



FORGE DevCon 2017

Seamless integration with Forge Webhooks

Adam Nagy &
Senior Developer Advocate

Monmohan Singh
Forge Architect

November, 2017

Class Summary

In this class you'll learn how to use the **Data Management** and **Model Derivative API's**, and **Webhooks** to create seamless integrations with the **Forge** platform

Key Learning Objectives

At the end of this class you'll be able to:

- Know the capabilities of the Data Management and Model Derivative API's
- Explain what Webhooks are and how to use them
- Write software that integrates seamlessly with Forge
- Know where to find more help on Forge

Authentication

Create App

Select the APIs you want to use in your app

-  BIM 360 API ✓
-  Data Management API ✓
-  Design Automation API ✓
-  Model Derivative API ✓

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

Your website URL (Optional)


CREATE APP >

MyTestApp


APIs




BIM 360 API



Data Management API



Design Automation API



Model Derivative API

About this app (Created 05 Jun 2017)

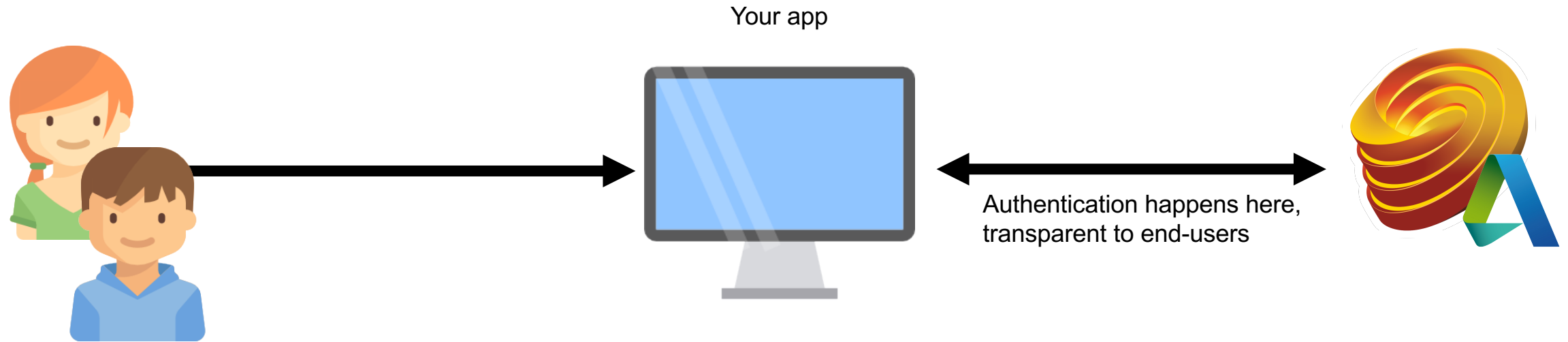
Client ID	HtMHsCXf1HB25sHGxn1J7D7XId5DwPyf
Client Secret	***** Show Regenerate

App Name MyTestApp

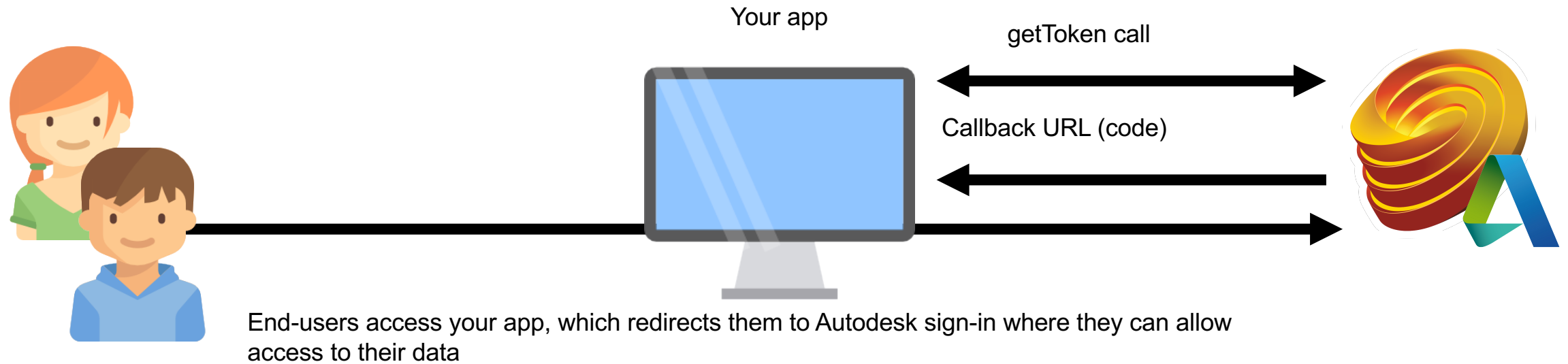
Description My app for testing

Callback URL https://localhost:3000/callback

2-legged authentication



3-legged authentication



OAuth scopes

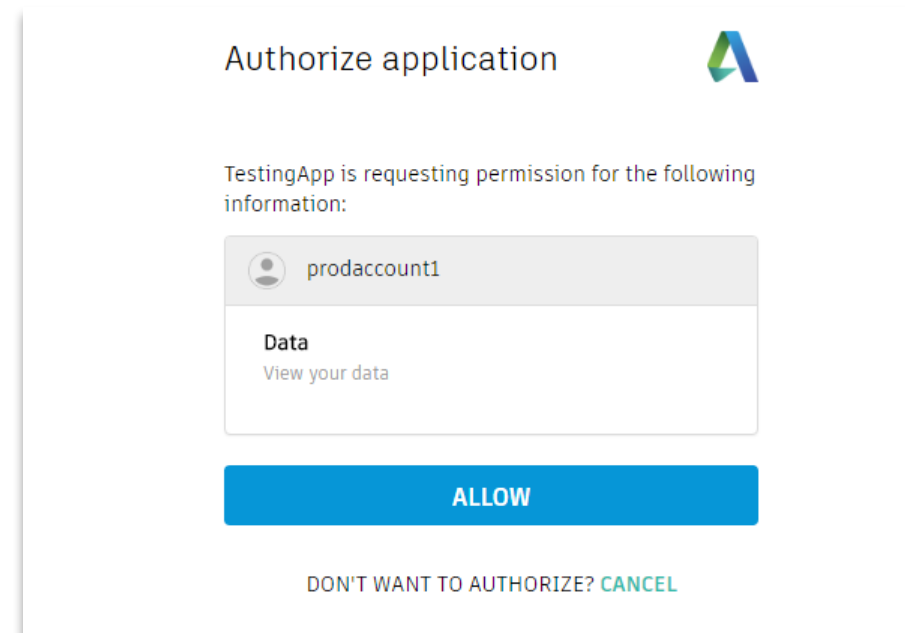
Define which data is accessible for the token
(both 2- or 3-legged)

On 3-legged, the scope define the permissions
the end-user will need to approve on the
consent page

IMPORTANT: if client app needs access to the
token (viewing)

You need create a token with restricted access
(e.g. read-only)

- Malicious end-user with a write-enabled
token could
modify data directly on the account



OAuth scopes

The screenshot shows the Forge API documentation page for the POST job endpoint. The page is titled "POST job" and includes a description, a "Resource Information" table, and sections for "Request" and "HTTP Headers". The "Required OAuth Scopes" row in the "Resource Information" table is highlighted with an orange border, showing the required scopes: `data:read and (data:write or data:create)`.

FORGE APIs Support SIGN UP SIGN IN

Model Derivative API > API Reference > HTTP Specification > POST job > v2

Derivatives

- GET formats
- POST job
- GET :urn/thumbnail
- GET :urn/manifest
- DELETE :urn/manifest
- GET :urn/manifest/:derivativeurn
- GET :urn/metadata
- GET :urn/metadata/:guid
- GET :urn/metadata/:guid/properties

POST job

Translate a source file from one format to another.

Derivatives are stored in a manifest that is updated each time this endpoint is used on a source file.

Note that this endpoint is asynchronous and initiates a process that runs in the background, rather than keeping an open HTTP connection until completion. Use the [GET :urn/manifest](#) endpoint to poll for the job's completion.

