



FORGE - BIM 360 活用セミナー 2020

BIM 360 Docs と Forge からのデータ アクセス

伊勢崎俊明

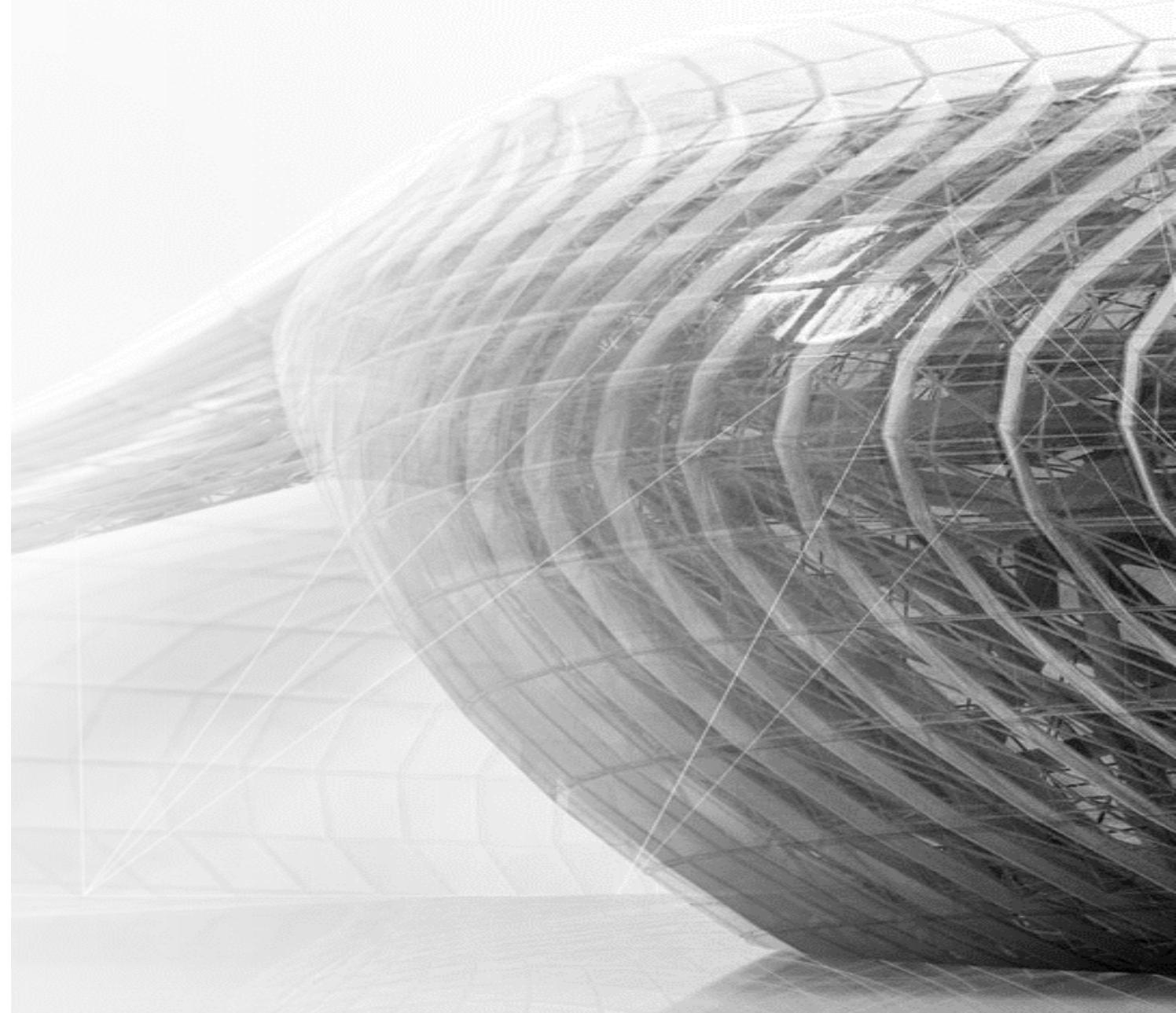
Developer Advocacy & Support



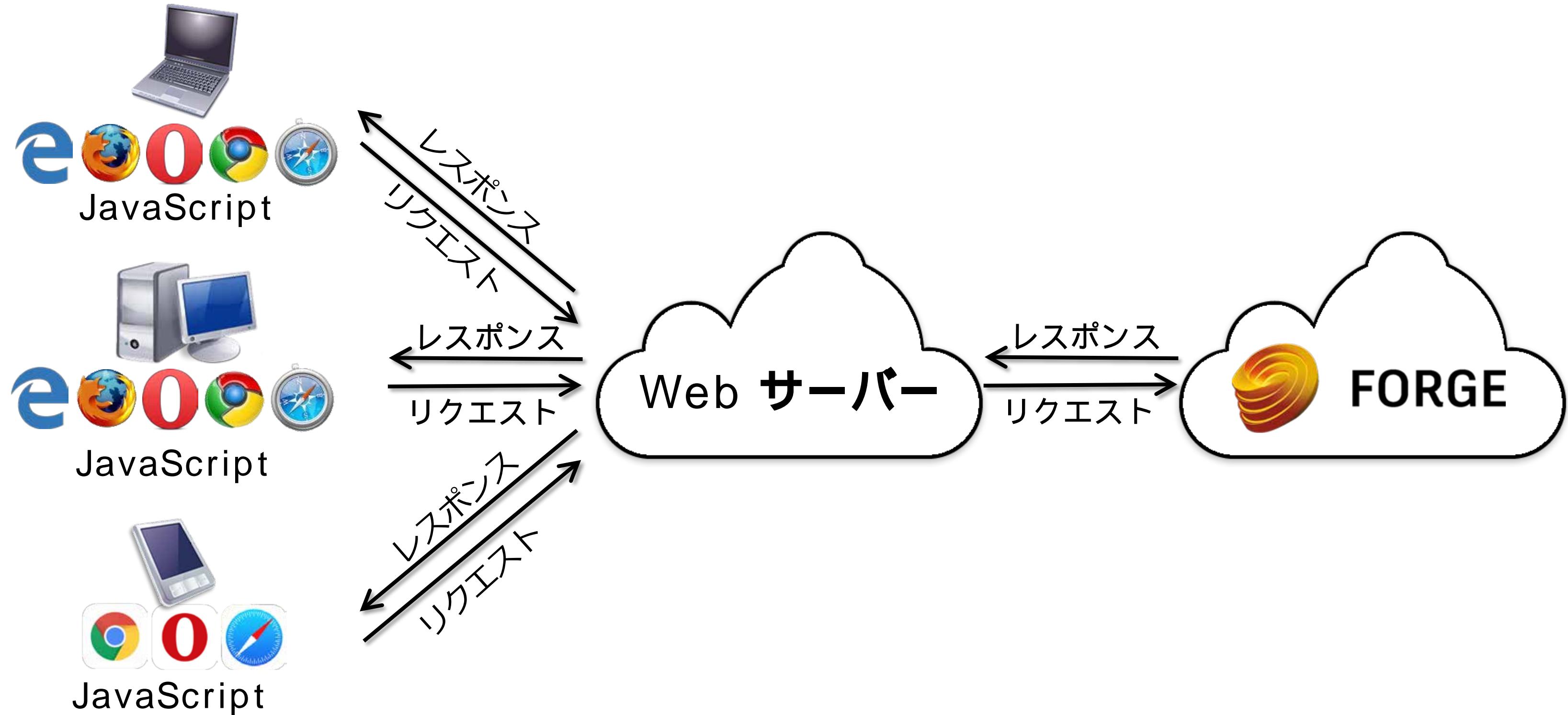
アジェンダ – ご紹介する内容

- § シナリオに沿った BIM 360 Docs アクセス
- § BIM 360 Docs アクセスの準備
- § BIM 360 Docs アクセスの実際

