

3ds Max Design Automation: Add Beautiful Renders to Your Web Site

Denis Grigor

Developer Advocate | @apprentice3d



About the speaker

Denis Grigor

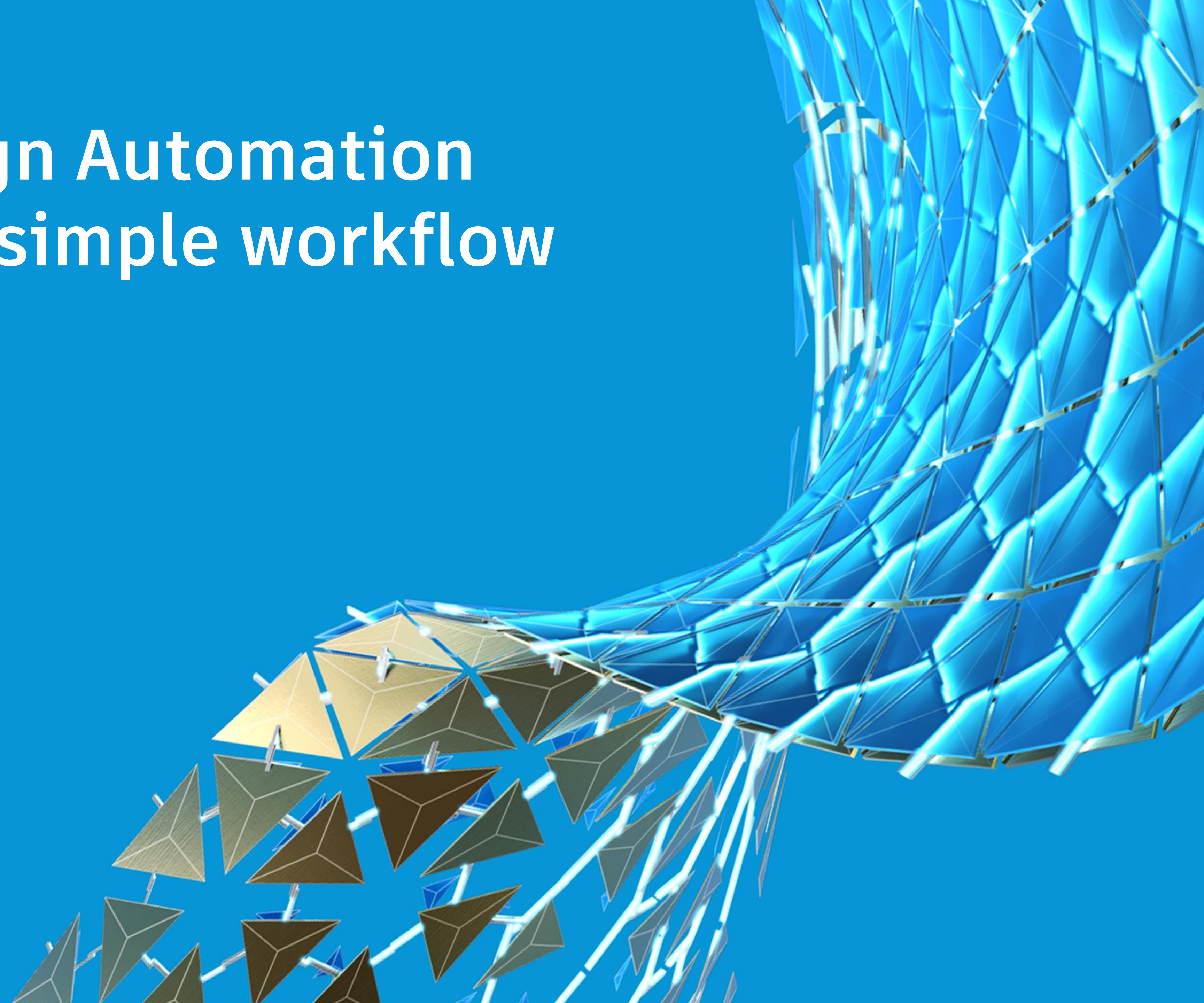
He likes to know how everything works under the hood, and is not afraid of low-level stuff like bits, buffers, pointers, stack, heap, threads, shaders and of course Math.

He is interested in 3D for Web, from raw WebGL to libraries and frameworks with different levels of abstractions.

