インデックス化したオブジェクトプロパティの実際のデータ
results	NDJSON	クエリを実行した結果のオブジェクトプロパティ。

NDJSON = new-line delimited JSON(改行区切りの JSON)



インデックスを作成する
と3つのダウンロード可
能な JSON データが生
成されます:
▪ Manifest
▪ Fields
▪ Properties

結果: クエリフィルタに
マッチする JSON デー
タが生成されます。

Model Properties API の仕組み

Index エンドポイント

エンドポイント	
Index	POST indexes:batch-status
	GET indexes/:indexId
	GET indexes/:indexId/manifest 
	GET indexes/:indexId/fields 
	GET indexes/:indexId/properties 
Query	POST indexes/:indexId/queries
	GET indexes/:indexId/queries/:queryId
	GET indexes/:indexId/queries/:queryId/properties 

- 8 つのエンドポイント

Model Properties API の仕組み

Index 作成のエンドポイント

エンドポイント		
Index	POST	indexes:batch-status
	GET	indexes/:indexId
	GET	indexes/:indexId/manifest 
	GET	indexes/:indexId/fields 
Query	GET	indexes/:indexId/properties 
	POST	indexes/:indexId/queries
	GET	indexes/:indexId/queries/:queryId
	GET	indexes/:indexId/queries/:queryId/properties 

- 基本的な Index の作成 – “遅延実行”
 - 初回 – インデックス作成ジョブを開始して結果をキャッシュします。
 - 2回目以降 – キャッシュを利用。
 - キャッシュは最後に使用した日から30日間保持されます。
- 進捗状況のポーリング
 - state: PROCESSING, FINISHED, FAILED
- レスポンスの JSON は同一です。
- stats: オブジェクトの数
- ダウンロード可能な3つのjson.gzリソースの作成
 - Manifest, fields, properties

例：インデックスの作成 – POST indexes:batch-status

```
curl --request POST 'https://developer.api.autodesk.com/construction/index/v2/projects/f83c...' ... /indexes:batch-status'  
--header 'Authorization: Bearer ****' \  
--header 'Content-Type: application/json' \  
--data-raw '{  
    "versions": [  
        {  
            "versionUrn": "urn:adsk.wipprod:fs.file:vf.DyTwutcvTcOLUNUARxcTzQ?version=4"  
        }  
    ]  
}'  
  
[  
    {  
        "projectId": "f83cef12-deef-4771-9feb-4f85643e3c46",  
        "indexId": "qTmPiKJZ7siqxkTNpWGAnw",  
        "type": "INDEX",  
        "state": "PROCESSING",  
        "selfUrl": "https://developer.api.autodesk.com/construction/index/v2/projects/f83cef12-deef-4771-9feb-4f85643e3c46",  
        "versionUrns": [  
            "urn:adsk.wipprod:fs.file:vf.DyTwutcvTcOLUNUARxcTzQ?version=4"  
        ],  
        "updatedAt": "2021-08-19T08:21:13.8771187+00:00",  
        "retrvAt": "2021-08-27T14:28:28.8382067+00:00",  
        "stats": null,  
        "manifestUrl": null,  
        "fieldsUrl": null,  
        "propertiesUrl": null  
    }  
]
```

リクエスト

レスポンス

例:進捗状況のポーリング - GET indexes/:indexId

```
curl --request GET 'https://developer.api.autodesk.com/construction/index/v2/projects/ ... /indexes/qTmPiKJZ7siqxkTNpWGANw'  
--header 'Authorization: Bearer ****'
```

リクエスト

レスポンス

```
{  
    "projectId": "f83cef12-deef-4771-9feb-4f85643e3c46",  
    "indexId": "qTmPiKJZ7siqxkTNpWGANw",  
    "type": "INDEX",  
    "state": "FINISHED",  
    "selfUrl": "https://developer.api.autodesk.com/construction/index/v2/proje ... /indexes/qTmPiKJZ7siqxkTNpWGANw",  
    "versionUrns": [  
        "urn:adsk.wipprod:fs.file:vf.DyTWutcvTc0LUNUARxcTzQ?version=4"  
    ],  
    "updatedAt": "2021-08-19T08:21:13.8771187+00:00",  
    "retryAt": "2021-08-27T14:31:55.1444684+00:00",  
    "stats": {  
        "objects": 33097  
    },  
    "manifestUrl": "https://developer.api.autodesk.com/construction/index/v2/pro ... 46/indexes/qTmPiKJZ7siqxkTNpWGANw/manifest",  
    "fieldsUrl": "https://developer.api.autodesk.com/construction/index/v2/proje ... /indexes/qTmPiKJZ7siqxkTNpWGANw/fields",  
    "propertiesUrl": "https://developer.api.autodesk.com/construction/index/v2/p ... 3c46/indexes/qTmPiKJZ7siqxkTNpWGANw/properties"  
}
```