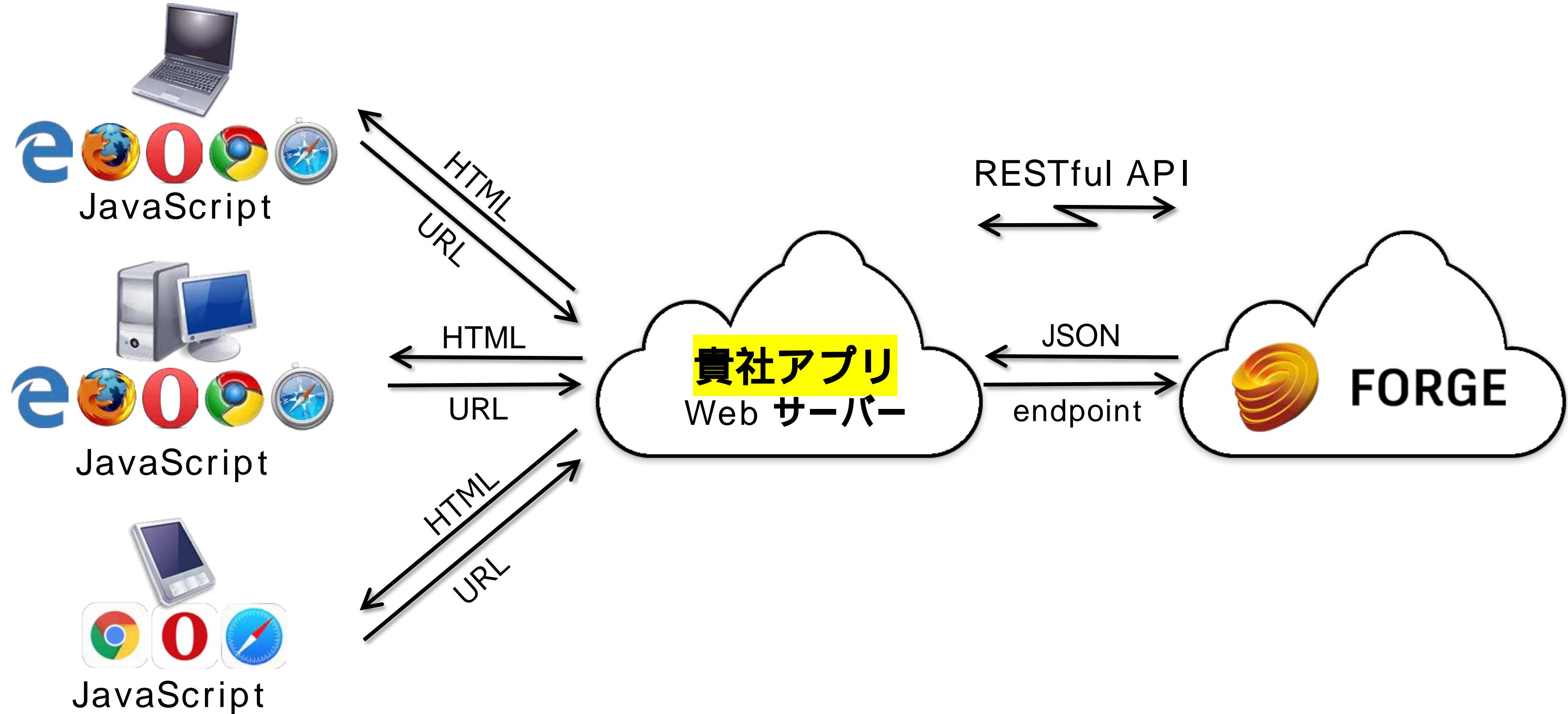
シナリオに沿った BIM 360 Docs アクセス



Web / クラウド アプリの仕組み



Web / クラウド アプリの仕組みと開発



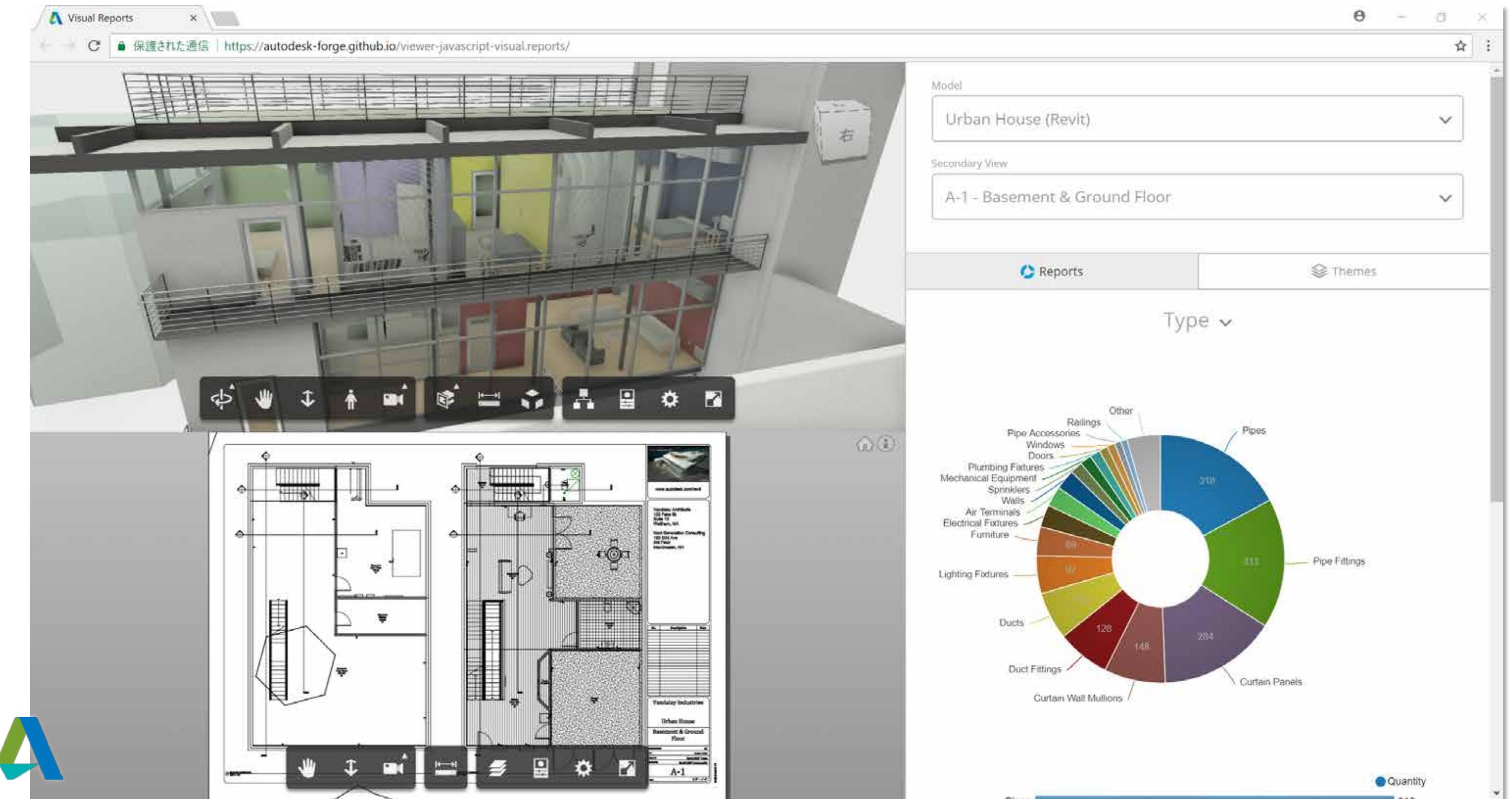
デベロッパキーとアクセストークン

Forge ポータル

(forge.autodesk.com)

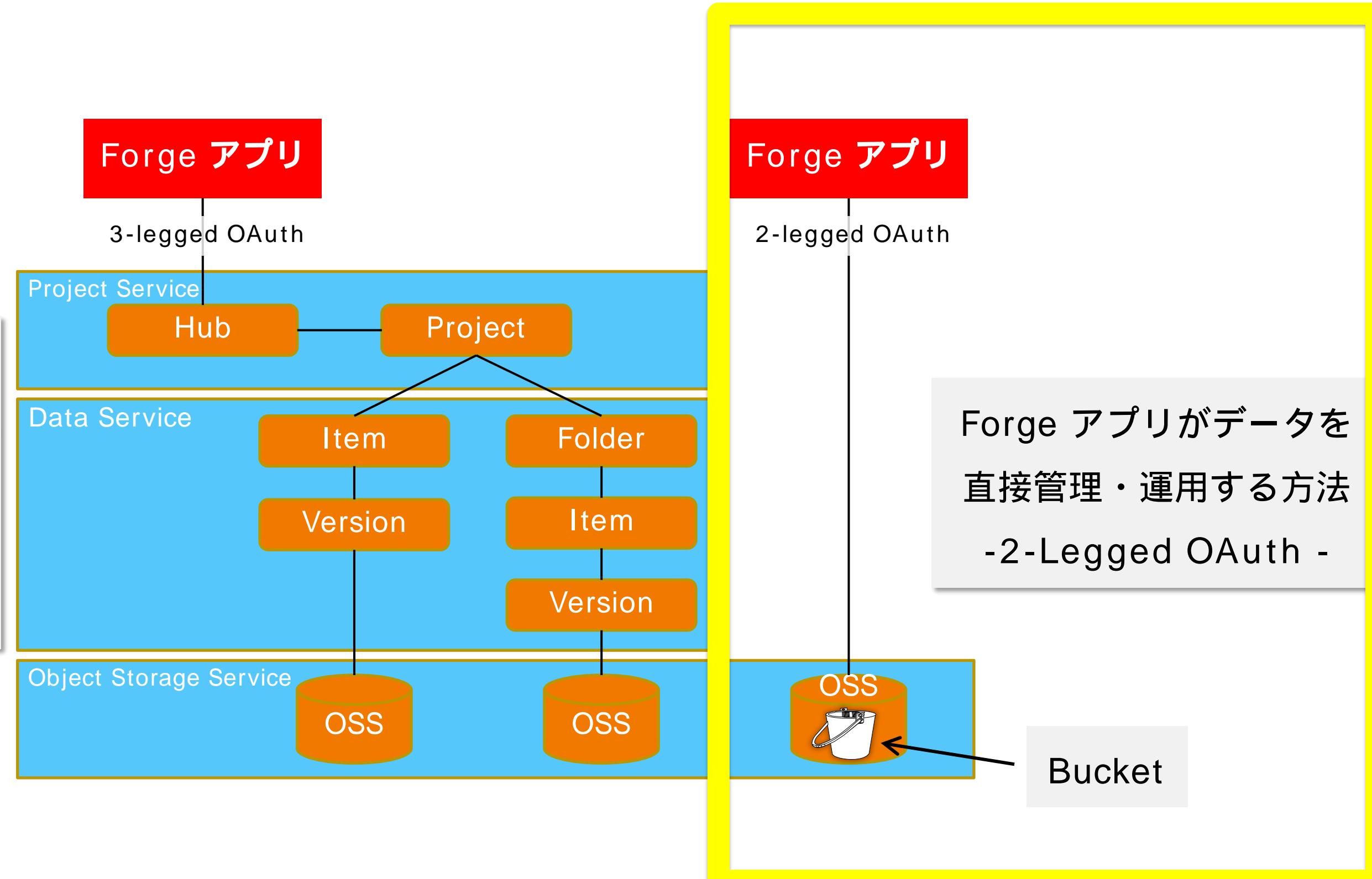


'BIM ダッシュボード' のデータは何处に?