Resource Information

Method and URI	POST https://developer.api.autodesk.com/modelderivative/v2/designdata/job
Authentication Context	app only
Required OAuth Scopes	<code>data:read and (data:write or data:create)</code>
Data Format	JSON

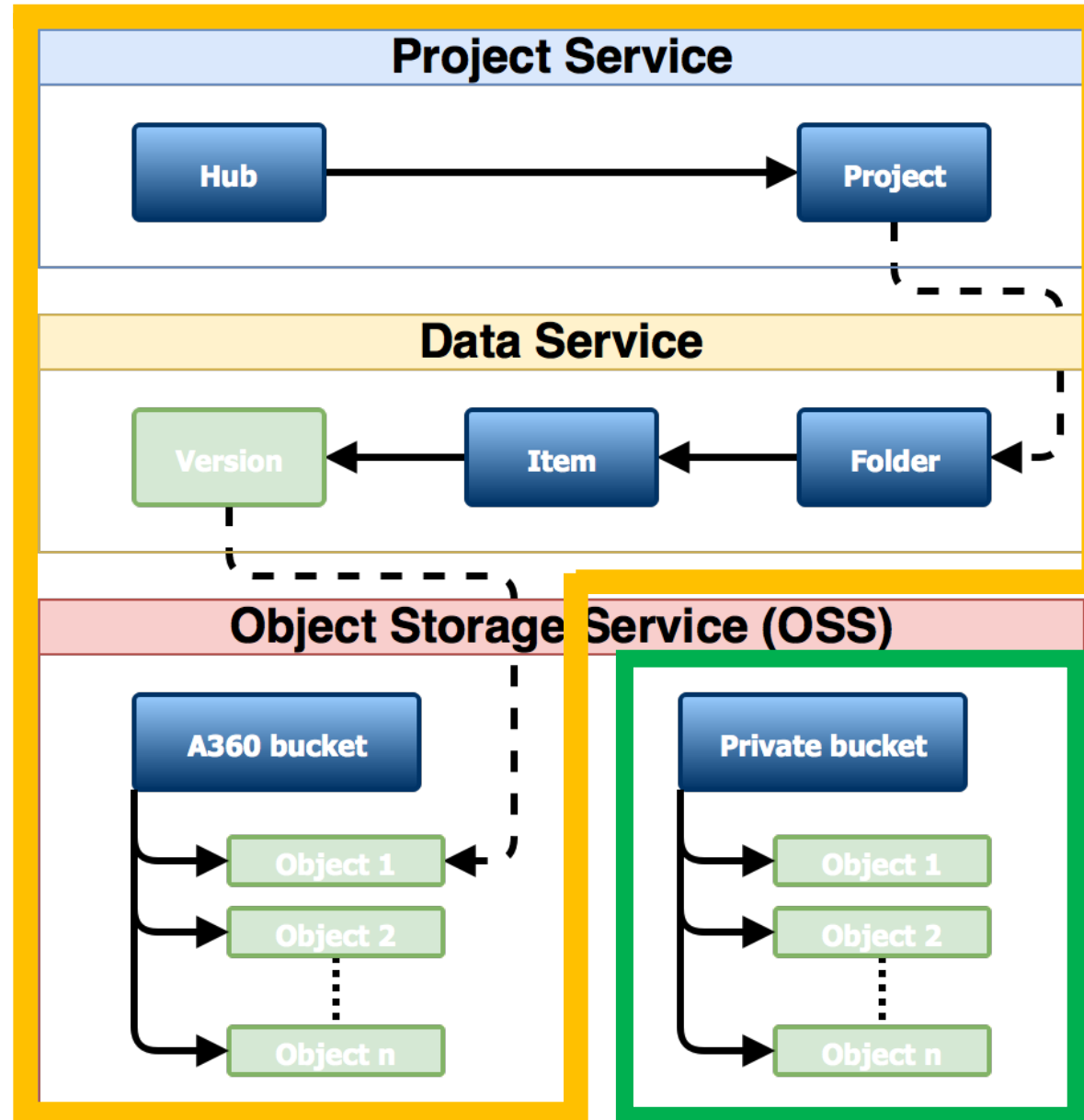
Request

HTTP Headers

Data Management API

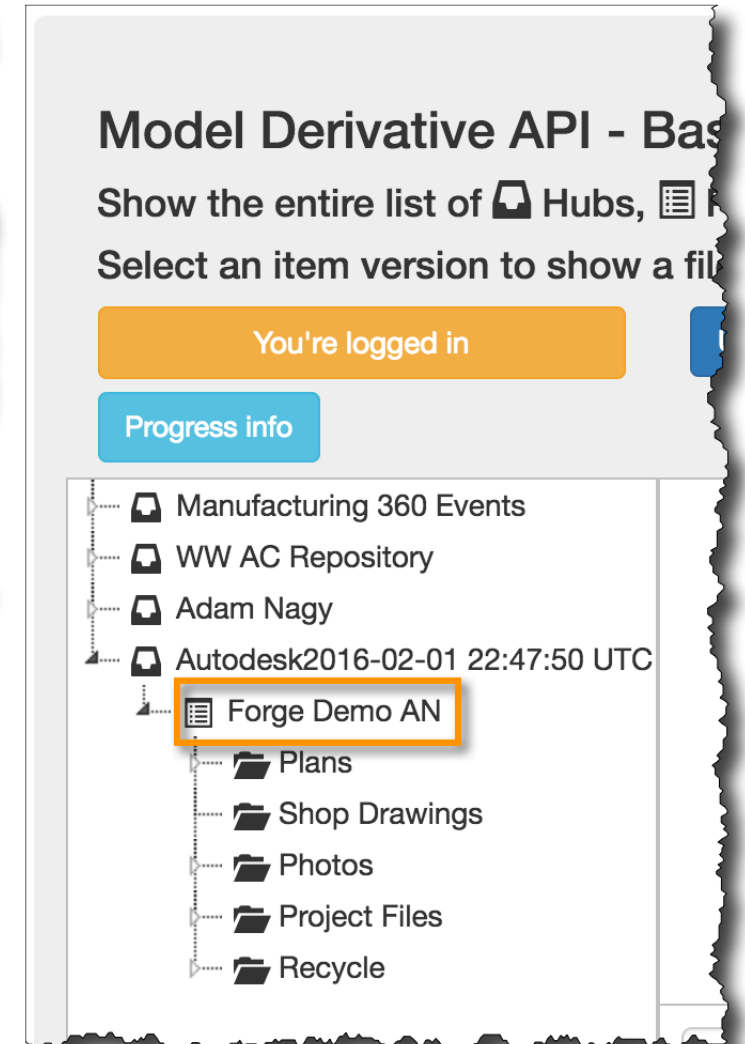
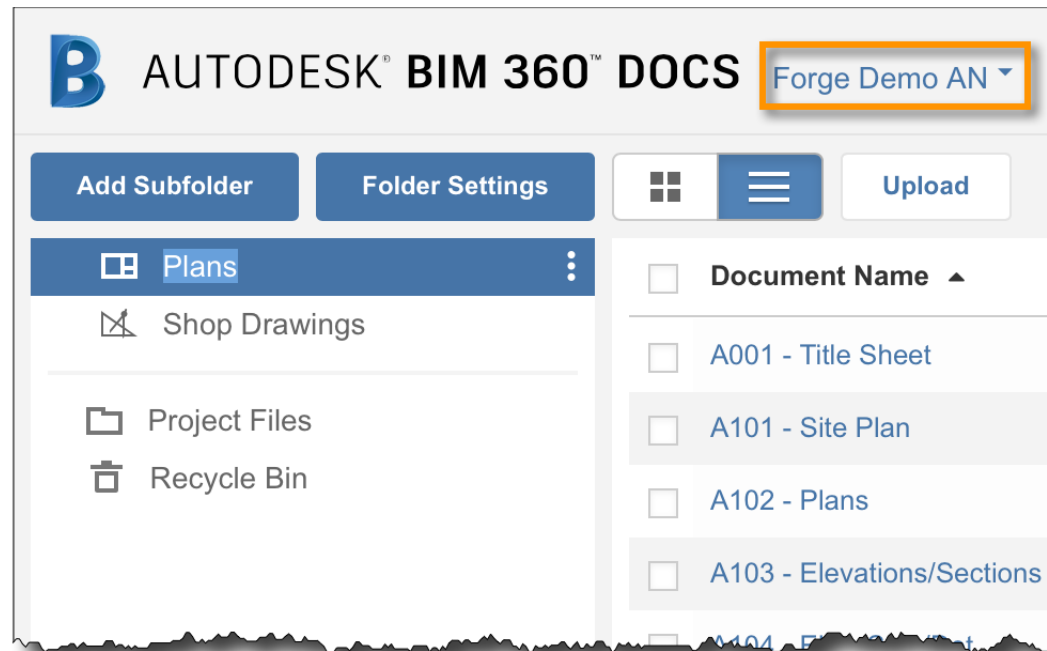
Data Management API - Services