Agenda

- **Review Design Automation and create a simple workflow**
- **Create still renderings using Design Automation for 3ds Max**
- **Use Forge Viewer to setup scene and send jobs to Design Automation for 3ds Max**
- **Review the strengths and limitations of using Design Automation for 3ds Max as a rendering solution**

Review Design Automation and create a simple workflow



Design Automation concepts

ENGINE

The actual processing engine that runs the WorkItem job and processes the Activity.

ACTIVITY

The specification of an action that can be executed using a specified engine.

APPBUNDLE

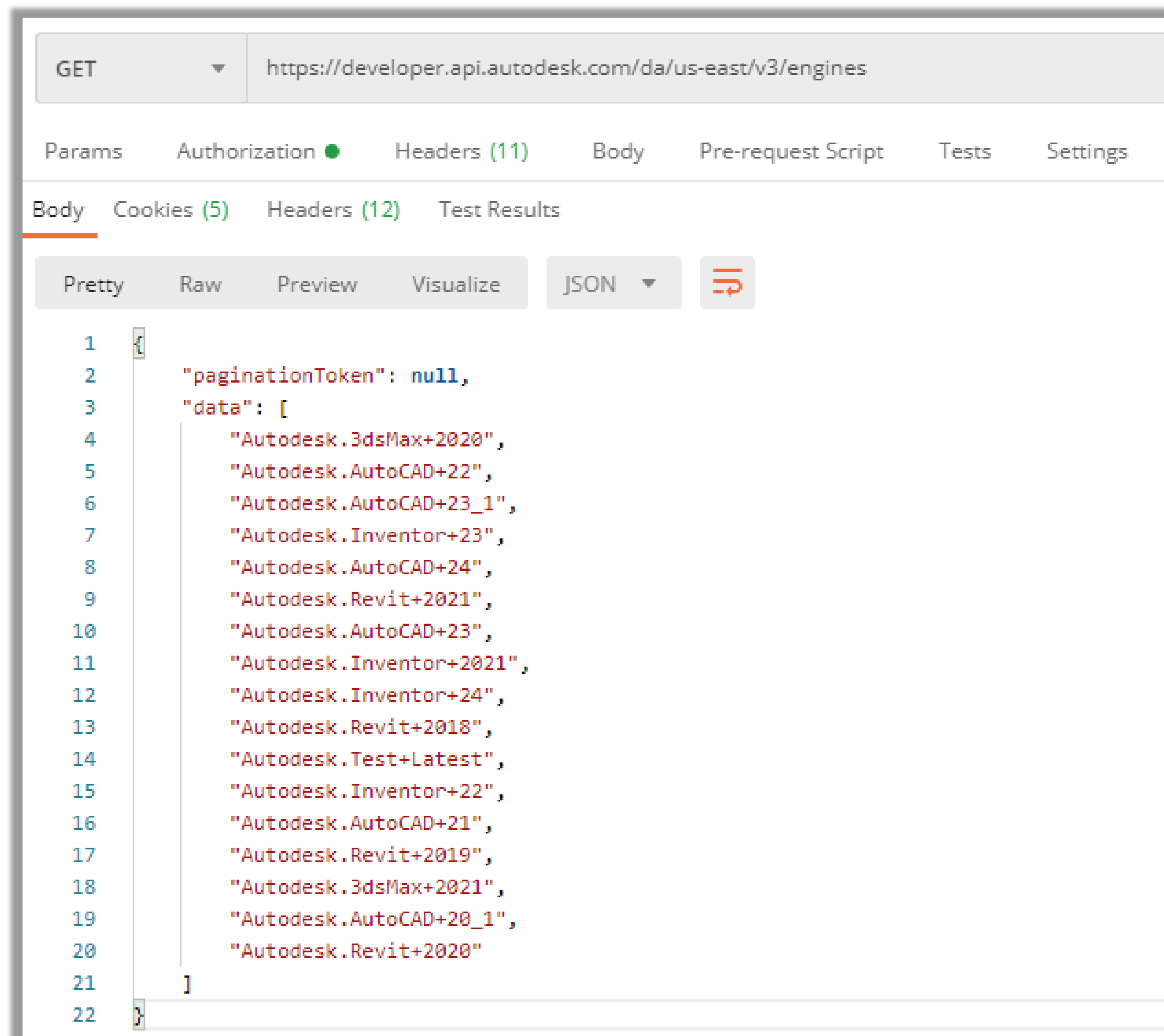
A module referenced by an Activity in order to perform specific functions.

WORKITEM

A job that executes a specified Activity, using specified input files and generating appropriate output files.