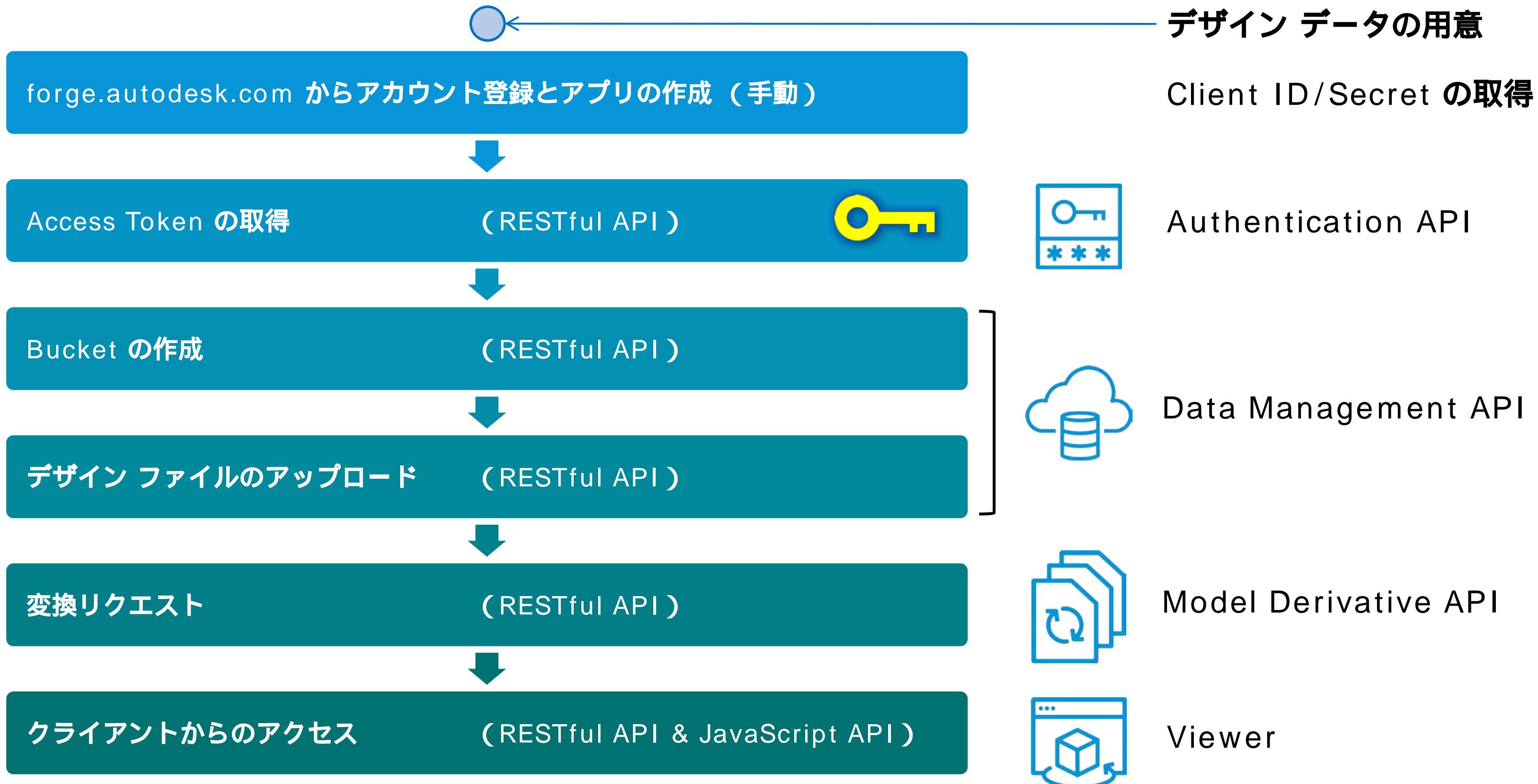


シナリオ / 目的に応じた認証

Forge アプリが A360/
Fusion Team/BIM 360 Docs
のユーザ データ領域に
アクセスして運用する方法
- 3-Legged OAuth -



2-legged OAuth



'BIM ダッシュボード' のデータは何处に?

The screenshot displays the Autodesk Visual Reports application window. On the left, a sidebar shows a file tree under 'Autodesk Forge Partner Development' with 'Forge Demo DevTech' selected. Inside 'Plans', there's a folder 'Office.rvt' with a sub-item 'v1: Oct 23, 2017, 8:07 am by Philippe Leefsma'. Below this are other sample projects like 'Pacific Center Hospital', 'Revit Basic Sample House', etc. The main area features a 3D isometric view of a building model with various components highlighted in green. Below it is a 2D floor plan viewer showing two levels, A-2 and 1st & 2nd Floor. To the right, there are two data visualization sections: a donut chart titled 'Object Type' showing the distribution of objects by type, and a bar chart titled 'Quantity' listing the count of various object types.

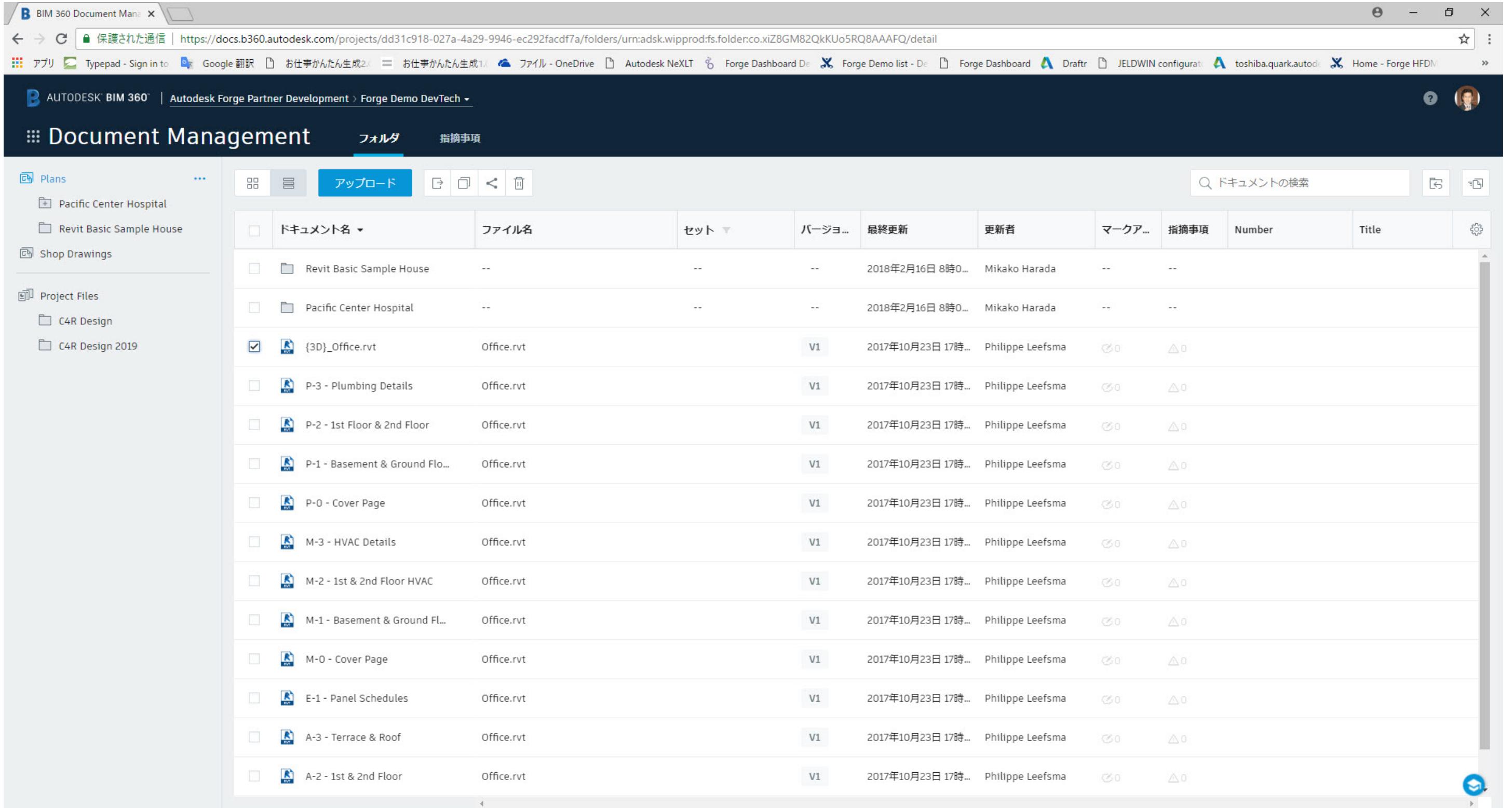
Object Type
Quantities in model (Object Type)

Object Type	Quantity
Pipes	26%
Pipe Fittings	26%
Curtain Wall Mullions	7%
Duct Fittings	6%
Ducts	6%
Air Terminals	4%
Electrical Fixtures	4%
Curtain Panels	4%
Furniture	4%
Lighting Fixtures	4%
Walls	3%
Mechanical Equipment	2%
Plumbing Fixtures	2%
Sprinklers	1%
Doors	1%
Windows	1%
Pipe Accessories	1%
Railings	1%
Generic Models	1%
Other	3%

Quantity

Object Type	Quantity
Pipes	634
Pipe Fittings	625
Duct Fittings	164
Curtain Wall Mullions	149
Ducts	139
Lighting Fixtures	104
Furniture	84
Curtain Panels	69
Electrical Fixtures	55
Air Terminals	52
Walls	49
Mechanical Equipment	35
Plumbing Fixtures	34
Sprinklers	32
Doors	23
Windows	19
Pipe Accessories	18
Railings	16
Generic Models	12
Floors	11
Columns	11
Electrical Equipment	10
Flex Ducts	9
Stairs	9

A360 Fusion Team BIM 360 Docs データにアクセスするには?