3-legged



2-legged

BIM 360 Docs



Hubs listed just like A360 hubs

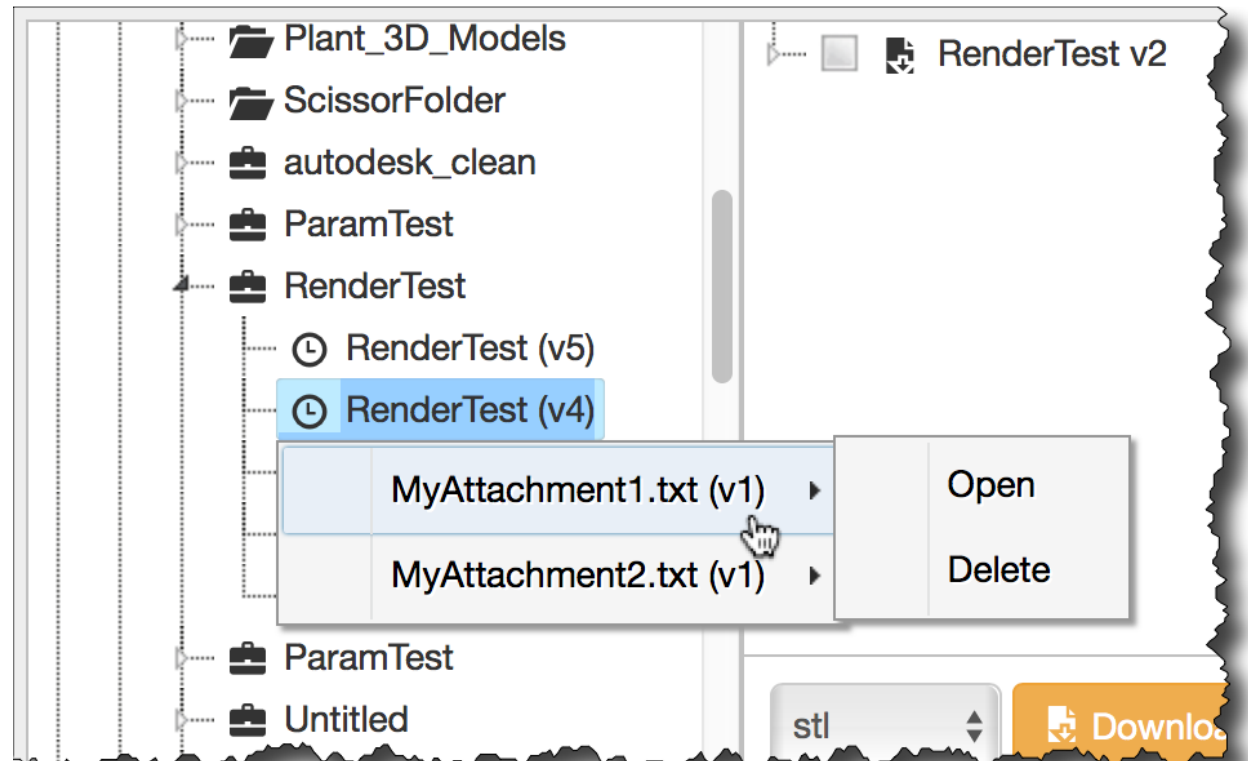
No special API needed

Relationships

Add attachment to item version

```
var attachmentSpec = {  
  "jsonapi": {  
    "version": "1.0"  
  },  
  "data": {  
    "type": "versions",  
    "id": versionId,  
    "meta": {  
      "extension": {  
        "type": "auxiliary:autodesk.core:Attachment",  
        "version": "1.0"  
      }  
    }  
  }  
}
```

Set reference



Overview

API endpoints

Projects, Data & OSS endpoints, here are a few (of many):

/projects/

- Hubs `/project/v1/hubs`
- Projects `/project/v1/hubs/:hub_id/projects`

/data/

- Folders `/data/v1/projects/:project_id/folders/:folder_id/contents`
- Items `/data/v1/projects/:project_id/items/:item_id`
- Version `/data/v1/projects/:project_id/versions/:version_id`

/oss/

- Buckets `/oss/v2/buckets` (*POST to create, GET to list*)
- Upload `/oss/v2/buckets/:bucketKey/objects/:objectName`

BIM 360: Listing files

About the `attributes.extension.type`

Hubs

- Enterprise (shared with me): hubs:autodesk.core:Hub
- Personal: hubs:autodesk.a360:PersonalHub
- BIM 360 Docs account: hubs:autodesk.bim360:Account

Projects

- Other projects: projects:autodesk.core:Project
- BIM 360 Docs Projects: projects:autodesk.bim360:Project

Items

- Folders folders:autodesk.core:Folder or folders:autodesk.bim360:Folder
- Files items:autodesk.core:File or items:autodesk.bim360:File
- Others items:autodesk.bim360:Document
items:autodesk.bim360:ReviewDocument

Upload a file

Tutorial: <https://developer.autodesk.com/en/docs/data/v2/tutorials/upload-file/>

POST projects/:project_id/items

Creates a new item (and first version)

- data.attribute.extension.type
"items:autodesk.core:File" : "items:autodesk.bim360:File"
- included[0].attribute.extension.type
"versions:autodesk.core:File" : "versions:autodesk.bim360:File"

POST projects/:project_id/versions

Creates a new version for an item

- data.attribute.extension.type
"versions:autodesk.core:File" : "versions:autodesk.bim360:File"

Create Folder

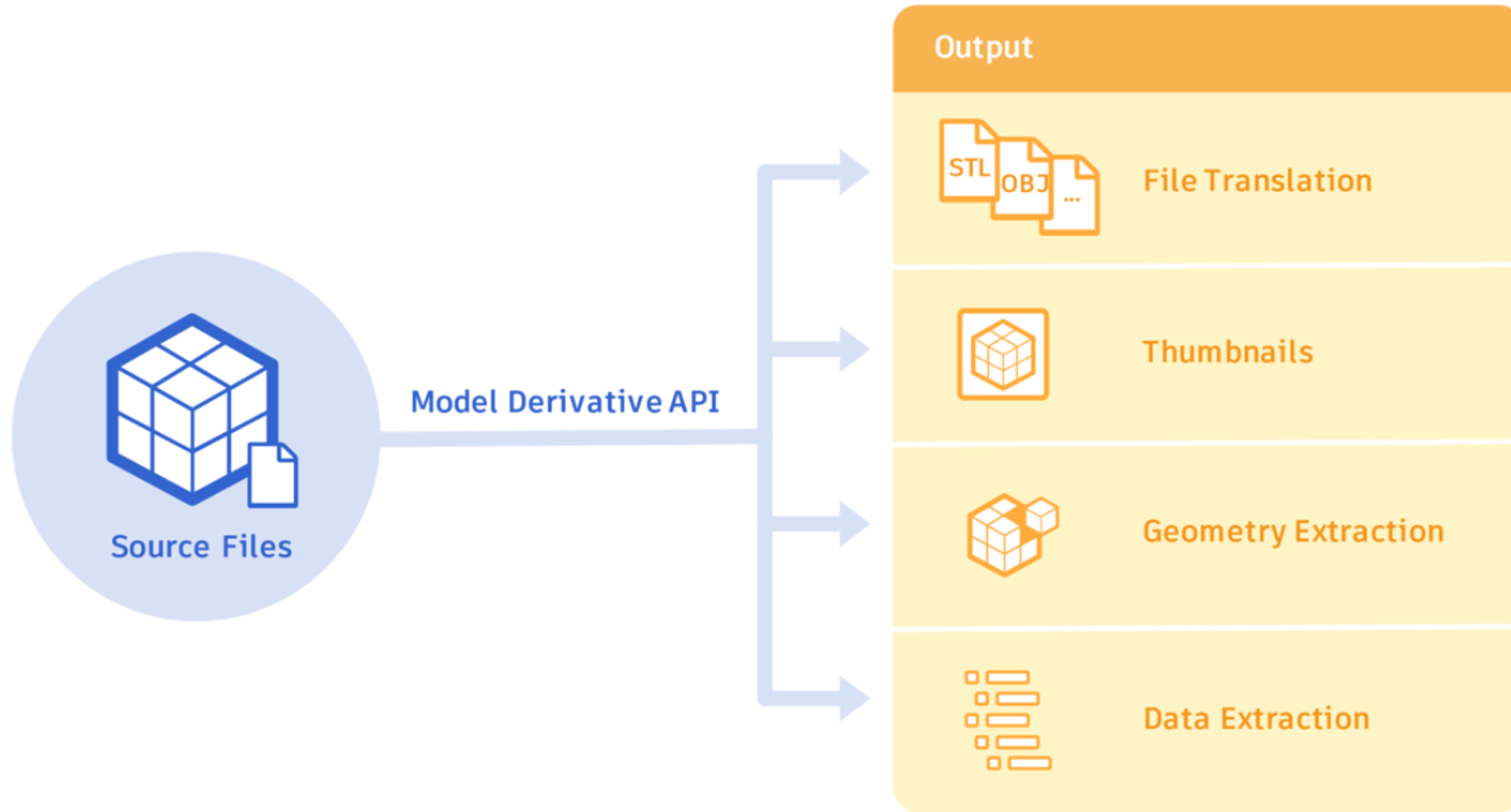
BIM 360 Team

- POST projects/:project_id/folders
3-legged
2-legged

BIM 360 Docs

- POST projects/:project_id/commands
3-legged
2-legged only with x-user-id (as of August/2017)