Engine

The actual processing engine that runs the WorkItem job and processes the Activity.



Activity

The specification of an action that can be executed using a specified engine.

```
1 {  
2   "id": "GetRenderList",  
3   "commandLine": "$(engine.path)/3dsmaxbatch.exe \"$(args[script].path)\"",  
4   "description": "Gets the list of available renderers",  
5   "appbundles": [  
6     ],  
7   "engine" : "Autodesk.3dsMax+2021",  
8   "parameters": {  
9     "script": {  
10      "verb": "get",  
11      "required": "true",  
12      "description": "script containing function calls and params"  
13    },  
14    "OutputFile": {  
15      "zip": false,  
16      "ondemand": false,  
17      "verb": "put",  
18      "description": "List of available renderers",  
19      "required": true,  
20      "localName": "output.json"  
21    }  
22  }  
23 }
```

func GetRenderList(**Script**, **InputFile**) => **OutputFile** { ... }

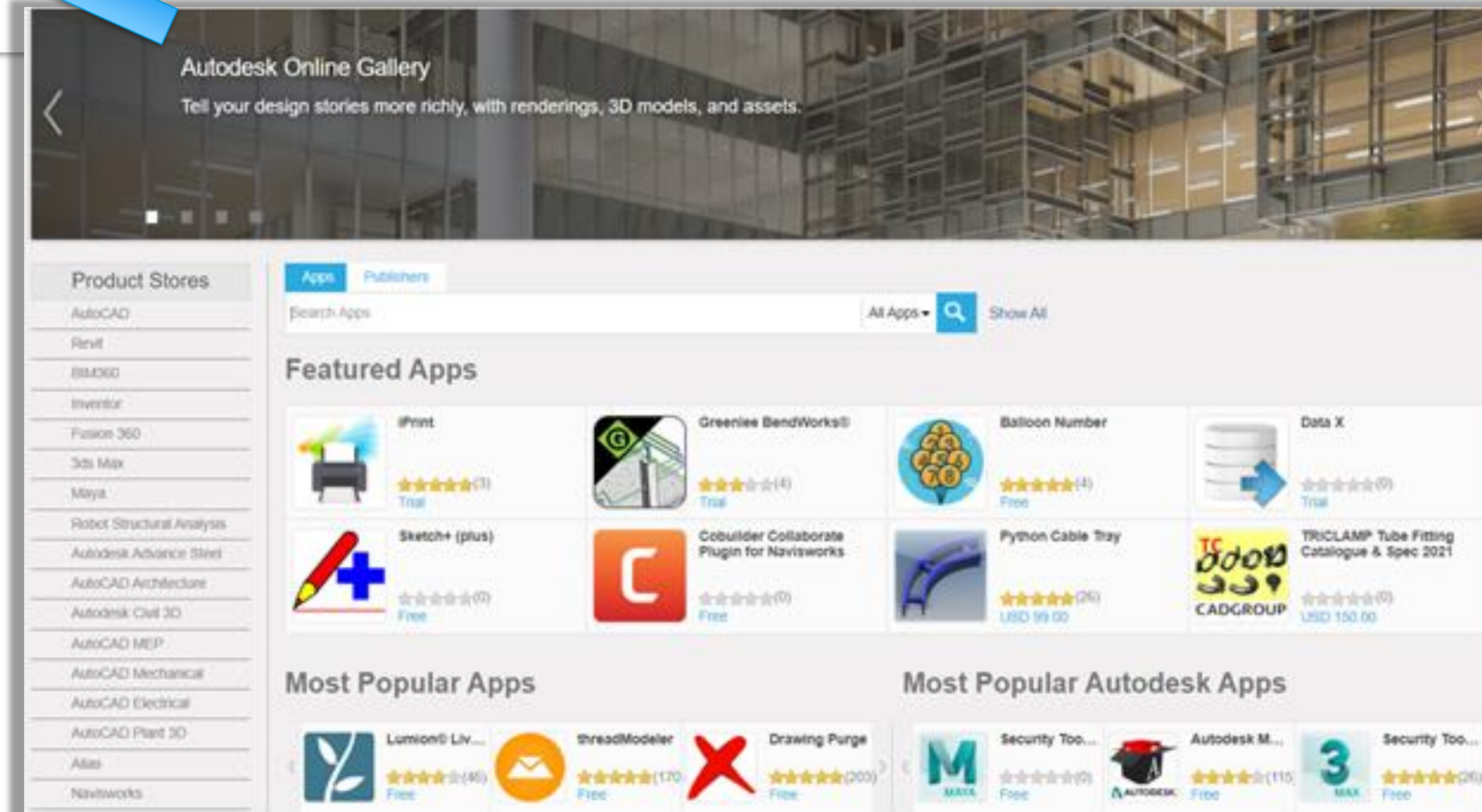


2021

AppBundle

A module referenced by an Activity in order to perform specific functions.

```
{
  "id" : "ListMyObjects",
  "commandLine": "$(engine.path)/3dsmaxbatch.exe -sceneFile \"$(args[InputFile].path)\" \"$(apps[ListMyObjects].path)/run.ms\"",
  "description": "run a ms and return OutputMax file",
  "apps": [
    "denix.ListMyObjects+test"
  ],
  "engine" : "Autodesk.3dsMax+N802",
  "parameters": {
```



```
<?xml version="1.0" encoding="utf-8"?>