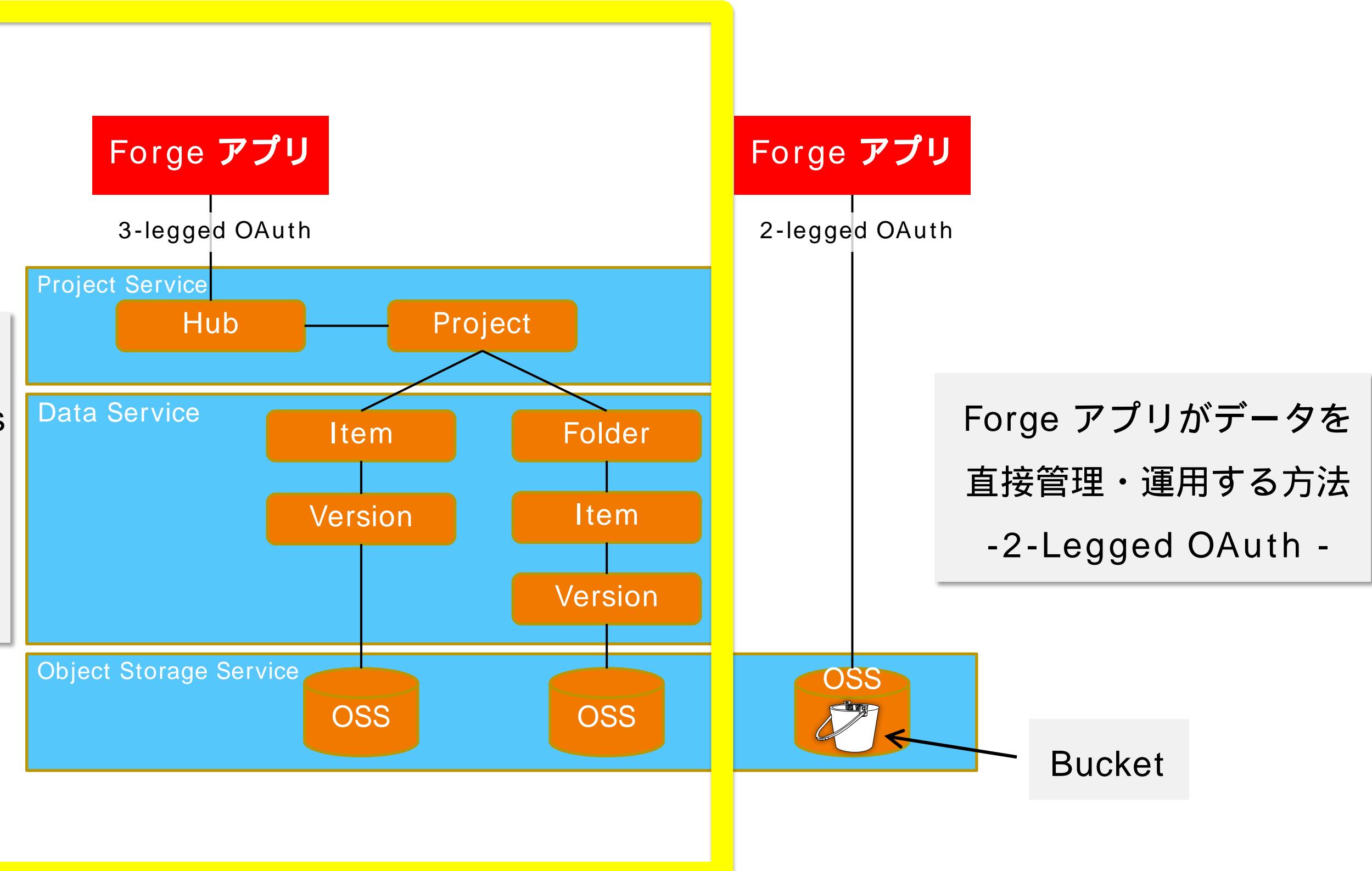


The screenshot shows the Autodesk BIM 360 Document Management interface. On the left, there's a sidebar with categories like 'Plans', 'Pacific Center Hospital', 'Revit Basic Sample House', 'Shop Drawings', 'Project Files', 'C4R Design', and 'C4R Design 2019'. The main area is titled 'Document Management' and contains a table with the following data:

ドキュメント名	ファイル名	セット	バージョン	最終更新	更新者	マークア...	指摘事項	Number	Title	操作
Revit Basic Sample House	--	--	--	2018年2月16日 8時0...	Mikako Harada	--	--			
Pacific Center Hospital	--	--	--	2018年2月16日 8時0...	Mikako Harada	--	--			
{3D}_Office.rvt	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				
P-3 - Plumbing Details	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				
P-2 - 1st Floor & 2nd Floor	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				
P-1 - Basement & Ground Flo...	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				
P-0 - Cover Page	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				
M-3 - HVAC Details	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				
M-2 - 1st & 2nd Floor HVAC	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				
M-1 - Basement & Ground Fl...	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				
M-0 - Cover Page	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				
E-1 - Panel Schedules	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				
A-3 - Terrace & Roof	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				
A-2 - 1st & 2nd Floor	Office.rvt	V1	2017年10月23日 17時...	Philippe Leefsma	0	△0				

シナリオ / 目的に応じた認証

Forge アプリが A360/
Fusion Team/BIM 360 Docs
のユーザ データ領域に
アクセスして運用する方法
- 3-Legged OAuth -



認証（Authentication）と認可（Authorization）

§ A360/Fusion Team/BIM 360 Docs 上のデータ

§ Autodesk ID でサインインした
エンドユーザのみがアクセス可能

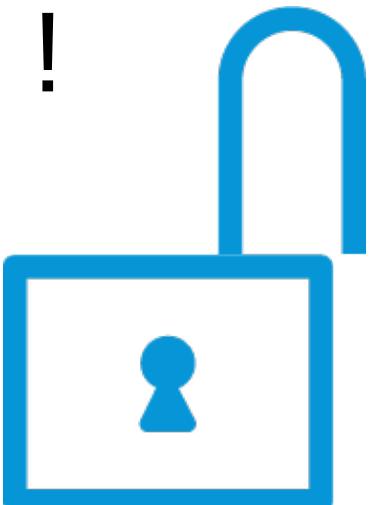


§ Forge アプリは通常アクセス不可

§ エンドユーザからの認可があればアクセスが可能に！

§ 3-legged OAuth の仕組みが認可プロセスを実現

§ Callback URL 実装を利用



Remember! - My Apps からのアプリ登録

The screenshot shows the Autodesk Forge 'My Apps' registration interface. At the top, there's a navigation bar with links for Success Stories, Solutions, Getting Started, Documentation, Community, Support, Pricing, and a user icon. Below the navigation, the page title is 'App information' with the subtitle 'Provide basic information about your app.' There are two input fields: 'App Name' and 'App description'. Further down, there's a 'Callback URL' field with the placeholder '(example) https://www.yoursite.com'. To the right of this field is a large yellow arrow pointing left, with the text 'Callback URL !!' overlaid in black. Below the callback URL field is another input field for 'Your Website URL' with a dropdown menu showing 'http://'. At the bottom right is a large orange 'CREATE APP >' button. The footer contains links for FOLLOW FORGE (Twitter, Facebook), SOLUTIONS (BIM 360, Data Management, Design Automation, Model Derivative), DOCUMENTATION (Authentication, BIM 360, Data Management, Design Automation), RESOURCES (Get Help, API Status, Blog, FAQ), and ABOUT (About Forge, Pricing, Success Stories, Partners).

AUTODESK[®]
FORGE

Success Stories Solutions ▾ Getting Started Documentation Community ▾ Support ▾ Pricing

App information
Provide basic information about your app.

App Name

App description
Provide a brief description of your app

Callback URL What is this ?
(example) https://www.yoursite.com

Your Website URL
http:// Your website URL (Optional)

CREATE APP >

FOLLOW FORGE

SOLUTIONS

DOCUMENTATION

RESOURCES

ABOUT

BIM 360

Data Management

Design Automation

Model Derivative

Authentication

BIM 360

Data Management

Design Automation

Get Help

API Status

Blog

FAQ

About Forge

Pricing

Success Stories

Partners

ローカル開発環境でのコールバック URL 指定例

The screenshot shows the Autodesk Forge developer portal interface. At the top, there's a navigation bar with links for Success Stories, Solutions, Getting Started, Documentation, Community, Support, and Pricing. On the far right of the navigation bar is a small Android icon.

The main content area is titled "APIs" and contains three cards representing different APIs:

- BIM 360 API (with a blue square icon containing a white letter B)
- Data Management API (with a blue cloud icon)
- Model Derivative API (with a blue document icon)

Below these cards, the section "App information" is displayed, indicating the app was created on 04 Jan 2019. It includes fields for Client ID (pbaf6dfHoYxaNv3OusvwueGty8haQygV4), Client Secret (a redacted string), App Name (Test App), Description (Test App for 3-legged OAuth), CallBack URL (<http://localhost:3000/callback>), and Your Website URL (<http://www.autodesk.co.jp>). A large yellow arrow points from the text "http://localhost:3000/callback" back to the "CallBack URL" input field. At the bottom right are "DELETE" and "EDIT" buttons.