Model Properties API の仕組み

Index ダウンロードのエンドポイント

	エンドポイント	
Index	POST	indexes:batch-status
	GET	indexes/:indexId
	GET	indexes/:indexId/manifest 
Query	GET	indexes/:indexId/fields 
	GET	indexes/:indexId/properties 
	POST	indexes/:indexId/queries
Query	GET	indexes/:indexId/queries/:queryId
	GET	indexes/:indexId/queries/:queryId/properties 

- (オプショナル) ダウンロード
 - manifest
 - fields
 - Properties

```
"schema": "2.0.0",
"projectId": "f83cef12-deef-4771-9feb-4f85643e3c46",
"status": "Succeeded",
"createdAt": "2021-07-23T08:56:07.0868303+00:00",
"seedFiles": [
  {
    "lineageId": "a19f7db",
    "lineageUrn": "urn:adsk.wipprod:dm.lineage:DyTwutcvTcOLUNUARxcTzQ",
    "versionUrn": "urn:adsk.wipprod:fs.file:vf.DyTwutcvTcOLUNUARxcTzQ?version=4",
    "databases": [
      {
        "id": "3747dccf",
        "offsets": "urn:adsk.viewing:fs.file:dXJuOmFkc2sud2l...yc2lzbj04/output/Resource/objects_offs.json.gz",
        "attributes": "urn:adsk.viewing:fs.file:dXJuOmFkc2s...dmVyc2lzbj04/output/Resource/objects_attrs.json.gz",
        "values": "urn:adsk.viewing:fs.file:dXJuOmFkc2sud2l...c2lzbj04/output/Resource/objects_vals.json.gz",
        "mapping": "urn:adsk.viewing:fs.file:dXJuOmFkc2sud2l...yc2lzbj04/output/Resource/objects_avs.json.gz",
        "ids": "urn:adsk.viewing:fs.file:dXJuOmFkc2sud2lwchJ...vbj04/output/Resource/objects_ids.json.gz"
      }
    ],
    "views": [
      {
        "id": "e7fd9d5",
        "urn": "urn:adsk.wipprod:fs.file:vf.DyTwutcvTcOLUNUARxcTzQ?version=4",
        "is3d": true,
        "viewableName": "{3D}",
        "viewableId": "0935d8b2-149b-4a0d-b816-863f0d595a20-000bcd64",
        "viewableGuid": "00cd2da3-fbfa-44a9-7a33-cad0bc4720cb"
      },
      {
        "id": "12fc372",
        "urn": "urn:adsk.wipprod:fs.file:vf.DyTwutcvTcOLUNUARxcTzQ?version=4",
        "is3d": true,
        "viewableName": "New Construction",
        "viewableId": "c884ae1b-61e7-4f9d-0001-719e20b22d0b-00120bb2",
        "viewableGuid": "4a966c2a-ead6-65c3-4f98-273dd7543047"
      }
    ]
  },
  "errors": [],
  "stats": {
    "objects": 33097,
    "contentLength": 1881318
  }
}
```

Lineage と Version

Manifest (.json)

SVF2 Prop DB リソース URNs

Viewables

Index のバイトサイズ と行数

Index Fields (json.gz)

```
{"key": "p153cb174", "category": "__name__", "type": "String", "name": "name", "uom": null}
{"key": "p74a9a490", "category": "__document__", "type": "String", "name": "schema_name", "uom": null}
{"key": "p137c14f2", "category": "__document__", "type": "String", "name": "schema_version", "uom": null}
{"key": "p1490bcea", "category": "__document__", "type": "Boolean", "name": "is_doc_property", "uom": null}
{"key": "p5eddc473", "category": "__category__", "type": "String", "name": "Category", "uom": null}
{"key": "p00723fa6", "category": "Identity Data", "type": "String", "name": "Design Option", "uom": null}
{"key": "pe8094f29", "category": "Other", "type": "String", "name": "Project Issue Date", "uom": null}
{"key": "p50756a0d", "category": "Other", "type": "String", "name": "Client Name", "uom": null}
{"key": "p32791eb0", "category": "Other", "type": "String", "name": "Project Address", "uom": null}
{"key": "pbf75ced9", "category": "Other", "type": "String", "name": "Project Name", "uom": null}
{"key": "p8213f1ad", "category": "Other", "type": "String", "name": "Project Number", "uom": null}
{"key": "pa7275c45", "category": "__categoryId__", "type": "Integer", "name": "CategoryId", "uom": null}
{"key": "p93e93af5", "category": "parent", "tvne": "DhKev", "name": "parent", "uom": null}
{"key": "p1d45bc4f", "category": "Dimensions", "type": "Double", "name": "Computation Height", "uom": "ft"}
{"key": "pe01bd7ef", "category": "Extents", "type": "String", "name": "Scope Box", "uom": null}
{"key": "p9ffb245", "category": "Materials and Finishes", "type": "Integer", "name": "Color", "uom": null}
{"key": "p1b3b6224", "category": "Materials and Finishes", "type": "String", "name": "Transparency", "uom": null}
{"key": "pd9fcab30", "category": "Materials and Finishes", "type": "Boolean", "name": "Glow", "uom": null}
{"key": "pf62e5a3c", "category": "Structural", "type": "Double", "name": "Structural Framing Length Roundoff", "uom": "ft"}
```