Model Derivative API



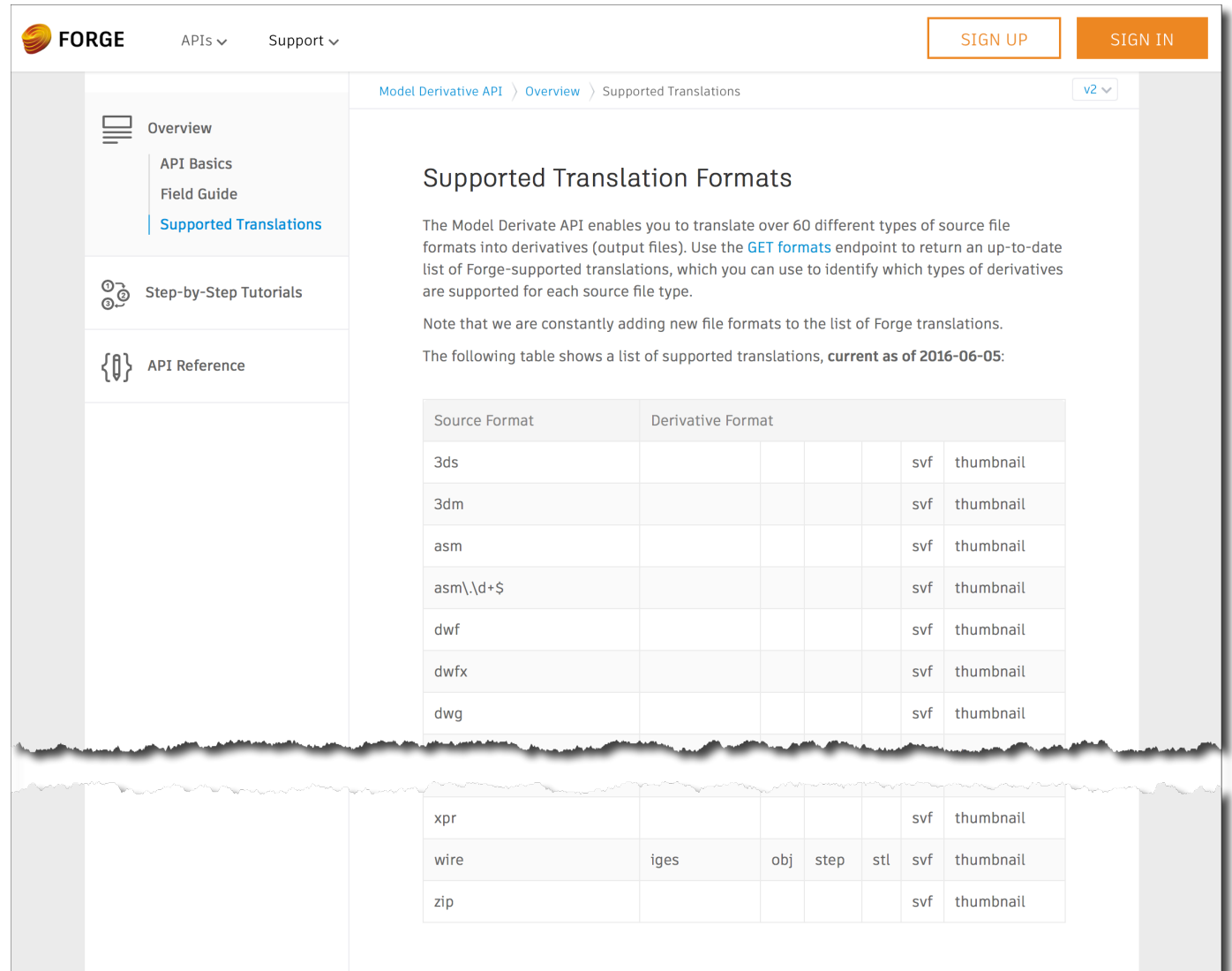
<https://developer.autodesk.com/en/docs/model-derivative/v2/overview/>

Translation

Viewing/Data extraction:
60+ file formats

OBJ export:
All formats at file level
& at component level

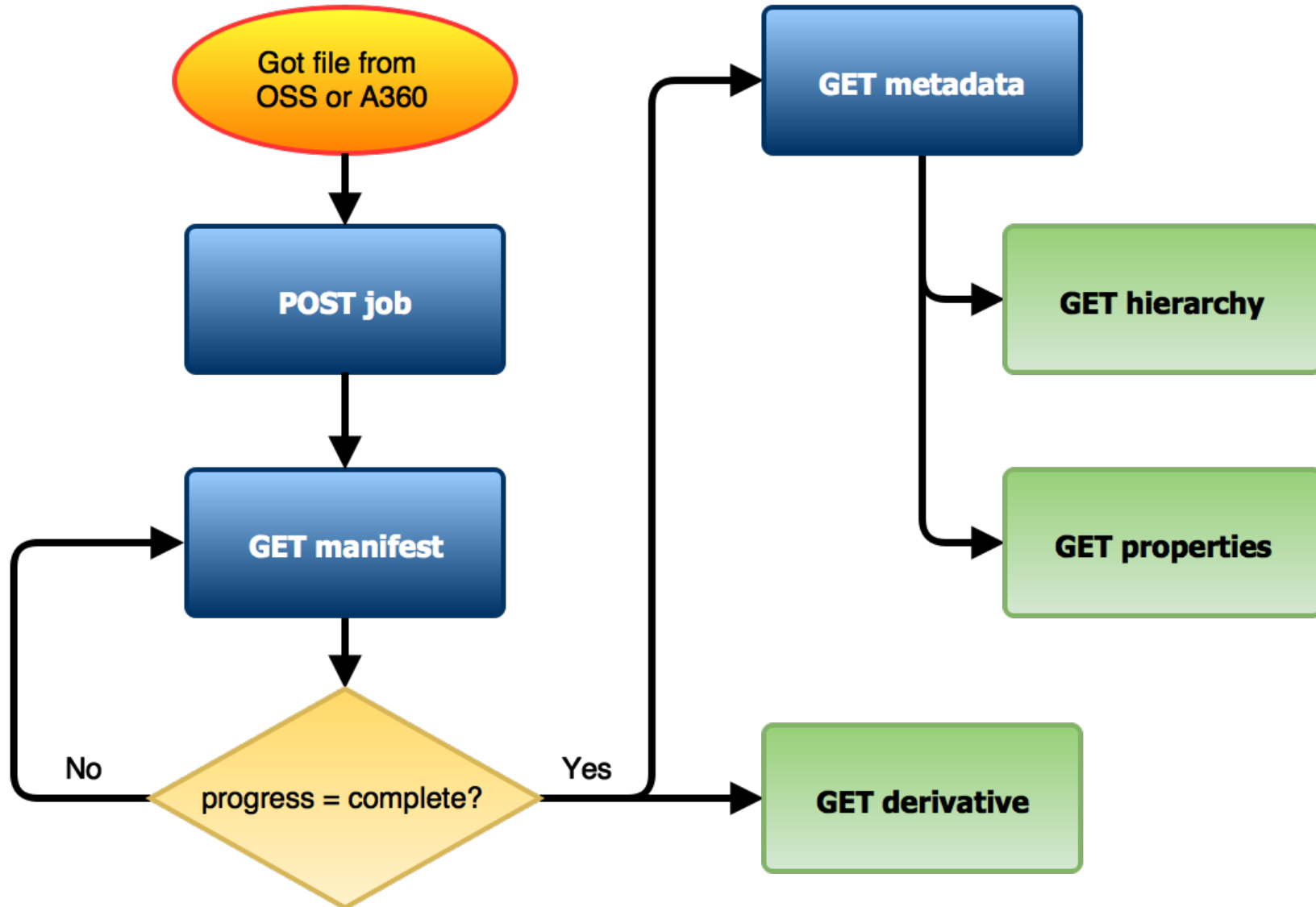
STEP, IGES, STL export:
File level



The screenshot shows the Forge DevCon website interface. The top navigation bar includes the Forge logo, 'APIs' and 'Support' dropdown menus, and 'SIGN UP' and 'SIGN IN' buttons. The main content area is titled 'Supported Translation Formats' under the 'Model Derivate API' section. The page includes a sidebar with navigation links: Overview, API Basics, Field Guide, Supported Translations (highlighted), Step-by-Step Tutorials, and API Reference. The main content area contains an introductory paragraph, a note about adding new file formats, and a table of supported translations as of 2016-06-05.