Forge SDK (Node.js) を使ったコールバック実装例

```
var express = require("express");
var ForgeSDK = require('../src/index');
var app = express();

var CLIENT_ID = '<Your Client ID>', CLIENT_SECRET = '<Your Client Secret>';
var REDIRECT_URL = '<Your Callback URL>';

var autoRefresh = false;
var oAuth2ThreeLegged = new ForgeSDK.AuthClientThreeLegged(CLIENT_ID, CLIENT_SECRET,
    REDIRECT_URL, ['data:write', 'data:read'],
    autoRefresh);

app.get('/', function (req, res) {
  var url = oAuth2ThreeLegged.generateAuthUrl();
  res.redirect(url);
});

app.get('/callback', function (req, res) {
  var code = req.query.code;
  oAuth2ThreeLegged.getToken(code).then(function (credentials) {
    console.log("**** Got Credentials", credentials);
    res.header({'Content-Type': 'text/html; charset=utf-8'});
    res.header({'Access-Control-Allow-Origin': '*'});
    res.send(JSON.stringify(credentials));
  }, defaultHandleError);
});
```

エンドユーザ認可のプロセスとは?



Forge アプリにアクセスすると
当該ストレージの所有者である
エンドユーザにサインインを促す
ユーザ名(Autodesk ID)画面に遷移

同じくパスワード入力画面に遷移

サインインが完了した時点で
Forge アプリが指定した Scope に
沿って Forge アプリからのアクセス
を認可するか確認する画面に遷移

3-legged OAuth



デザイン データの用意

Client ID/Secret の取得

Authentication API



Data Management API



Model Derivative API
(変換が必要な場合)



Viewer



シナリオ / 目的に応じた認証

§ デザイン データの扱いに依存

 § アプリ用の共有ストレージにアクセス

 § Object Storage Service (OSS)