フィールドキー →
SQL カラム名

カテゴリ

型

名前

UOM
(Unit of Measurement)

Basic Properties (json.gz)

```
{  
    "svf2Id": 68,  
    "lineageId": "a19f7db",  
    "externalId": "b5c4b31f-321a-418d-a61a-0c8e326aa154-0003f740",  
    "lmvId": 2388,  
    "databaseId": "3747dccf",  
    "props": {  
        "p00723fa6": "Main Model",  
        "p13b6b3a0": "HSS7X7X.250",  
        "p153cb174": "HSS-Hollow Structural Section-Column [259904]",  
        "p188478f2": 0.485383241976329e0,  
        "p20d8441e": "Structural Columns",  
        "p30db51f9": "HSS-Hollow Structural Section-Column",  
        "p5eddc473": "Revit Structural Columns",  
        "p63ed81bb": "Superstructure",  
        "p6637df3c": "Metal - Steel - ASTM A500 - Grade B - Rectangular and Square",  
        "pbafde721": "BEARING",  
        ...  
        "pddd761c6": "FOUNDATION PLAN",  
        "pe61a57c3": 0e0,  
        "pee815a7f": "None",  
        "pef87fde6": 0e0,  
        "pf4ca6ab": 583333333333334e-16,  
    },  
    "propsHash": "bcde34b3",  
    "propsIgnored": {  
        "p6a81eafd": 2386,  
        "p93e93af5": 2387  
    },  
    "geomHash": "TCC2Cc9tv04EVazM7308BQ",  
    "bboxMin": {  
        "x": -1413565004170512e-13,  
        "y": -5410244931321833e-14,  
        "z": 10000000002097008e-14  
    },  
    "bboxMax": {  
        "x": -14063352214982766e-14,  
        "y": -53379471045994805e-15,  
        "z": 1101965298365471e-14  
    },  
    "views": [  
        "e7fd9d5",  
        "12fc372"  
    ]  
}
```

Object ID, Index manifest JSONのキー
(diff Index の場合は Type と ChangeType)

インデックス フィールド プロパティの値

プロパティのハッシュ値 + ハッシュを計算するときに無視するプロパティ

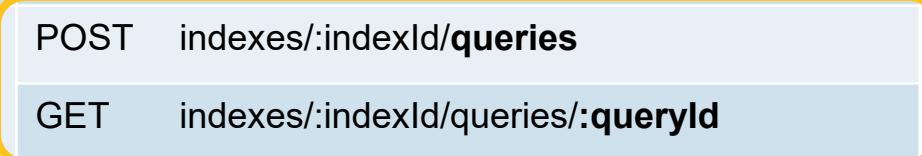
SVF2 ジオメトリハッシュ

Viewable オブジェクトのバウンディングボックス
min/max

オブジェクトを含む Viewables
(Viewables の manifest キー)

Model Properties API の仕組み

クエリのエンドポイント

	エンドポイント	
Index	POST	indexes:batch-status
	GET	indexes/:indexId
	GET	indexes/:indexId/manifest 
	GET	indexes/:indexId/fields 
	GET	indexes/:indexId/properties 
Query	POST	indexes/:indexId/queries
	GET	indexes/:indexId/queries/:queryId 
	GET	indexes/:indexId/queries/:queryId/properties 

- クエリのビルトと実行
 - インデックスクエリは、カスタム JSONスキーマで記述。(AWS S3 Select文のフィルタ式に変換されます)
 - カラムを制限することができます。(別のヘッダーを持つ)エイリアスの使用も可能。
- 進捗状況のポーリング
 - state: PROCESSING, FINISHED, FAILED

```
// Forge viewer element display name field
{"key":"p153cb174","category":"__name__","type":"String","name":"name","uom":null}
// Revit category name field
{"key":"p20d8441e","category":"__category__","type":"String","name":"_RC","uom":null}
// Revit family name field
{"key":"p30db51f9","category":"__category__","type":"String","name":"_RFN","uom":null}
// Revit type name field
{"key":"p13b6b3a0","category":"__category__","type":"String","name":"_RFT","uom":null}
```