<ApplicationPackage
  SchemaVersion="1.0"
  AutodeskProduct="3ds Max"
  ProductType="Application"
  ProductCode="3ds Max Design Share Plugin">
  <CompanyDetails />
  <Components Description="pre-start-up scripts parts">
    <RuntimeRequirements
      OS="Win64"
      Platform="3ds Max"
      SeriesMin="2018"
      SeriesMax="2019" />
    <ComponentEntry
      AppName="ListMyObjects"
      Version="1.0.0"
      ModuleName="./Content/ListMyObjects.ms" />
  </Components>
</ApplicationPackage>
```

Check the class: SD473707 App Bundle: cross-distribution for Autodesk products, App Store and Forge

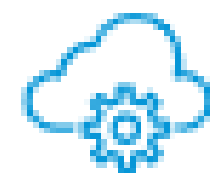
WorkItem

A job that executes a specified Activity, using specified input files and generating appropriate output files.

```
1 {
2   "activityId": "{{nickname}}.{{ActivityID}}+{{ActivityAlias}}",
3   "arguments": {
4     "script" : {
5       "verb": "get",
6       "url": "http://dc91342f0d53.ngrok.io/scripts/run.ms"
7     },
8     "InputFile": {
9       "url": "https://sample-collection.s3.amazonaws.com/assets/models/radiosity.max",
10      "verb": "get"
11    },
12    "OutputFile": {
13      "url": "https://developer.api.autodesk.com/oss/v2/signedresources/dcafb539-7412-4856-8477-a28772faa6b6?region=US",
14      "verb": "put"
15    }
16  }
17 }
```



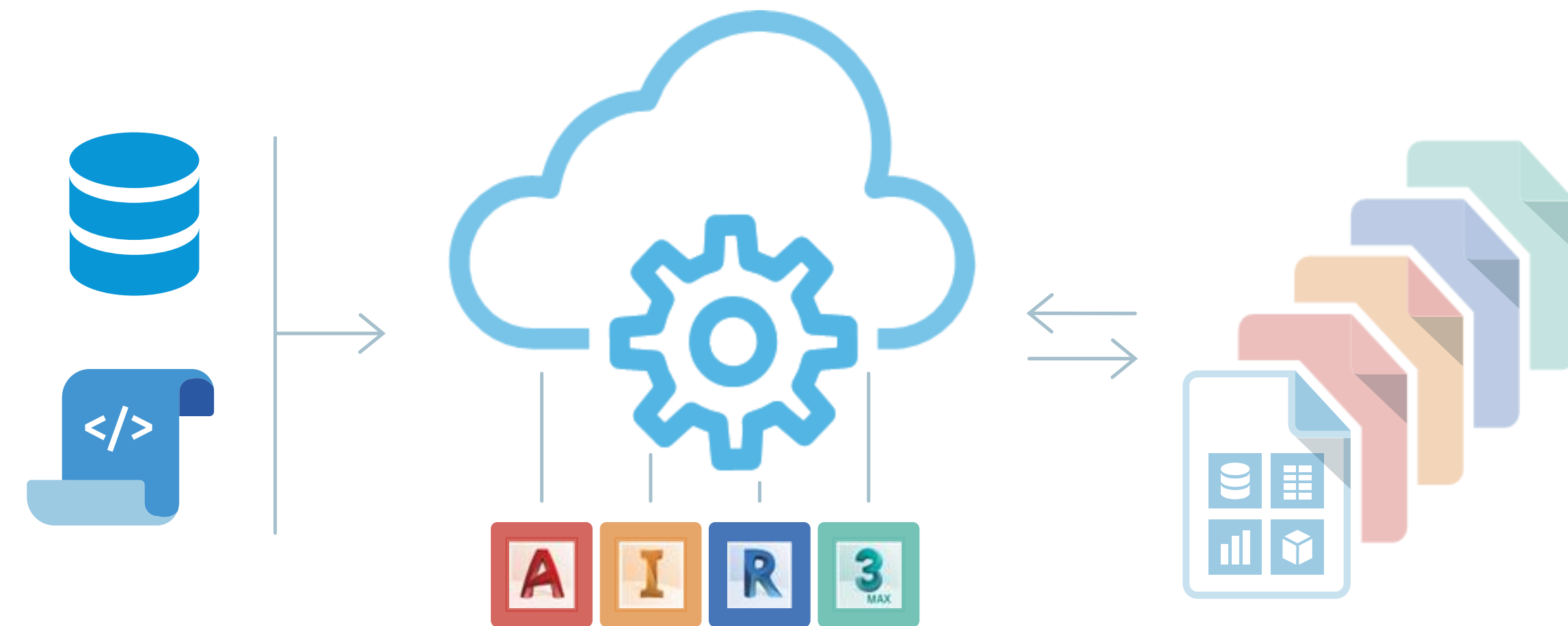
OutputFile := NameOfActivity(script = "the url", InputFile = "the other url")



