Getting Started with Design Automation for Inventor on Forge

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It all starts with Forge...
What is Design Automation and is it for me?
Sample walkthrough
Details with Postman
When things go wrong
Best practices
Where to go for more...
Is session this for me?

There will be demos but…

There will be a fair amount of code too!
It all starts with Forge…
A set of web service APIs
A set of web service APIs
What Customers and Partners Build

- Data Visualization & Analysis
- Digital Twin
- Augmented & Virtual Reality
- SaaS Integration
- Catalogs
- Configurators
- Design Automation
- Photo to 3D
What is Design Automation and is it for me?
Design Automation API V3
Run automations on your design files

AUTODESK® REVIT®
AUTODESK® INVENTOR®
AUTODESK® 3DS MAX®
AUTODESK® AUTOCAD®

AutoCAD Web + Mobile
Input/outputs are NOT stored, they are downloaded/processed and DISCARDED.

Upload results via links

Run your code

Download inputs via links

Send links to your data to Forge DA (permissions!)

Make your data available in the cloud

Azure
Google
Dropbox
Box
Others…
Building Products

Inventor

IAM

Simplified Model + meta-data

Shrinkwrap

Facilities Management

Revit

RFA
Design Automation API for Inventor

Use Inventor data in cloud-native applications to automate at scale

Configure
- Engineering Automation
- Sales Configuration
- iLogic

Export
- CAD Formats
- Drawings
- BOM
- Custom Interop

Generate
- Parts Data Warehouse
- Model Validation
- Bulk Operations
The API

<table>
<thead>
<tr>
<th>V3 HTTP Endpoint</th>
<th>Programming concept</th>
<th>Product concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>/workitems</td>
<td>Function call</td>
<td>Product execution, job</td>
</tr>
<tr>
<td>/activities</td>
<td>Function definition</td>
<td>Input/Output types, parameters</td>
</tr>
<tr>
<td>/appbundles</td>
<td>Shared library</td>
<td>Plugin</td>
</tr>
<tr>
<td>/engines</td>
<td>Instruction set</td>
<td>Product (inventor, autocad..) to use</td>
</tr>
</tbody>
</table>
Inventor Engines

- Multiple Versions
- Run jobs in parallel
- Optimized for Inventor workflows
- iLogic and translator plugins loaded
- Custom plug-ins
- No license needed, just pay for use

- Limited Excel (read not write)
- No sticky sessions
- No Application Add-ins (Frame Generator, T&P…)

Runs in a “sandbox”
- One job per worker, nothing shared with anyone else
- Protects your code, protects our infrastructure
- No access outside of working directory

Quotas and Limits
- Input and Output file size
- Job duration
Sample walkthrough
Details with Postman
Postman collection for Design Automation

The collection contains a group of saved requests which are organized into folders. To use the collection, follow these steps:

- Download Postman
- Import all json files
  - Design Automation public.postman_collection.json
  - OSS collection.postman_collection.json
  - das-prd.postman_environment.json
a quick aside | anatomy of an activity
variable expansion

```
"commandLine": [
  "$(engine.path)\InventorCoreConsole.exe /al $(appbundles[DaWrenchConfig].path) $(args[DocumentParams].path) /i $(args[InventDoc].path)"
],
"parameters": {
  "InventDoc": {
    "zip": true,
    "verb": "get",
    "description": "Assembly Zip",
    "localName": "Wrench"
  },
  "DocumentParams": {
    "verb": "get",
    "description": "Json file containing User Parameters",
    "localName": "documentParams.json"
  },
  "OutputZip": {
    "verb": "put",
    "description": "Resulting assembly",
    "localName": "result.zip"
  }
},
"id": "PADkTk2xPFGbB2gH2iHyPjGAGfrwQc.DaWrenchConfig+alpha",
"engine": "Autodesk.Inventor+24",
"appbundles": [
  "PADkTk2xPFGbB2gH2iHyPjGAGfrwQc.DaWrenchConfig+alpha"
]
```
WorkItem result log


"Id": "e8282428678a4f26be46bf177b453e0c"
"ActivityId": "PADtk2xPfgb2GahL2iHyPjGAGFrmwQc.DaWrenchConfig+alpha"
"Engine.Id": "Autodesk.Inventor!4"
"Apps": ["App.Id": "PADtk2xPfgb2GahL2iHyPjGAGFrmwQc.DaWrenchConfig!3"

"BoundArguments": {
  "InventorDoc": {
    "zip": true,
    "localName": "Wrench",
    "pathInZip": "Wrench.iam",
    "headers": {
      "Authorization": "Bearer <your token>"
    }
  },
  "DocumentParams": {
    "localName": "documentParams.json",
    "url": "data:application/json, {"WrenchSz": "\\\"Medium\\\"", "JawOffset": "40 mm", "PartMaterial": "\\\"Cast Bronze\\\""}"
  },
  "OutputZip": {
    "localName": "result.zip",
    "headers": {
      "Authorization": "Bearer <your token>"
    },
    "verb": "put"
When things go wrong
postman
Best practices
Keep data close to workers with Forge DM/OSS for WIP.
Templates, static data in AppBundles

Inventor Assembly

params to change

AppBundle

Templates, Static Data and code

your web service

Results

+ your web service
'activityId': activityId,
'arguments': {
    'InventorDoc': {
        'url': signedUrl
    },
    'InventorParams': {
        'url': 'data:application/json,\"' + paramname + '\": \"' + paramvalue + '\\"'}
},
'OutputIpt': {
    'url': outputUrl,
    'verb': 'put',
    'headers': {
        'Authorization': 'Bearer ' + access_token,
        'Content-type': 'application/octet-stream'
    }
},
'onComplete': {
    'verb': 'post',
    'url': FORGE_CALLBACK_HOST + '/api/forge/workitem/complete'
}
Granularity of WorkItems

Open Time vs. Processing Time
Where to go for more…
Forge Accelerator

http://autodeskcloudaccelerator.com

Autodesk Forge Accelerator Programs

Expand your business with Autodesk Forge

A series of Accelerator programs for creative developers to spend quality time working on a Forge project.

Current offering for 2019

Paris, France – December 9-13

Current offering for 2020

San Francisco, CA – January 13-17
Bogota, Colombia – February 3-7
London, United Kingdom – February 17-21
Sydney, Australia – March 9-13
São Paulo, Brazil – April 6-10
Boston, MA – April 27-May 1
Barcelona, Spain – June 8-12

Contact us if you are interested in a future Accelerator.
Learn Autodesk Forge

Learn the basics of authentication, data management, file translation, and model rendering, with our quickstart guides.

What is it?

Forge enables companies to leverage design and engineering data to develop custom software applications and connected workflows for manufacturing, media/entertainment, architecture, engineering, and construction.

- **View 3D models directly in your browser**: The Viewer allows you to embed, interact with, and retrieve meta data about design files in over 50 formats right in your browser, without having to install extra software.
- **Centrally manage data**: The Data Management API allows you to access your data and interact with it, providing a single source of truth for your design and engineering processes.
Forge Community

Community
- Twitter: @AutodeskForge
- Facebook @AdskForge
- YouTube: https://forge.autodesk.com/YouTube
- Blog: https://forge.autodesk.com/blog
- Stackoverflow: https://stackoverflow.com/questions/tagged/autodesk-designautomation

Design Automation for Inventor
InventorOn Forge@autodesk.com
the source

Wrench Demo
https://github.com/akenson/da-wrench-config

Configuration App
https://github.com/akenson/da-devcon2019

Postman Collection
https://github.com/Developer-Autodesk/design.automation-postman.collection