Index Fields

クエリ

```
{
  "query": {
    "$and": [
      { "$notnull": "s.props.p20d8441e" },
      { "$notnull": "s.props.p30db51f9" },
      { "$notnull": "s.props.p13b6b3a0" },
      { "$gt": [{ "$count": "s.views" }, 0] }
    ]
  },
  "columns": {
    "svf2Id": true,
    "lmvName": "s.props.p153cb174",
    "revitCategory": "s.props.p20d8441e",
    "revitFamily": "s.props.p30db51f9",
    "revitType": "s.props.p13b6b3a0",
    "s.views": true
  }
}
```

Revit の分類を示す Row

0 以上のビュー配列

エイリアスを定義したカラム

クエリのサンプル:
Revit の分類をカスタムの
カラムで取得

対応する S3 SQL

```
select
  s.svf2Id,
  s.props.p153cb174 as lmvName,
  s.props.p20d8441e as revitCategory,
  s.props.p30db51f9 as revitFamily,
  s.props.p13b6b3a0 as revitType,
  s.views
from S3Object[*] s
where
  s.props.p20d8441e is not null and
  s.props.p30db51f9 is not null and
  s.props.p13b6b3a0 is not null and
  count(s.views) > 0
```

Model Properties API の仕組み

クエリの結果をダウンロードするエンドポイント

		エンドポイント
Index	POST	indexes:batch-status
	GET	indexes/:indexId
	GET	indexes/:indexId/manifest 
	GET	indexes/:indexId/fields 
	GET	indexes/:indexId/properties 
Query	POST	indexes/:indexId/queries
	GET	indexes/:indexId/queries/:queryId
	GET	indexes/:indexId/queries/:queryId/properties 

- クエリの結果をダウンロード
 - クエリのリクエスト時の queryResultsUrl、またはクエリID を使用して、送信されたクエリ式に一致するインデックス行をダウンロードします。
 - 結果: 改行区切りの NDJSON
 - プロパティインデックス行のサブセット
 - フォーマットは、先に見たプロパティと全く同じです。

Model Properties API の仕組み

Diff エンドポイント

エンドポイント	
Diff	POST diffs:batch-status
	GET diffs/:diffId
	GET diffs/:diffId/manifest 
	GET diffs/:diffId/fields 
	GET diffs/:diffId/properties 
Query	POST diffs/:diffId/queries
	GET diffs/:diffId/queries/:queryId
	GET diffs/:diffId/queries/:queryId/properties 

- Diff – Index 作成と同じ手順

- 比較する2つのバージョンの URN を指定:

```
{  
  "diffs": [  
    {  
      "prevVersionUrn": "urn:adsk.w...  
      "curVersionUrn": "urn:adsk.w..."  
    }  
  ]  
}
```

- stats: add, removed, modified

```
{  
    "type": "OBJECT_CHANGED",  
    "svf2Id": 160,  
    "externalId": "552d2a83-4642-4d5c-8e7f-5de799129097-000d047a",  
    "lmvId": 2699,  
    "lineageId": "2b856593",  
    "databaseId": "3d0bd846",  
    "props": {  
        "p002932a2": 0.0,  
        "p01bbdcf2": "Arch-FIRST FLOOR",  
        ...  
    },  
    "views": [  
        "f109b687",  
        "f24d458"  
    ],  
    "prev": {  
        "lmvId": 2699,  
        "lineageId": "b28c3429",  
        "databaseId": "936acb06",  
        "props": {  
            "p1b2aab1": 10.5  
        },  
        "propsHash": "ad9828df",  
        "propsIgnored": {  
            "p6a81eafdf": 2545,  
            "p93e93af5": 2546  
        },  
        "geomHash": "4s1yfJZdOhnBu2DdFL4HEw",  
        "bboxMin": {  
            "x": -1413565004170512e-13,  
            "y": -5410244931321833e-14,  
            "z": 10000000002097008e-14  
        },  
        "bboxMax": {  
            "x": -14063352214982766e-14,  
            "y": -53379471045994805e-15,  
            "z": 11101965298365471e-14  
        },  
        "views": [  
            "f109b687",  
            "8e525582"  
        ]  
    }  
}
```