Source Format	Derivative Format
3ds	svf thumbnail
3dm	svf thumbnail
asm	svf thumbnail
asm\.\d+\$.	svf thumbnail
dwf	svf thumbnail
dwx	svf thumbnail
dwg	svf thumbnail
xpr	svf thumbnail
wire	iges obj step stl svf thumbnail
zip	svf thumbnail

Workflow



(OSS = Object Storage Service)

POST job

Composite models can be uploaded as a zip

- e.g. **main.iam, part1.ipt, part2.ipt** >> **main.zip**
- automatic reference resolution
- **input.compressedUrn = true**
- **input.rootFilename = main.iam**

Single files are uploaded in their own file format

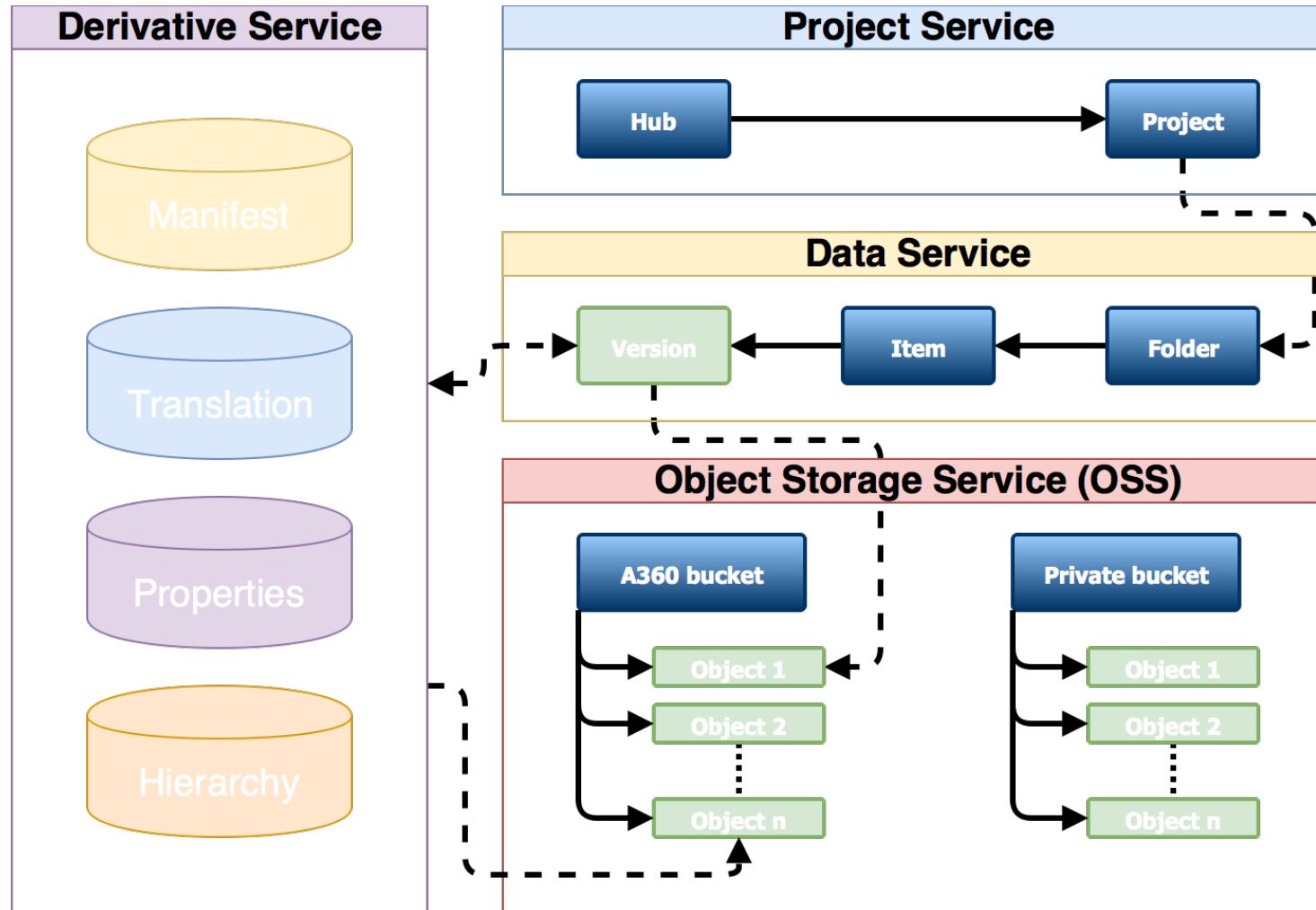
- e.g. **part1.ipt**

Important: keep the extension! – needed by the extractor to identify the file type

- Part1.ipt > **Part1.ipt** (OK)
- Part1.ipt > **a4c7d-e64a-85bc.ipt** (OK)
- Part1.ipt > **a4c7d-e64a-85bc** (Wrong!)

```
var job = {
  input: {
    urn: 'dXjhsjkagJHFkjhfgv...akjhfakljfh',
    rootFilename: 'main.iam',
    compressedUrn: true
  },
  output: {
    formats: [{
      type: 'svf',
      views: ['2d', '3d']
    }],
    destination: {
      region: 'us'
    }
  }
}
```