 § アプリは Forge からの認証を得ればアクセス可能

 § 2-legged OAuth

 § オートデスク クラウドのユーザストレージ領域にアクセス

 § A360 Team、Fusion Team、BIM 360 Docs

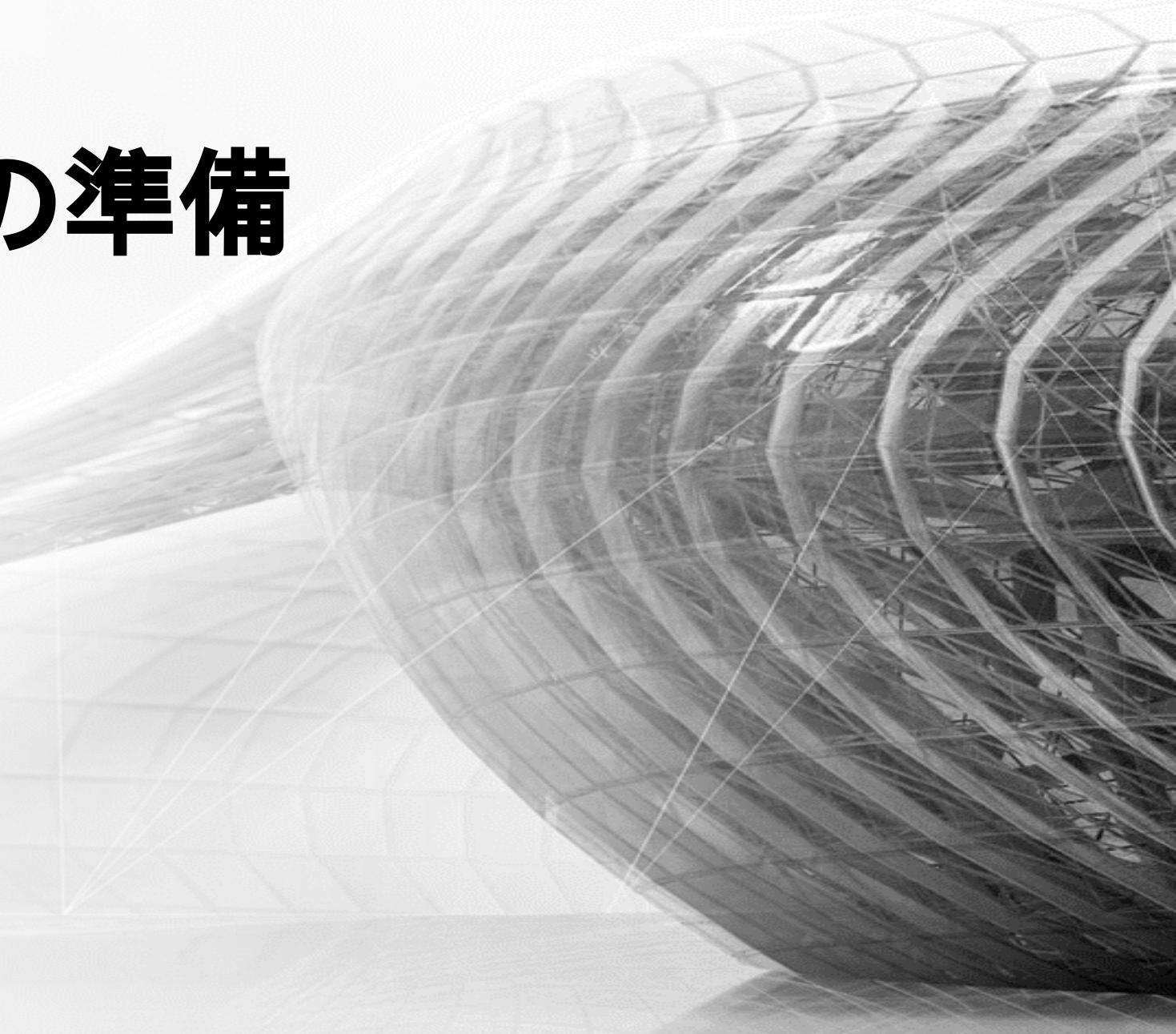
 § ユーザ アカウントのみがアクセス出来る領域

 § アプリは、ユーザにアクセス許可(認可)を得た後に Forge が認証

 § 3-legged OAuth

§ 認可後に Access Token (アクセス トークン) を発行 

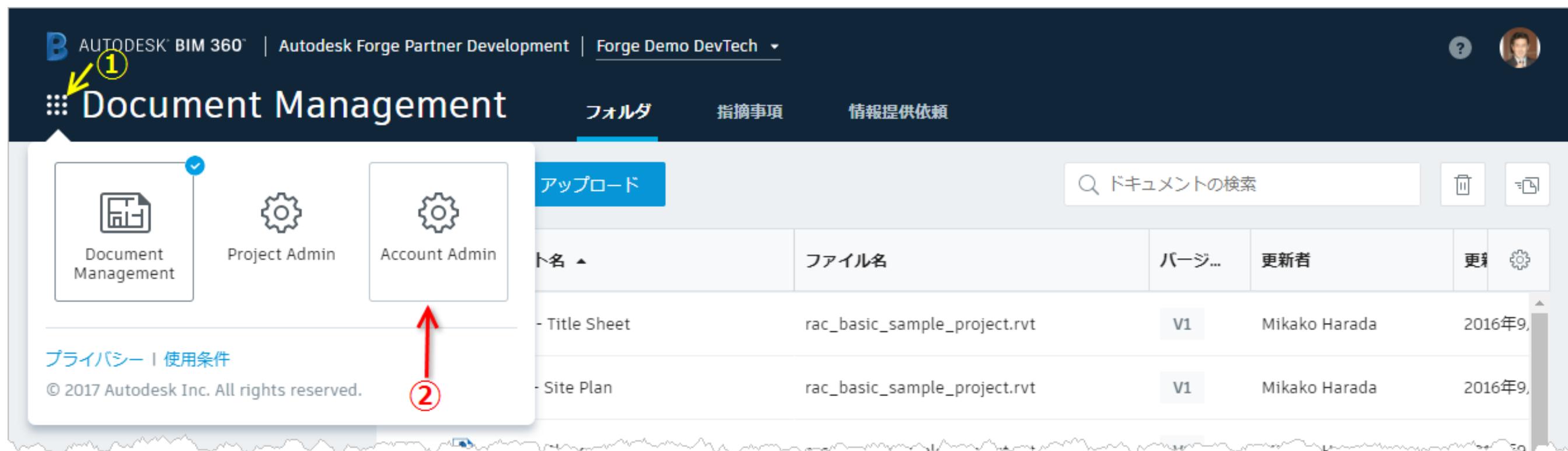
BIM 360 Docs アクセスの準備



BIM 360 Docs アクセスの追加手順 ~ その 1

§ BIM 360 Docs 固有の追加設定が必要

§ A360/Fusion Team ストレージアクセスは不要



BIM 360 Docs アクセスの追加手順 ~ その 2

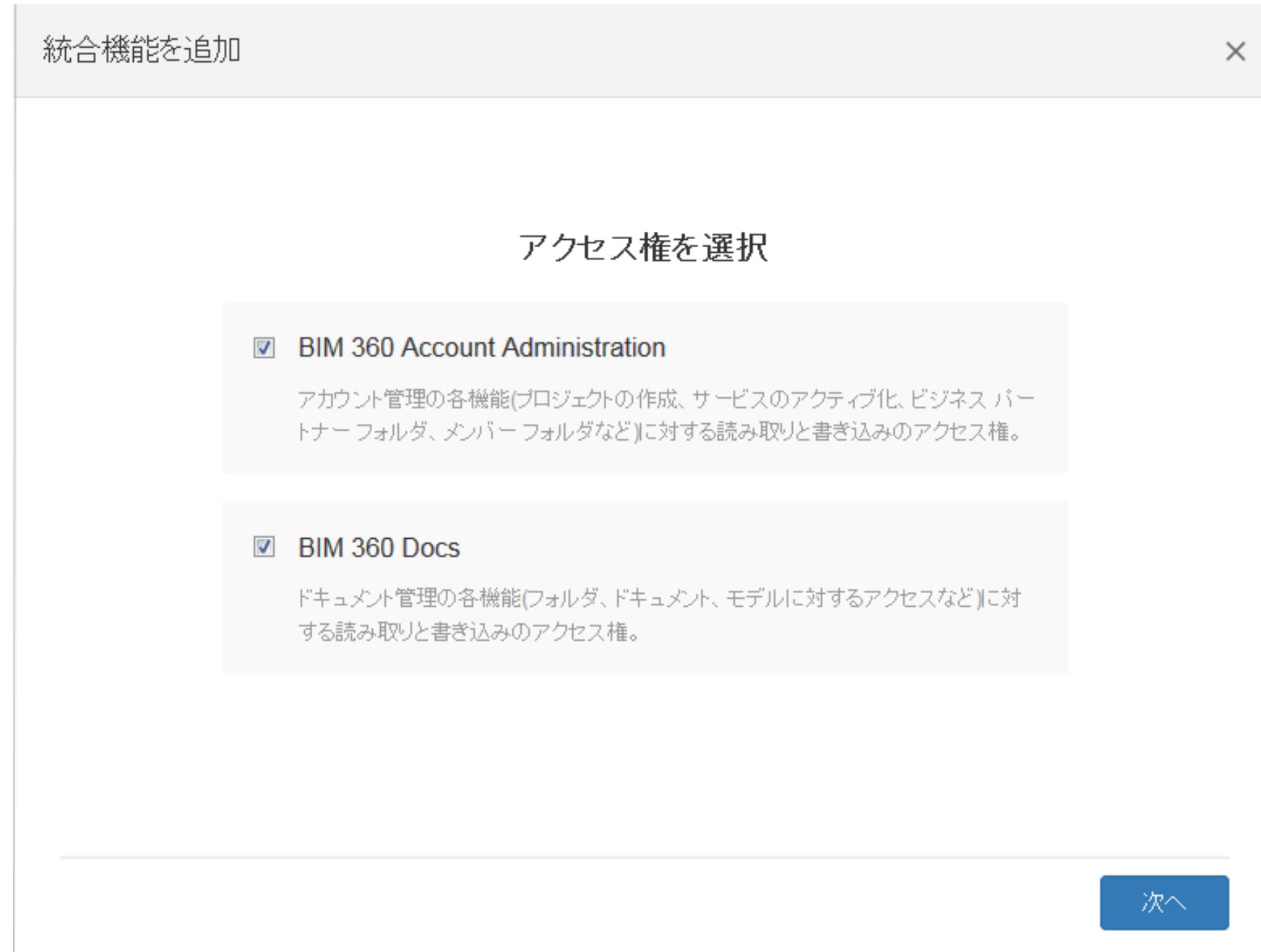
The screenshot shows the Autodesk BIM 360 Docs Account Manager interface. The top navigation bar includes links for Project, Member, Company, Analysis, Settings (which is underlined and highlighted with a yellow arrow labeled ①), and Apps. Below the navigation is a horizontal menu with Profile, Business Unit, Custom Integration Functions (highlighted with a red arrow labeled ②), and Manager's Activities.

The main content area features the Autodesk Forge logo and a section about account-level API details. A blue button at the bottom left is labeled "Custom Integration Functions Add".

Three numbered arrows point to specific elements:

- Yellow arrow pointing to the "Settings" link in the top navigation bar.
- Red arrow pointing to the "Custom Integration Functions" link in the horizontal menu.
- Red arrow pointing to the "Custom Integration Functions Add" button at the bottom left.

BIM 360 Docs アクセスの追加手順 ~ その 3



BIM 360 Docs アクセスの追加手順 ~ その 4



BIM 360 Docs アクセスの追加手順 ~ その 5

統合機能を追加

必要な BIM 360 情報

アプリから BIM 360 API にアクセスするときには、BIM 360 アカウント ID を入力する必要があります。
続行する前に、必ず BIM 360 アカウント ID 情報を記録用に保存しておいてください。

BIM 360 アカウント ID

a4f95080-84fe-4281-8d0a-bd8c885695e0

アカウント ID 情報を安全な場所に保存しました。

アプリの情報を入力

* Forge クライアント ID

Forge クライアント ID

Client ID
Forge ポータルで取得済で BIM 360 API で使用する ID

アプリのロゴ

アップロード画像を選択
JPEG、GIF、PNG、または
BMP ファイル(400 x 200 ピクセル、最大 4 MB)