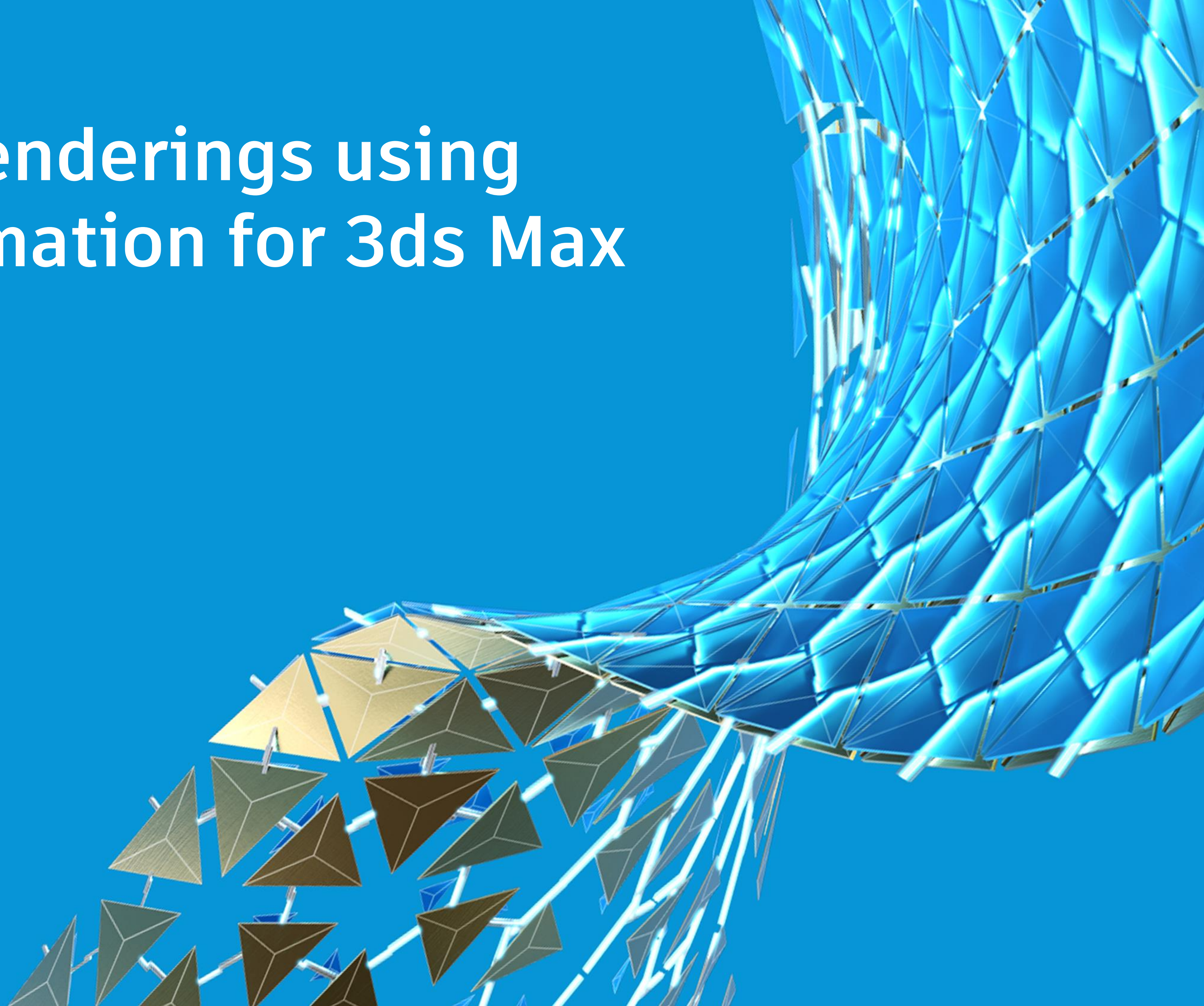
Design Automation API v3

Workflow

- List the available engines and pick one
- (Optional) Create the appbundle and upload it
- Create the activity.
- Create the work item (or more).
- Start the job and get the results upon completion.



Create still renderings using Design Automation for 3ds Max



Engine

```
1  {  
2    "paginationToken": null,  
3    "data": [  
4      "Autodesk.3dsMax+2020",  
5      "Autodesk.AutoCAD+22",  
6      "Autodesk.AutoCAD+23_1",  
7      "Autodesk.Inventor+23",  
8      "Autodesk.AutoCAD+24",  
9      "Autodesk.Revit+2021",  
10     "Autodesk.AutoCAD+23",  
11     "Autodesk.Inventor+2021",  
12     "Autodesk.Inventor+24",  
13     "Autodesk.Revit+2018",  
14     "Autodesk.Test+Latest",  
15     "Autodesk.Inventor+22",  
16     "Autodesk.AutoCAD+21",  
17     "Autodesk.Revit+2019",  
18     "Autodesk.3dsMax+2021",  
19     "Autodesk.AutoCAD+20_1",  
20     "Autodesk.Revit+2020"  
21   ]  
22 }
```



?



2020



2021

Activity

```
1  {
2      "id": "RenderDefaultCamera",
3      "commandLine": "$(engine.path)/3dsmaxbatch.exe -sceneFile \"$(args[InputFile].path)\" \"$(settings[script].path)\",
4      "description": "Renders having the current camera selected",
5      "appbundles": [],
6      "engine" : "Autodesk.3dsMax+2021",
7      "parameters": {
8          "InputFile" : {
9              "zip": false,
10             "description": "Input 3ds Max file",
11             "ondemand": false,
12             "required": true,
13             "verb": "get",