Diff のインデックスかどうか判別する Type

現在のインデックス行に保持されている
前 (prev) のオブジェクト。
Lineage のマニフェストキーと Viewable ID。

現在の値と異なる値を持つプロパティキー
の配列

以前のバウンディングボックス、ハッシュ、
マニフェストの Viewable キー

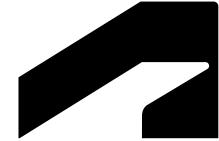
Basic インデックス行 vs. Diff インデックス行

インデックス行に含まれるフィールドの一覧

説明	現在のバージョン	前のバージョン
IDs	s.svf2Id s.externalId	
Change type, previous vs. current		s.type s.changeType
lineage version info, SVF2 database URNs	s.lmvId s.lineageId s.databaseId	s.prev.lmvId s.prev.lineageId s.prev.databaseId
Property values	s.props.* s.propsHash s.propsIgnored.*	s.prev.props.* s.prev.propsHash s.prev.propsIgnored.*
Geometry hash and bounding box values IF viewable	s.geomHash s.bboxMin.x s.bboxMin.y s.bboxMin.z s.bboxMax.x s.bboxMax.y s.bboxMax.z	s.prev.geomHash s.prev.bboxMin.x s.prev.bboxMin.y s.prev.bboxMin.z s.prev.bboxMax.x s.prev.bboxMax.y s.prev.bboxMax.z
Viewable keys IF viewable	s.views s.views[i]	s.prev.views s.prev.views[i]

JSON 抽象構文木 → S3 Select(AWS)

\$not	\$like	\$cat	\$char_length
\$and	\$between	\$coalesce	\$lower
\$or	\$in	\$mod	\$upper
\$gt	\$contains	\$cast	\$count
\$lt	\$isnull	\$nullif	\$sum
\$eq	\$notnull	\$date_add	\$avg
\$le	\$add	\$date_diff	\$min
\$ge	\$sub	\$extract	\$max
	\$mul	\$substring	\$trim
	\$div	\$to_string	\$utcnow
		\$to_timestamp	\$case



開発者リソース

Model Properties API

開発者リソース

ドキュメンテーション

- フィールドガイド
 - [Introduction to Model Properties](#)
- Step-by-Step チュートリアル
 - [Index Querying](#)
 - [Tracking Changes](#)
 - [Query Language Reference](#)
- レファレンスガイド
 - [Index](#)
 - [Diff](#)

The screenshot shows the Autodesk Construction Cloud APIs Developer's Guide page. The left sidebar has a tree view of documentation sections. The 'Model Properties' section under the 'Field Guide' heading is highlighted with an orange box. The right main content area is titled 'Introduction to Model Properties' and 'Model Properties Service'. It explains that the service allows callers to build and query indexes from BIM models uploaded to Autodesk and BIM 360 Docs. It mentions that model indexes are built using PDB files extracted during SVF translation, and SVF2 IDs are added to these indexes. It also notes that for a property field to be available for indexing, it must be supported in the SVF translation process. The content continues with details about property data, index service features like triggering changes calculation, and diff index file type support. The 'Model Properties' section in the sidebar and its corresponding content in the main area are also highlighted with orange boxes.

Autodesk Construction Cloud APIs

Version 1

Developer's Guide

- Introduction
- Field Guide
 - Assets (beta)
 - Model Properties**
- Rate Limits and Quotas
- BIM 360 Compatibility

Step-by-Step Tutorials

- Getting Started
- Assets (beta)
- Forms
- RFIs (beta)
- Takeoff
- Model Properties**
 - Index Querying
 - Tracking Changes
 - Query Language Reference

API Reference

Documentation / Autodesk Construction Cloud APIs / Developer's Guide

Introduction to Model Properties

Model Properties Service

The model properties service allows callers to build and query indexes built from the BIM models uploaded to Autodesk and BIM 360 Docs. These are the properties that can be displayed in the Forge viewer. Model indexes are built using the PDB (Property Database) files extracted as part of the SVF translation process. SVF2 viewable IDs are then added to these indexes from the SVF2 files. For a property field to be available for indexing, it must be supported in the SVF translation process. To maintain backwards compatibility with existing Forge viewer applications, the index rows generated contain both the SVF object IDs (lmvid) along with the newer SVF2 object IDs (svf2id).

In addition to property data, the indexes built by the service contain the identities and coordinates for objects that are viewable via the Forge viewer, allowing callers to view the results of queries. The API also allows users to trigger the service to calculate changes (diffs) that have occurred between consecutive versions of a model. To calculate a diff, callers specify a previous and current version, and the service compares these versions, computing changes to their property values and box geometry.

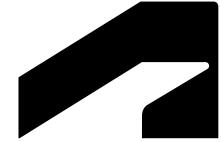
Diff index file type support

Unlike basic property indexing, which only depends on SVF translation, diff indexing depends on stability. In order for the model properties service to compare instances of the same design between consecutive versions of a file, the IDs of these elements must be the same. If the ID of a specific element changes between consecutive versions of the file, the ID is said to be unstable and will cause diff comparisons by the model properties service.