* アプリ名
アプリ名

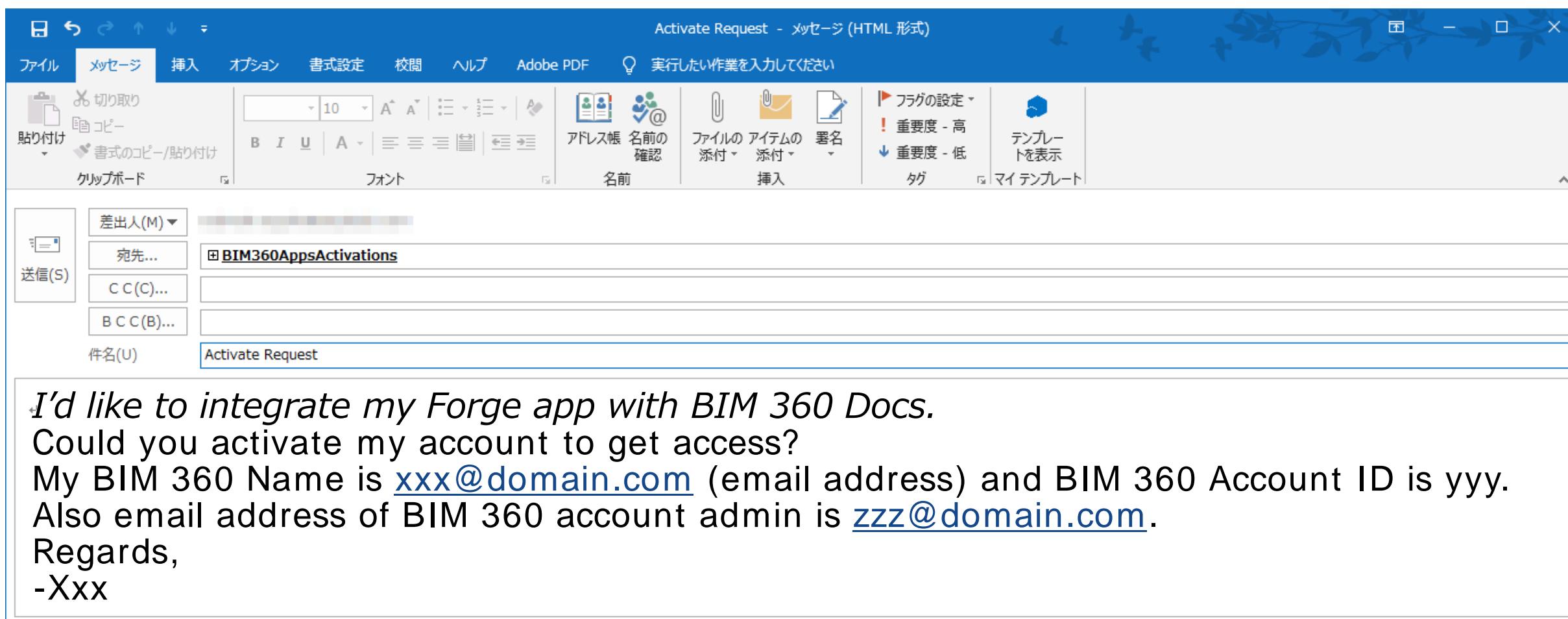
アプリの説明

BIM 360 Docs アクセスの追加手順 ~ その 6

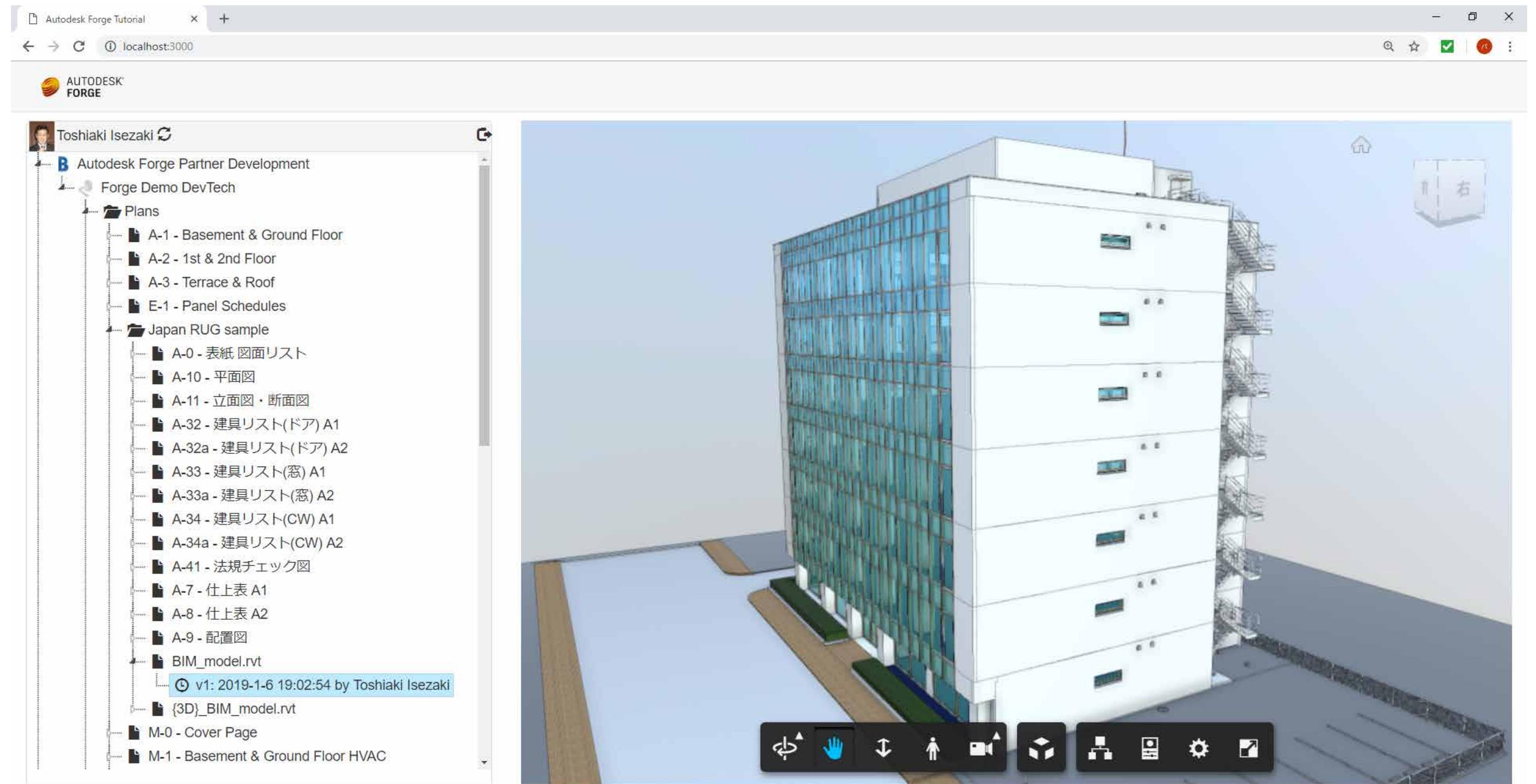
The screenshot shows the Autodesk BIM 360 Docs account settings interface. The top navigation bar includes links for 'AUTODESK BIM 360' | Autodesk Forge Partner Development, a user profile icon, and a help icon. The main menu has tabs for 'アカウント管理者' (Account Manager), 'プロジェクト' (Project), 'メンバー' (Members), '会社' (Company), '解析' (Analysis), '設定' (Settings) which is currently selected, and 'アプリ' (App). Below the menu, there are four tabs: 'プロファイル' (Profile), 'ビジネス ユニット' (Business Unit), 'カスタム統合機能' (Custom Integration Functions), and '管理者のアクティビティ' (Manager's Activity). The 'カスタム統合機能' tab is active. On the left, there is a sidebar for 'AUTODESK Forge' with a logo, a link to the 'BIM 360 API', and a note about adding custom Forge app integration functions. The main content area displays a card for 'Toshiaki Isezaki's app test', showing a thumbnail, the name, and status indicators for '詳細' (Details) and 'アクティブ' (Active).

カスタム統合機能タブが表示される?

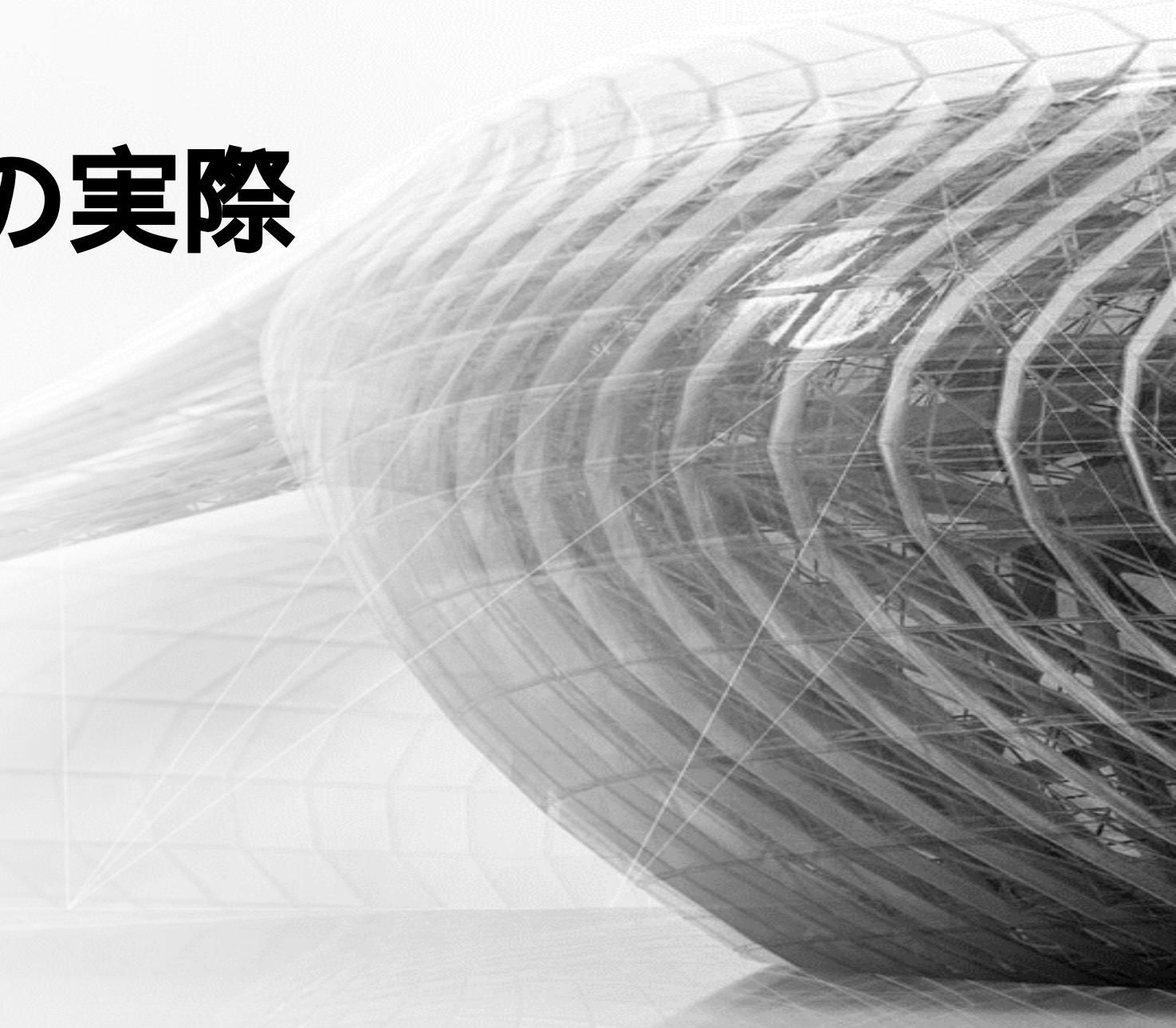
- § 表示は 100 ユーザ以上のサブスクリプション契約時のみ
- § トライアルでの開発評価が必要な場合は ...
- § bim360appsactivations@autodesk.com までリクエスト



Forge アプリへの認可後、モデル表示



BIM 360 Docs アクセスの実際



BIM 360 Docs と 2-Legged OAuth

§ Data Management API でのアクセス API Basics

There are two key data access paradigms that make up the Data Management API.

- Accessing data from Autodesk SaaS applications using any of the Data Management services.
 - For BIM 360 Team, Fusion Team, and A360 Personal, end users need to provide 3-legged authentication for your app to access the data.
 - For BIM 360 Docs, an account administrator needs to add an integration with your app in BIM 360 Enterprise. You can access data using either 2-legged or 3-legged authentication.



§ 2-Legged OAuth で取得した Access Token も利用化

§ BIM 360 は権限設定が細やか >> より柔軟な方法を提供

§ 当該 Client ID が「カスタム統合機能」で登録済が前提

Data Management API : 2-legged vs 3-legged 例

§ A360 プロジェクト ルート フォルダ直下 アイテム一覧 取得

GET

`projects/:project_id/folders/:folder_id/contents`

Returns a collection of items and folders within a folder. Items represent word documents, fusion design files, drawings, spreadsheets, etc.

Notes:

- The tip version for each item resource is included by default in the `included` array of the payload.

Resource Information

Method and URI

GET

https://developer.api.autodesk.com/data/v1/projects/:project_id/folders/:folder_id/contents

Authentication Context

user context optional

Required OAuth Scopes

`data:read`

Data Format

JSON

Data Management API : GET items

§ 2-legged

The screenshot shows a REST client interface with the following details:

- Body:** The tab is selected, showing the JSON response.
- Cookies (14):** 14 cookies are present.
- Headers (7):** 7 headers are present.
- Test Results:** Not visible in the screenshot.
- Status:** 403 Forbidden
- Time:** 325ms
- Size:** 463 B
- Save Response:** A red button.