14             "localName": "radiosity.max"
15         },
16         "OutputFile": {
17             "zip": false,
18             "ondemand": false,
19             "verb": "put",
20             "description": "Output rendered file",
21             "required": true,
22             "localName": "output.png"
23         }
24     },
25     "settings": {
26         "script": 'render outputfile:(sysInfo.currentdir + "/output.png") outputsize:[800, 600]'
27     }
28 }
```

WorkItem

```
1  {
2    "activityId": "Denix.RenderDefaultCamera+test",
3    "arguments": {
4      "InputFile": {
5        "url": "https://sample-collection.s3.amazonaws.com/assets/models/radiosity.max",
6        "verb": "get"
7      },
8      "OutputFile": {
9        "url": "https://developer.api.autodesk.com/oss/v2/signedresources/03316e91-dee8-4f58-8ad3-3c43c88357b4?region=US",
10       "verb": "put"
11     }
12   }
13 }
```


WorkItem

```
1  {
2    "activityId": "Denix.RenderDefaultCamera+test",
3    "arguments": {
4      "InputFile": {
5        "url": "https://sample-collection.s3.amazonaws.com/assets/models/radiosity.max",
6        "verb": "get"
7      },
8      "OutputFile": {
9        "url": "https://developer.api.autodesk.com/oss/v2/signedresources/e9a762e1-c0af-4d59-9461-508e1cc426e2?region=US",
10       "verb": "put"
11     },
12     "onProgress": {
13       "verb": "post",
14       "url": "http://1182877cf25b.ngrok.io/postFromDA"
15     },
16     "onComplete": {
17       "verb": "post",
18       "url": "http://1182877cf25b.ngrok.io/postFromDA"
19     }
20   }
21 }
```