The file types supported by the index service for diff comparisons currently include 3D RVT files, NWC files exported from Revit and AutoCAD verticals, IFC files exported from AutoCAD architecture 2018 and onwards, ARCHICAD, Revit, MagiCAD for Revit, and Tekla Structures.

開発者リソース

- GitHub コードサンプル
 - [Postman Collection](#) (3つの Step-by-Step チュートリアルに対応)
 - [Model Properties API Walkthrough in PowerShell Core](#) (クエリ言語の理解)
 - [Element Filtering and Partial Model Load](#) (Viewer 統合)
 - [Compare Two Versions](#) (Viewer 統合)
- ブログ記事
 - “BIM 360/ACC Model Properties API”
<https://forge.autodesk.com/blog/bim-360acc-model-properties-api>
 - キーワード “Model Properties” でページ内検索
<https://forge.autodesk.com/blog/model-properties-api-vs-model-derivative-api>



Data Connector API

Data Connector API

- Insight モジュール、アカウントレベル
- データのダンプが可能。
- パブリック (2021年1月~)
- API 自体は B360/ACC 互換
- データは製品によって異なります。
- Tip: Executive Overview permission
- プロジェクトレベル(Project Admin)



schemas
admin_account_services.csv
admin_accounts.csv
admin_business_units.csv
admin_companies.csv
admin_project_companies.csv
admin_project_roles.csv
admin_project_services.csv
admin_project_user_companies.csv
admin_project_user_roles.csv
admin_project_user_services.csv

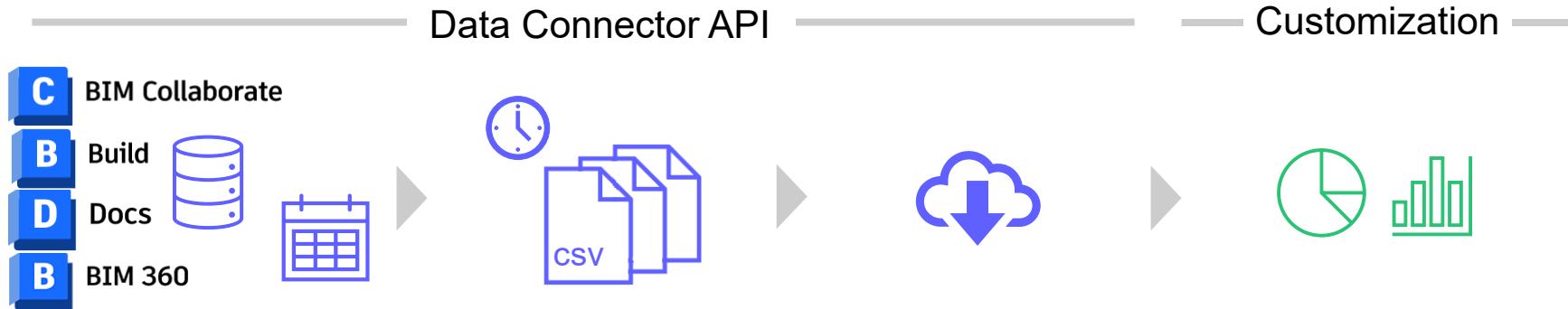
assets_asset_custom_attribute_values.csv
assets_asset_permissions.csv
assets_asset_statuses.csv
assets_assets.csv
assets_categories.csv
assets_category_custom_attribute_assignments.csv
assets_category_status_set_assignments.csv
assets_custom_attribute_default_values.csv
assets_custom_attribute_selection_values.csv
assets_custom_attributes.csv
assets_status_sets.csv

The screenshot shows the Autodesk Construction Cloud Data Connector interface. On the left, there's a sidebar with 'EXECUTIVE OVERVIEW' sections for Cost, Design, Quality, and Safety, and a 'Data Connector' section which is currently selected. The main area displays a card for a 'Data Connector' named 'Data Connector'. Below the card, it says 'Processing...' and shows a timestamp of 'May 22, 2022 4:19 PM'. A large orange circle highlights the 'Processing...' status. At the bottom right of the card, there are 'Download' and 'Schedule' buttons.

checklists_checklist_items.csv
checklists_checklist_items_answers.csv
checklists_checklist_section_assignees.csv
checklists_checklist_sections.csv
checklists_checklist_signatures.csv
checklists_checklists.csv
checklists_template_item_instructions.csv
checklists_template_items.csv
checklists_template_items_answers.csv
checklists_template_sections.csv
checklists_template_signatures.csv

This screenshot shows the same Autodesk Construction Cloud Data Connector interface, but the extraction has completed. The card now shows 'Download' instead of 'Processing...', and the timestamp is updated to 'May 22, 2022 4:22 PM'. A large orange circle highlights the 'Download' button at the bottom right.