The JSON response is displayed in a pretty-printed format:

```
1 {  
2   "jsonapi": {  
3     "version": "1.0"  
4   },  
5   "errors": [  
6     {  
7       "id": "9f214971-0632-4ffc-9f48-8e2f89f89318",  
8       "status": "403",  
9       "code": "USER_NOT_AUTHENTICATED",  
10      "detail": "The user could not be authenticated."  
11    }  
12  ]  
13 }
```

Data Management API : GET items

§ 3-legged (ユーザがプロジェクトメンバの場合)

Body Cookies (14) Headers (11) Test Results Status: 200 OK Time: 1075ms Size: 158.06 KB Save Response ▾

Pretty Raw Preview Visualize JSON  

```
1  {
2    "jsonapi": {
3      "version": "1.0"
4    },
5    "links": {
6      "self": {
7        "href": "https://developer.api.autodesk.com/data/v1/projects/a.cGVyc29uYlw6dWUyOwM4M2JmIzIwMTMxMTA5NTAxMTI2/
8          folders/urn:adsk.wipprod:fs.folder:co.t5c_G309T1uswJl-j2MeYQ/contents"
9      }
10   },
11   "data": [
12     {
13       "type": "folders",
14       "id": "urn:adsk.wipprod:fs.folder:co.JRRVI2xJT1SuzI23QkiBRw",
15       "attributes": {
16         "name": "Designs",
17         "display_name": "Designs"
18       }
19     }
20   ]
21 }
```

Data Management API : GET items

§ 3-legged (ユーザがプロジェクトメンバでない場合)

Body Cookies (13) Headers (7) Test Results Status: 403 Forbidden Time: 1164ms Size: 404 B Save Response ▾

Pretty Raw Preview Visualize JSON ↻

```
1 {  
2   "jsonapi": {  
3     "version": "1.0"  
4   },  
5   "errors": [  
6     {  
7       "id": "49153ac4-1292-4245-8041-9480ac7893e1",  
8       "status": "403",  
9       "detail": "Forbidden"  
10      }  
11    ]  
12 }
```

Data Management API : 2-legged vs 3-legged 例

§ BIM 360 プロジェクトルートフォルダ直下アイテム一覧取得

GET

`projects/:project_id/folders/:folder_id/contents`

Returns a collection of items and folders within a folder. Items represent word documents, fusion design files, drawings, spreadsheets, etc.

Notes:

- The tip version for each item resource is included by default in the `included` array of the payload.

Resource Information

Method and URI

GET

https://developer.api.autodesk.com/data/v1/projects/:project_id/folders/:folder_id/contents

Authentication Context

user context optional

Required OAuth Scopes

`data:read`

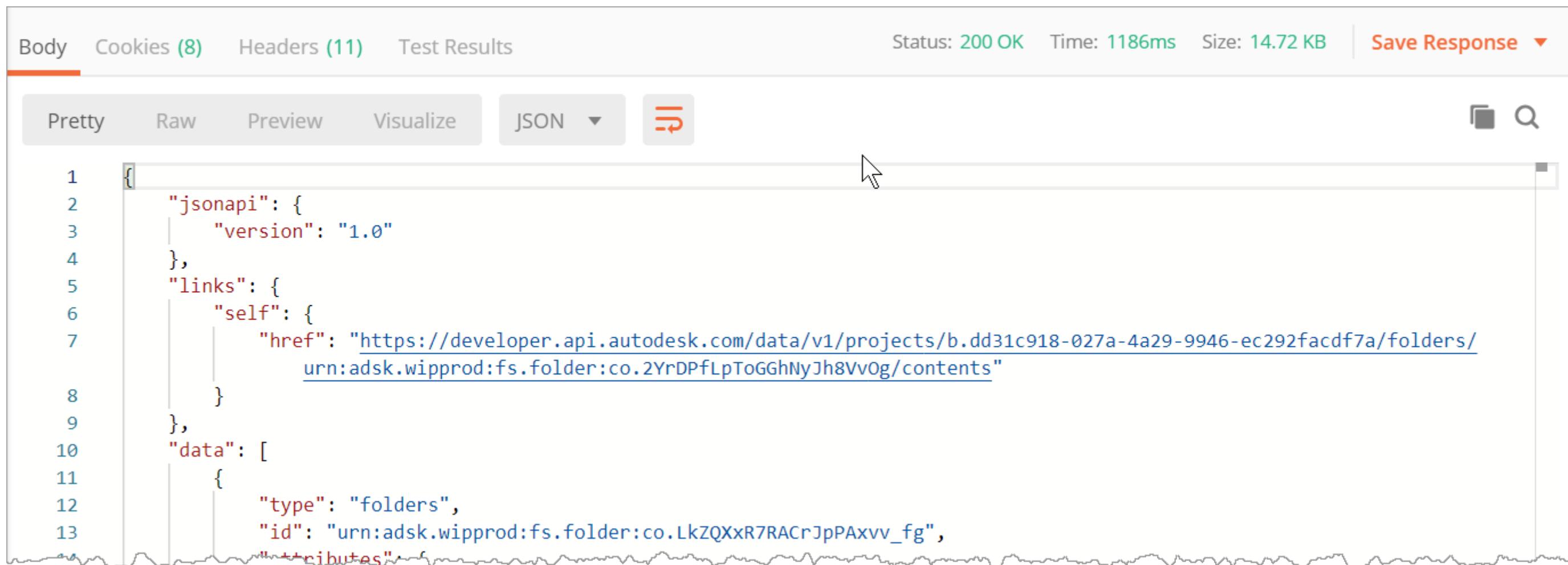
Data Format

JSON

Data Management API : GET items

§ 2-legged

§ 3-legged (ユーザがプロジェクトメンバの場合)



The screenshot shows a REST client interface with the following details:

- Top navigation: Body (selected), Cookies (8), Headers (11), Test Results.
- Status bar: Status: 200 OK, Time: 1186ms, Size: 14.72 KB, Save Response ▾.
- Toolbars: Pretty, Raw, Preview, Visualize, JSON ▾, and a copy/paste icon.
- Content area:

```
1 {
2   "jsonapi": {
3     "version": "1.0"
4   },
5   "links": {
6     "self": {
7       "href": "https://developer.api.autodesk.com/data/v1/projects/b.dd31c918-027a-4a29-9946-ec292facdf7a/folders/
8         urn:adsk.wipprod:fs.folder:co.2YrDPfLpToGGhNyJh8Vv0g/contents"
9     }
10  },
11  "data": [
12    {
13      "type": "folders",
14      "id": "urn:adsk.wipprod:fs.folder:co.LkZQXxR7RACrJpPAxvv_fg",
15      "attributes": {}
```

Data Management API : GET items

§ 3-legged (ユーザがプロジェクトメンバでない場合)

Body Cookies (8) Headers (7) Test Results Status: 403 Forbidden Time: 1407ms Size: 404 B Save Response ▾

Pretty Raw Preview Visualize JSON 🔍

```
1 {
2   "jsonapi": {
3     "version": "1.0"
4   },
5   "errors": [
6     {
7       "id": "d9bb9f74-8b22-4290-90d0-d640724f6440",
8       "status": "403",
9       "detail": "Forbidden"
10      }
11    ]
12 }
```

BIM 360 API : 2-legged vs 3-legged 例

§ BIM 360 プロジェクト一覧を取得

GET projects

Query all the projects in a specific BIM 360 account.

Resource Information

Method and URI (US)

GET https://developer.api.autodesk.com/hq/v1/accounts/:account_id/projects

Method and URI (EMEA)

GET https://developer.api.autodesk.com/hq/v1/regions/eu/accounts/:account_id/projects

Authentication Context

app only

Required OAuth Scopes

account:read

Data Formats

JSON

BIM 360 API : GET projects

§ 2-legged

Body Cookies (8) Headers (19) Test Results Status: 200 OK Time: 780ms Size: 2.21 KB Save Response ▾

Pretty Raw Preview Visualize JSON ▾

```
1 [
2   {
3     "id": "c5b38f2a-6659-4878-9b9f-dd1755d49ac0",
4     "account_id": "a4f95080-84fe-4281-8d0a-bd8c885695e0",
5     "name": "BIM 360 Cost Sample Project (Zhong)",
6     "start_date": "2015-05-01",
7     "end_date": "2018-05-03",
8     "value": 3000.0,
9     "currency": "USD"
10 }
```

§ 3-legged

Body Cookies (8) Headers (15) Test Results Status: 403 Forbidden Time: 2.05s Size: 592 B Save Response ▾

Pretty Raw Preview Visualize JSON ▾

```
1 [
2   {
3     "code": 1003,
4     "message": "Only support 2 legged access token."
5   }
6 ]
```

BIM 360 API : 2-legged vs 3-legged 例

§ BIM 360 プロジェクト ユーザー覧を取得

GET users

Query all the users in a specific BIM 360 account.

Resource Information

Method and URI (US)

GET https://developer.api.autodesk.com/hq/v1/accounts/:account_id/users

Method and URI (EMEA)

GET https://developer.api.autodesk.com/hq/v1/regions/eu/accounts/:account_id/users

Authentication Context

app only

Required OAuth Scopes

account:read

Data Formats

JSON

BIM 360 API : GET projects

§ 2-legged

The screenshot shows a REST client interface with the following details:

- Header bar: Body (highlighted in red), Cookies (8), Headers (19), Test Results.
- Status bar: Status: 200 OK, Time: 1053ms, Size: 4.69 KB, Save Response ▾.
- Toolbars: Pretty, Raw, Preview, Visualize, JSON ▾, and a copy/paste icon.
- Content area:

```
1 []
2 {
3     "id": "e98438f5-b095-4715-9b9f-6d1424255dd2",
4     "email": "eason.kang@autodesk.com",
5     "name": "Eason Kang",
6     "nickname": "eason.kangEDLV4",
7     "first_name": "Eason"
```

§ 3-legged

The screenshot shows a REST client interface with the following details:

- Header bar: Body (highlighted in red), Cookies (8), Headers (15), Test Results.
- Status bar: Status: 403 Forbidden, Time: 975ms, Size: 592 B, Save Response ▾.
- Toolbars: Pretty, Raw, Preview, Visualize, JSON ▾, and a copy/paste icon.
- Content area:

```
1 {
2     "code": 1003,
3     "message": "Only support 2 legged access token."
4 }
```



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Make anything.