WorkItem

```
1  {
2    "activityId": "Denix.RenderDefaultCamera+test",
3    "arguments": {
4      "InputFile": {
5        "url": "https://sample-collection.s3.amazonaws.com/assets/models/radiosity.max",
6        "verb": "get"
7      },
8      "OutputFile": {
9        "url": "https://developer.api.autodesk.com/oss/v2/signedresources/03316e91-dee8-4f58-8ad3-3c43c88357b4?region=US",
10       "verb": "put"
11     }
12   }
13 }
```

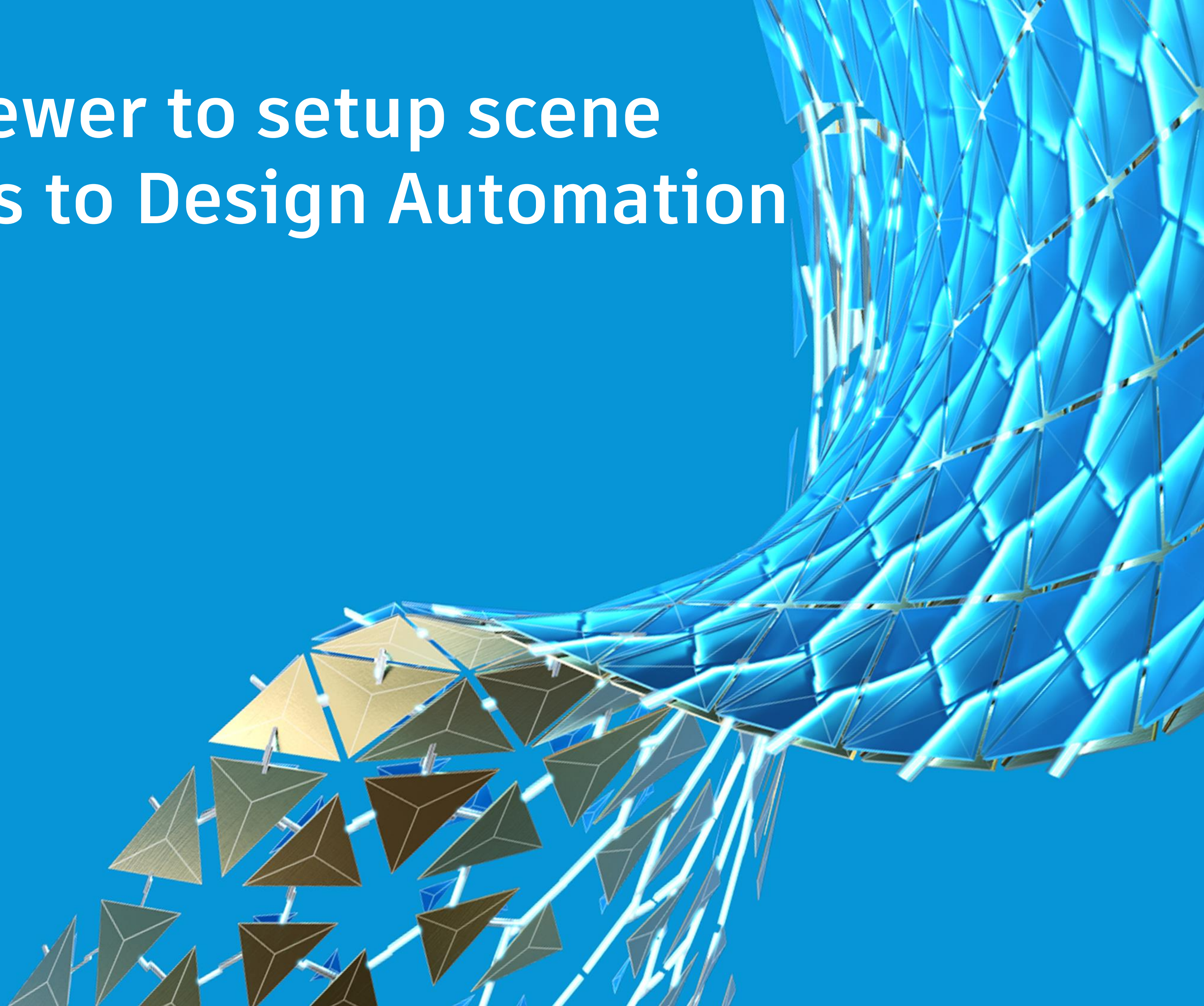

Report

```
39 }
40 "Quotas":{
41   "limitProcessingTimeSec": 3600,
42   "limitTotalUncompressedAppsSizeInMB": 5000
43 }
44 [10/19/2020 01:50:07] Starting work item 9571bbd17bb144438bad0e424cf8e7ae
45 [10/19/2020 01:50:17] Start download phase.
46 [10/19/2020 01:50:17] Start downloading input: verb - 'GET', url - 'https://sample-collection.s3.amazonaws.com/assets/models/radiosity.max'
47 [10/19/2020 01:50:18] '15740928' bytes have been written to T:\Aces\Jobs\9571bbd17bb144438bad0e424cf8e7ae\radiosity.max.
48 [10/19/2020 01:50:18] End downloading file 'https://sample-collection.s3.amazonaws.com/assets/models/radiosity.max'.
49 [10/19/2020 01:50:18] End download phase successfully.
50 [10/19/2020 01:50:18] Start preparing script and command line parameters.
51 [10/19/2020 01:50:18] Command line: [ -sceneFile "T:/Aces/Jobs/9571bbd17bb144438bad0e424cf8e7ae/radiosity.max" "T:\Aces\Jobs\9571bbd17bb144438bad0e424cf8e7ae\setting_script.ms"]
52 [10/19/2020 01:50:18] End preparing script and command line parameters.
53 [10/19/2020 01:50:18] Start script phase.
54 [10/19/2020 01:50:18] ### Command line arguments: /exe "T:\Aces\AcesRoot\23.2.0.2215\coreEngine\3dsmaxbatch.exe" -sceneFile "T:/Aces/Jobs/9571bbd17bb144438bad0e424cf8e7ae/radiosity.max"
    "T:\Aces\Jobs\9571bbd17bb144438bad0e424cf8e7ae\setting_script.ms".
55 [10/19/2020 01:50:18] Start 3DS Max Core Engine standard output dump.