基本的なワークフロー



データ抽出をリクエストします。
スケジュール: ワンタイム、毎日、
毎週、毎月、毎年。サービスを
選びます(admin, issues など)

スケジュールされた時刻に
ジョブが実行されます。
ステータスの確認とジョブID
の取得ができます。データは
30日間保存されます。

抽出したデータ(CSV)
をダウンロードします。
全部でも一部でも可。

任意のアプリケーション
でデータを利用します。

Data Connector API の仕組み

エンドポイント	
Requests	POST requests
	GET requests
	GET requests/:requestId
	PATCH requests/:requestId
	DELETE requests/:requestId
Jobs	GET requests/:requestId/jobs
	GET jobs/
	GET jobs/:jobId
	DELETE jobs/:jobId
Data	GET jobs/:jobId/data-listing
	GET jobs/:jobId/data/:name 

- 11 のエンドポイント

Data Connector API の仕組み

エンドポイント	
Requests	POST requests
	GET requests
	GET requests/:requestId
	PATCH requests/:requestId
	DELETE requests/:requestId
Jobs	GET requests/:requestId/jobs
	GET jobs/
	GET jobs/:jobId
	DELETE jobs/:jobId
Data	GET jobs/:jobId/data-listing
	GET jobs/:jobId/data/:name 

- データ抽出リクエストの作成
 - 認証されたユーザーのみ
 - 抽出のスケジュール
 - ワンタイム
 - インターバル - 毎日、毎週、毎月、毎年
 - サービスグループ
 - admin, assets, checklists, cost, daily logs, issues, locations, meeting minutes, relationships, rfis, submittals, ...
 - さらにサービスが追加されています。
 - (オプショナル) Callback URL - ジョブが実行された際に呼び出されます。

Data Connector API の仕組み

エンドポイント	
	POST requests
Requests	GET requests
	GET requests/:requestId
	PATCH requests/:requestId
	DELETE requests/:requestId
Jobs	GET requests/:requestId/jobs
	GET jobs/
	GET jobs/:jobId
	DELETE jobs/:jobId
Data	GET jobs/:jobId/data-listing
	GET jobs/:jobId/data/:name 

- データ抽出リクエストの情報を
Get/Update/Delete

Data Connector API の仕組み

エンドポイント	
Requests	POST requests
	GET requests
	GET requests/:requestId
	PATCH requests/:requestId
	DELETE requests/:requestId
Jobs	GET requests/:requestId/jobs
	GET jobs/  7/20 追加 !
	GET jobs/:jobId
	DELETE jobs/:jobId
Data	GET jobs/:jobId/ data-listing
	GET jobs/:jobId/ data/:name 

- 実行された抽出ジョブの情報の取得
 - status: queued, running, complete
 - completionStatus: success, failed, cancelled
- Delete

Data Connector API の仕組み

エンドポイント	
Requests	POST requests
	GET requests
	GET requests/:requestId
	PATCH requests/:requestId
	DELETE requests/:requestId
Jobs	GET requests/:requestId/jobs
	GET jobs/
	GET jobs/:jobId
	DELETE jobs/:jobId
Data	GET jobs/:jobId/ data-listing
	GET jobs/:jobId/ data/:name 

- 抽出したファイル名のリストを取得
 - README.html
 - autodesk_data_extract.zip
 - (全ファイルを .zip 圧縮、UI と同じ)
 - meta.csv – ジョブの日時とリージョン
 - .csv files
 - 各データに対して1つ以上のファイル
 - e.g., admin_companies.csv
 - Schema フォルダ内にスキーマファイル
- ダウンロード: GET signed URL

開発者リソース

Data Connector

■ ドキュメンテーション:

- [Field Guide](#)
- [Step-by-Step Tutorials](#)
- [Reference Guide](#)

■ GitHub コードサンプル:

- [Postman collection](#)
- [Export/create requests, get jobs, data and make dashboard](#)

■ Blog:

<https://forge.autodesk.com/blog/bim-360-data-connector-api-available-public-beta>

The screenshot shows a web browser displaying the Autodesk Data Connector API (beta) Field Guide. The page has a navigation bar at the top with links for Platform Vision, Solutions, Getting Started, Documentation, Community, and Support. Below the navigation bar, there's a breadcrumb trail: Documentation / BIM 360 API / Developer's Guide. The main content area is titled "Data Connector API (beta) Field Guide". On the left, there's a sidebar with a tree view of the field guide sections. The "Data Connector (beta)" section is highlighted with an orange box. The main content area contains a heading "Data Requests" and a bulleted list of requirements for using the Data Connector API. At the bottom, there's a paragraph about how the Data Connector service handles data requests.