GET manifest, hierarchy, properties

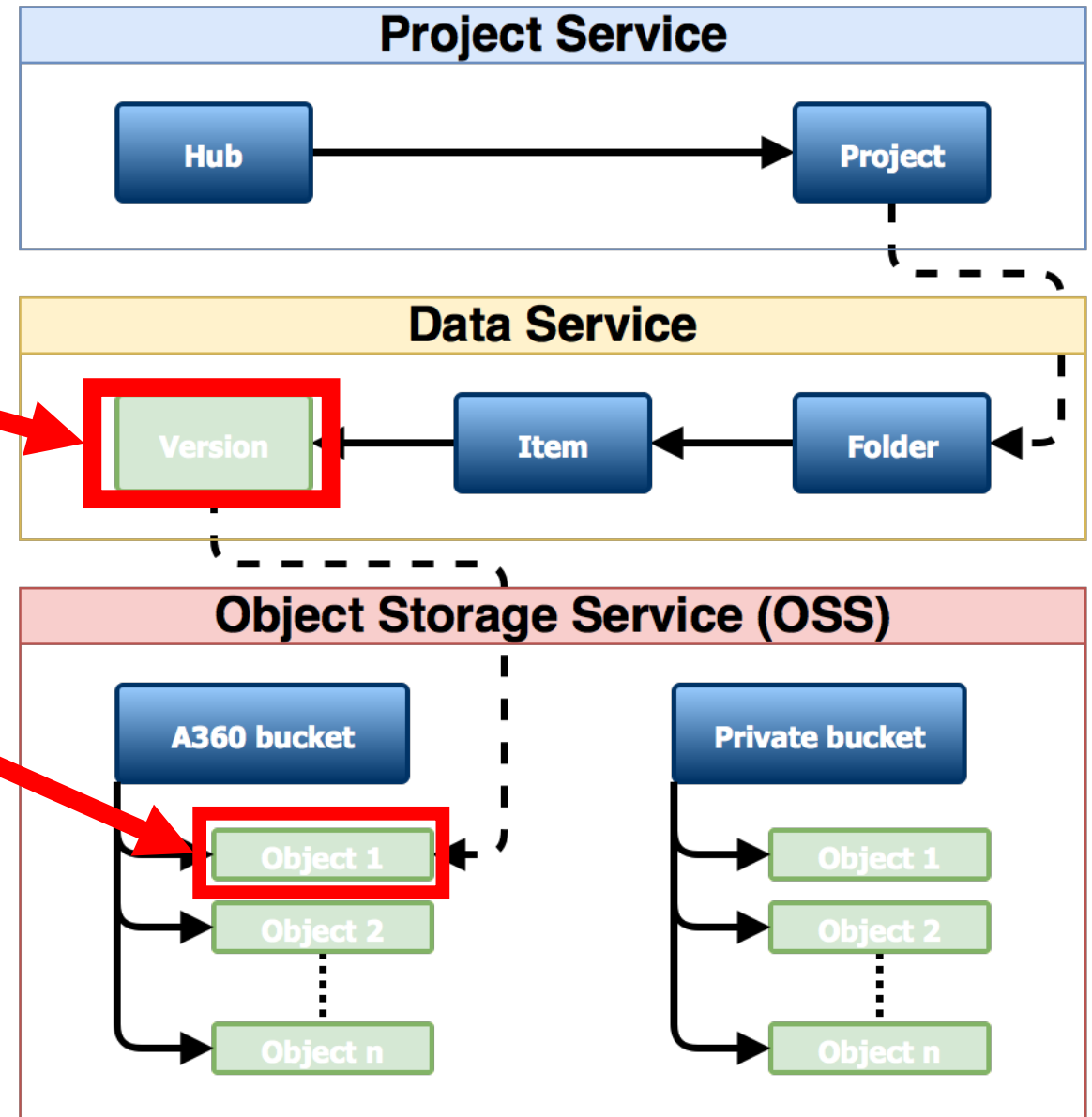


The **Green** items can be used by the Model Derivative API

Work with Item version id

Use derivative on Item
version id

Or drill down to the file
on OSS



Forge Webhooks

Webhooks – what are they?

A **callback** mechanism for Web Apps

A commonly used paradigm

An application implementing Webhooks will POST a message to a URL when certain things happen.





What problems do they solve?

- Primary use case is Enterprise Integrations;
Data $\leftarrow \rightarrow$ Forge API $\leftarrow \rightarrow$ Other Enterprise applications like NetSuite, Oracle, Box, Zendesk etc.
- *Plugin* for the Cloud
Extend functionality of a Product or an API
- *Pipes* for Cloud Applications
If this, then that

When a file is added to folder, Then send a notification (on Slack, email etc.)

When a file is added to folder, Then sync to Google Drive/ Box

On any update to a Folder, Trigger a custom workflow (audit etc.)

** When a Supplier is created in Fusion Lifecycle, Then create a vendor in Salesforce.*

** When a derivative job is finished, download thumbnail*

Forge-Webhooks API

Provide a SIMPLE platform for EXTERNAL users, partners, consultants to “hook” into events of ALL Autodesk Services

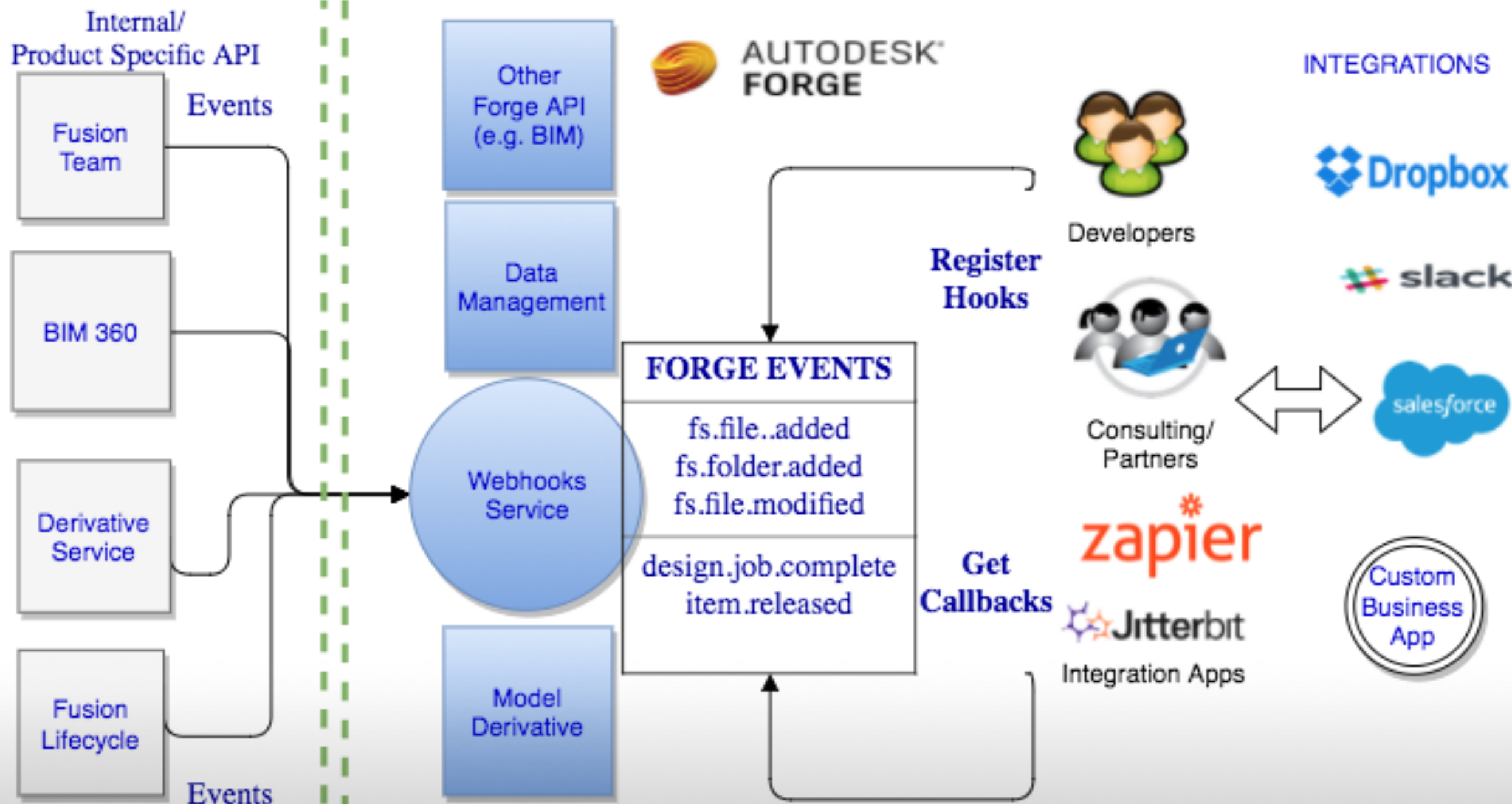
Coarse grained events, Simple (HTTP, no client library), Multiple & diverse subscription

It is not meant for real time connected IOT devices, extremely low latency , batch/stream events

* Starting with Data Management events

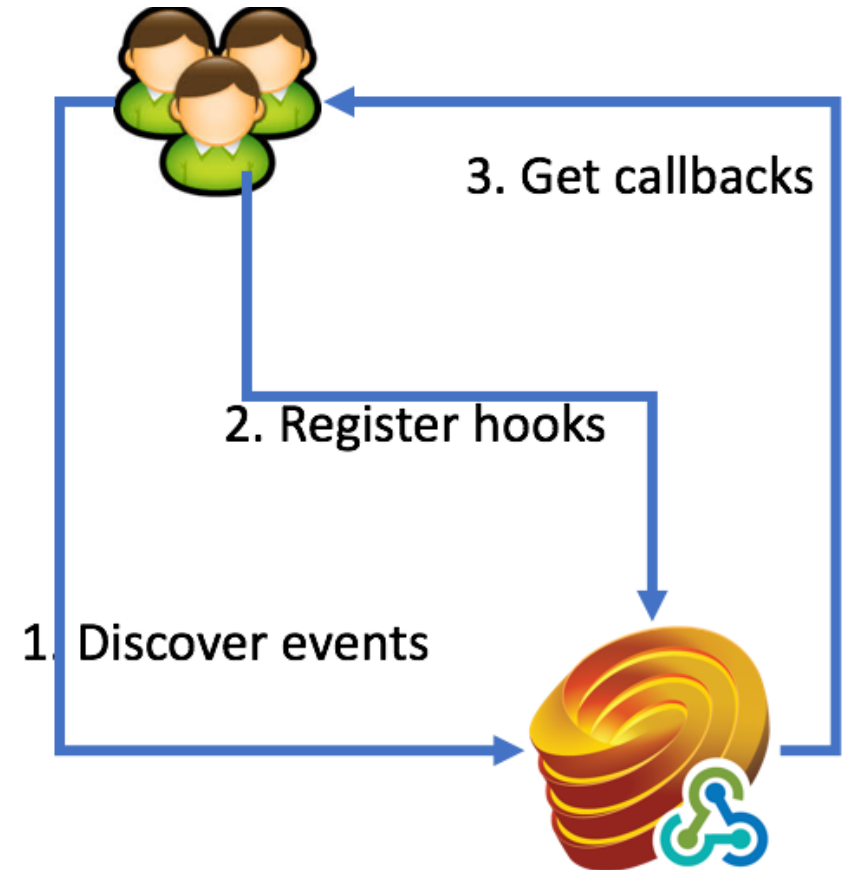


Forge Webhooks



Webhook

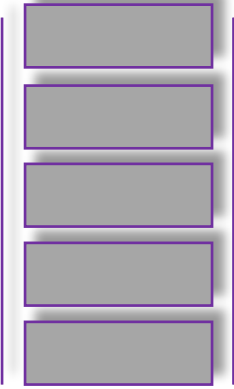
- A Webhook is defined by
 - An HTTP URL
 - Has an owner
 - Metadata (scope)
 - Is associated with an event
- REST based
 - Discover events
 - Register Hooks
 - Receive callbacks



Security

- OAuth
 - 2 Legged – Applications can create hooks
 - 3 Legged – Users can create hooks
 - 2 Legged Whitelisted – For Internal Autodesk services and high trust applications.
- Read Access check on scope (Folder)
 - When a user/application creates a hook
 - When callback is delivered to the user
- Prevent Callback spoofing
 - Shared secret
 - All callbacks contain x-ads-signature header
 - Value of the header is SHA-1 hash of the callback payload

Data Management



Security



Sourced
Events



ACM

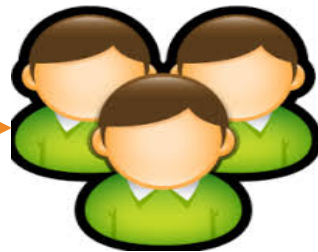
Register
callback e.g.
item added in
\$project

Check
\$user/\$app
still has Read
access for
Data?



Data
Management

Callback, if
still has Read
Access



SLA

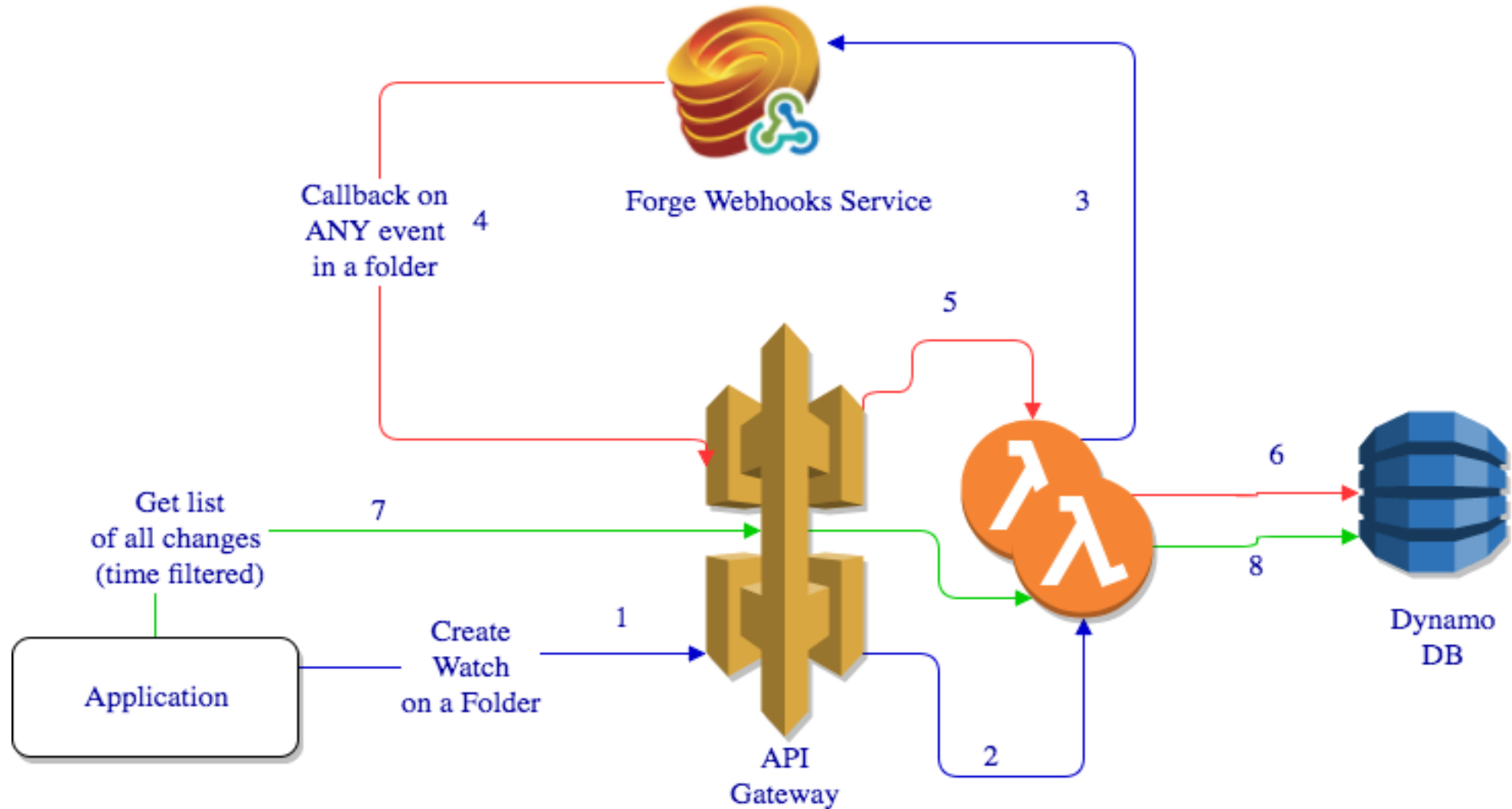
- Working on formal SLA
- Delivery Guarantees
 - **At least** once
 - Ordering is not guaranteed
- Responsibility of Callback URLs
 - Callback URLs have fixed time window in which to respond (~10 secs)
 - Best Practice – Return 202 and process asynchronously
 - 3 Retries done , 15 minutes apart
 - Final retry 24 hours later
 - If none succeed, we will disable the Webhook
- Latency
 - HTTP Latency: Ideally suited to coarse grained events.

Building a Serverless changelog with Webhooks

- API to allow an application to register folder/projects to record changes
 - This in turn should register the folder to Webhook Service
 - Watch API
- API to Receive callbacks from Webhooks Service
 - Get a callback → Add a Record
- API to query the changes
 - List of events == List of changes !!

<https://console.aws.amazon.com/apigateway/home?region=us-east-1#/apis>

Building a Serverless changelog with Webhooks



<https://console.aws.amazon.com/apigateway/home?region=us-east-1#/apis>

Explore the Service

- Private Beta
- Documentation
 - <https://developer.autodesk.com/en/docs/webhooks/v1>
- External Consumers
 - Need to whitelist Client-ID of their apps
 - Provide ClientId of application to us via beta-support email
- Beta support email
 - forge.webhooks.beta.appsupport@autodesk.com