This field guide describes the components of the BIM 360 Data Connector API and how they work together.

Data Requests

Using the Data Connector API starts with a data request. A request defines important information such as:

- The account in which to extract data
- One or more service groups for which to return data: currently admin (both account), checklists, daily logs, issues, locations, RFIs, and submittals
- A schedule to follow when extracting data: immediately and just once, or repeat weekly, monthly or yearly during a specified interval of time
- An optional callback URL that the Data Connector service calls whenever data is available

When the Data Connector service receives a data request, it stores the request where it can be retrieved later. It can also delete it later. The request remains in place even after all its specified data extraction has been completed. You can request a list of all currently stored requests that you have created, and look to see the status of each request, and look to see what data each request has returned.

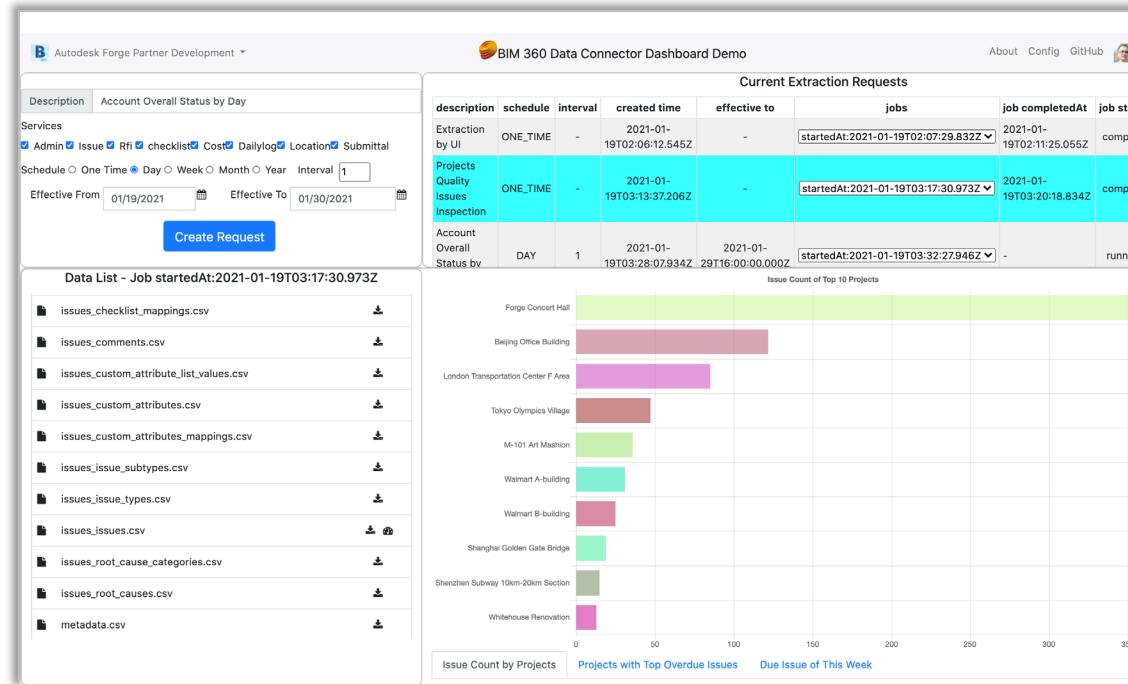
ダッシュボードサンプル

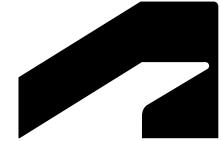
Data Connector

- 概要: スケジューリング（左上）、ジョブのリストアップ（右上）、指定したジョブの利用可能なデータのリストアップ（左下）、棒グラフでの指摘事項のカウント数の表示（右下）。

- ソースコード: GitHub サンプル
[Export/create requests, get jobs, data and make dashboard](#)

- 開発者: Xiaodong Liang,
Autodesk





今後の予定



今後の予定



Coming Soon

- Locations write
- Build: シート
- Cost Webhooks
- Forms 取得の改善点
(割り当てられた担当者の会社/役割をサポート)



デザインレビュー

- Docs: ファイル – pdf 書き出し (w/ マークアップ)
- Data Connector – プロジェクト レベルのアクセス
- AutoSpec (Pype)



高い優先度

- Admin - プロジェクトの作成、ユーザー・会社・役割の追加
 - テンプレート
 - 全てのサービスを有効化
- Issues – ベータ版からパブリックリリース



Thank you!



@autodeskforge



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