Notifier Sample

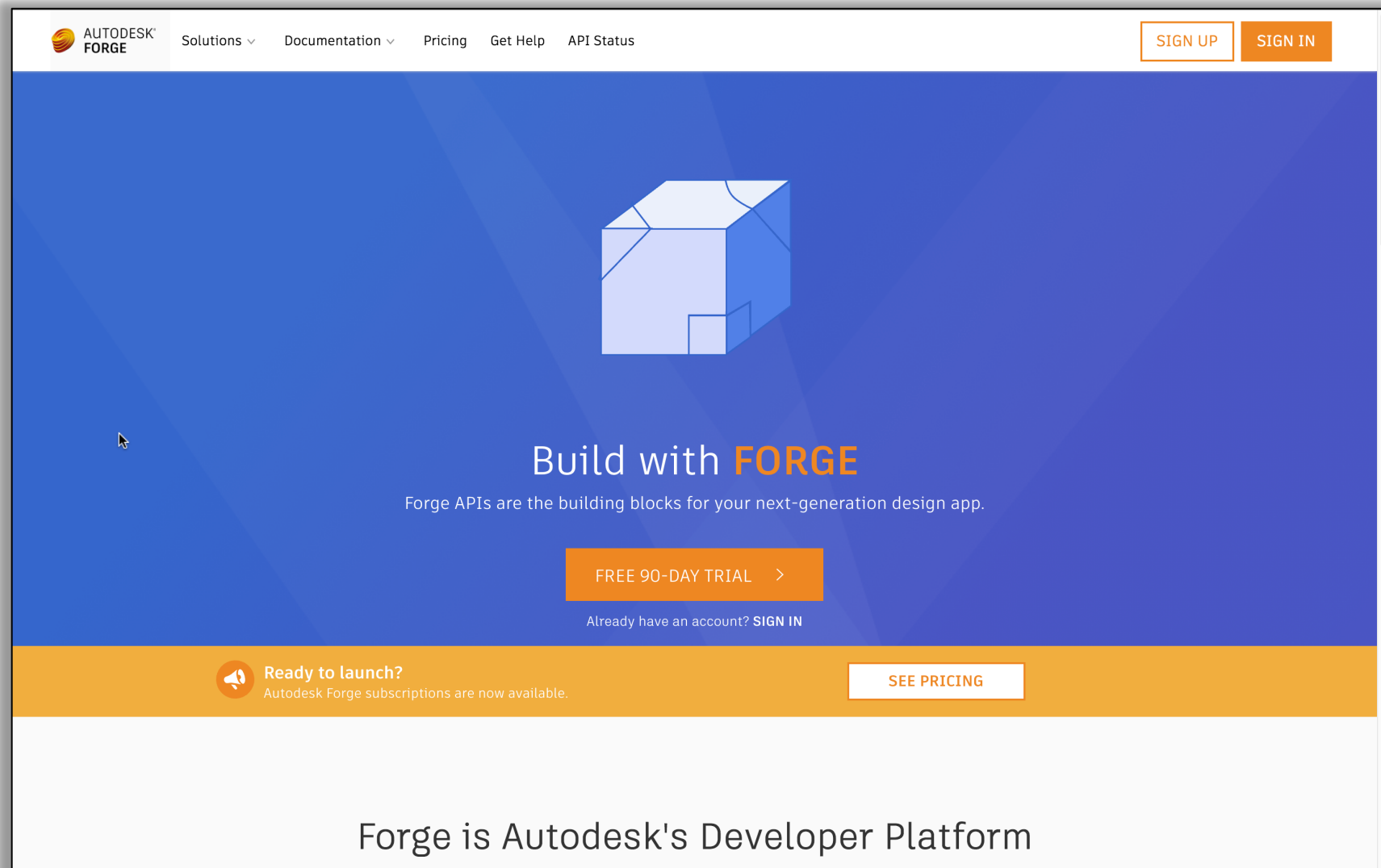
The screenshot displays the BIM 360 Notifier web application interface, which is divided into three main sections:

- 1. Select folder:** A tree view on the left shows a user profile for Adam Nagy and a list of folders. The 'Test' folder is currently selected.
- 2. Select events:** Two panels in the center allow for selecting events. The 'Files & Versions' panel includes options for Added, Modified, Copied, Moved, and Deleted. The 'Folders' panel includes options for Added, Modified, Copied, Moved, and Deleted.
- 3. Contact information:** A configuration area on the right for setting up notifications. It includes:
 - SMS notification:** A Twilio integration with a phone number field set to 07787 556166.
 - Email notification:** A Postmark integration with an email address field set to adam.nagy@autodesk.com.
 - Slack notification:** A Slack integration with a webhook URL field.

At the bottom right of the configuration area, there is an 'Update notification' button and a note: "Note: this notification data is connected to the folder, including phone and email used on this app."

<https://bim360notifier.herokuapp.com/>

Resources – Forge



The screenshot shows the Autodesk Forge website homepage. At the top left is the Autodesk Forge logo. To its right is a navigation menu with links for Solutions, Documentation, Pricing, Get Help, and API Status. On the top right are two buttons: SIGN UP and SIGN IN. The main content area has a blue background with a 3D wireframe cube in the center. Below the cube, the text reads "Build with FORGE" in white, with "FORGE" in orange. Underneath that is the subtext "Forge APIs are the building blocks for your next-generation design app." Below the subtext is an orange button that says "FREE 90-DAY TRIAL" followed by a right-pointing chevron. Underneath the button is the text "Already have an account? SIGN IN". At the bottom of the blue section is an orange banner with a bell icon on the left, the text "Ready to launch? Autodesk Forge subscriptions are now available.", and a white button on the right that says "SEE PRICING". Below the orange banner is a white section with the text "Forge is Autodesk's Developer Platform".

Resources – Forge

The screenshot shows a Stack Overflow search page for the query "What is Forge [autodesk-viewer]". The page includes a search bar, navigation links, and a list of search results. A summary box at the top explains that Autodesk Viewer allows for visualizing and interacting with 2D and 3D design data in a web browser. Below this, several questions and answers are listed, covering topics like viewer file URLs, API deprecations, and coordinate systems. On the right side, there are promotional banners for Microsoft Azure and a job listing for a Software Engineer at Quali Financials.

stackoverflow Questions Developer Jobs Tags Users What is Forge [autodesk-viewer] ? Log In Sign Up

Search

What is Forge [autodesk-viewer] search

40 results relevance newest votes active

The Autodesk Viewer enables your customers to visualize and interact with 2D and 3D design data in a web browser or on a mobile device, anytime, anywhere. No downloads or plug-ins required.
[learn more...](#) [top users](#) [synonyms](#)

1 vote
1 answer
autodesk autodesk-forge autodesk-viewer
asked Aug 10 '16 by Greg Bluntzer

0 votes
1 answer
autodesk-forge autodesk-viewer
asked May 11 by Matt

2 votes
A: Getting real world coordinates from Forge model
viewer.model.getData().globalOffset is what you are looking for: Aligning Coordinate Systems in Autodesk Forge Viewer ...
answered Mar 30 by Philippe Leefsma

3 votes
1 answer
autodesk-forge autodesk-viewer
asked Aug 29 by artobii

0 votes
Q: Forge Get/Share Link
I'm running our Forge Viewer within our internal intranet site. Is there any way to share a model with an outside client via the free A360 viewer or similar remote viewer? That site has the ability ... to share models

Advanced Search Tips

results found containing what is forge

tagged with autodesk-viewer

Microsoft Azure Microsoft
Vous avez 5 minutes ?
Alors, vous avez le temps de déployer votre première solution cloud.
Azure - Essai gratuit

Work from anywhere

Software Engineer - Quali Financials
Kuali Lehi, UT
REMOTE
javascript saas

Cloud Azure Architect - LIVE ANYWHERE in United States
Cloud Technology Partners Boston, MA
REMOTE
azure visual-studio

Work remotely - from home or wherever you

Resources – Forge

The screenshot displays the GitHub organization page for Forge Platform. At the top, there is a navigation bar with links for Features, Business, Explore, Marketplace, Pricing, and a search bar. The main header includes the Forge logo, the organization name 'Forge Platform', and a brief description: 'Forge is a set of Autodesk APIs and services for software developers to build innovative cloud-powered apps.' Below this, there are tabs for 'Repositories 51' and 'People 1'. A search bar for repositories is present, along with filters for 'Type: All' and 'Language: All'. The main content area lists several repositories:

- forge-rcdb.nodejs**: Forge Responsive Connected Database: A responsive React-based web application that showcases the use of Autodesk Forge Viewer and Forge web services ...
 - JavaScript
 - 49 stars
 - 32 forks
 - MIT license
 - Updated 10 hours ago
- design.automation-custom-data-viewer**: DWG custom data viewer: End to end sample that demonstrates extracting custom data from DWG files interacting with it in the Viewer
 - C#
 - 6 stars
 - 7 forks
 - MIT license
 - Updated 14 hours ago
- model.derivative-csharp-context.menu**: Extract properties from Revit files: Adds context menu for extracting properties for Revit files and save into an excel file
 - C#
 - 2 stars
 - 5 forks
 - MIT license
 - Updated 15 hours ago
- photo-to-3D-sample**

On the right side, there are two summary boxes:

- Top languages**: JavaScript, C#, Java, PHP, CSS
- Most used topics**: javascript, nodejs

At the bottom right, there is a 'People' section showing one member: **gregra81** (Greg Rashkevitch).



Autodesk and the Autodesk logo are registered trademarks or trademarks of Autodesk, Inc., and/or its subsidiaries and/or affiliates in the USA and/or other countries. All other brand names, product names, or trademarks belong to their respective holders. Autodesk reserves the right to alter product and services offerings, and specifications and pricing at any time without notice, and is not responsible for typographical or graphical errors that may appear in this document.

© 2017 Autodesk. All rights reserved.