56 [10/19/2020 01:50:19] 10/19/2020 1:50:18 AM; 3ds Max Install Location: T:\Aces\AcesRoot\23.2.0.2215\coreEngine\
57 [10/19/2020 01:50:19] 10/19/2020 1:50:18 AM; 3ds Max Executable: 3dsmax.exe
58 [10/19/2020 01:50:19] 10/19/2020 1:50:18 AM; Secure Mode: 'OFF'
59 [10/19/2020 01:50:19] 10/19/2020 1:50:18 AM; Script command: " -mxs "(filein @"T:\Aces\Jobs\9571bbd17bb144438bad0e424cf8e7ae\setting_script.ms\")""
60 [10/19/2020 01:50:19] 10/19/2020 1:50:18 AM; Scene File: "T:\Aces\Jobs\9571bbd17bb144438bad0e424cf8e7ae\radiosity.max"
61 [10/19/2020 01:50:19] 10/19/2020 1:50:19 AM; Python version: 3
62 [10/19/2020 01:50:19] 10/19/2020 1:50:19 AM; Product version: 3ds Max 2021.2 Update (23.2.0.2215)
63 [10/19/2020 01:50:19] 10/19/2020 1:50:19 AM; Data collection and use: personalize your experience and help us identify product improvements by participating in our data collection and usage programs. Learn more about data
    collection and use: https://www.autodesk.com/company/autodesk-analytics. Autodesk's Privacy Statement: https://www.autodesk.com/company/legal-notice-trademarks/privacy-statement
64 [10/19/2020 01:50:19] 10/19/2020 1:50:19 AM; Data collection and use is 'ON'. Change your participation anytime in the Help menu of 3ds Max.
65 [10/19/2020 01:50:44] 10/19/2020 1:50:44 AM; Initializing Python version: 3.7.6
66 [10/19/2020 01:51:03] 10/19/2020 1:51:03 AM; Task Completed Successfully
67 [10/19/2020 01:51:05] End 3DS Max Core Engine standard output dump.
68 [10/19/2020 01:51:05] End script phase.
69 [10/19/2020 01:51:06] Start upload phase.
70 [10/19/2020 01:51:06] Uploading 'T:\Aces\Jobs\9571bbd17bb144438bad0e424cf8e7ae\output.png': verb - 'PUT', url - 'https://developer.api.autodesk.com/oss/v2/signedresources/03316e91-dee8-4f58-8ad3-3c43c88357b4?region=US'
71 [10/19/2020 01:51:06] End upload phase successfully.
72 [10/19/2020 01:51:06] Job finished with result Succeeded
```



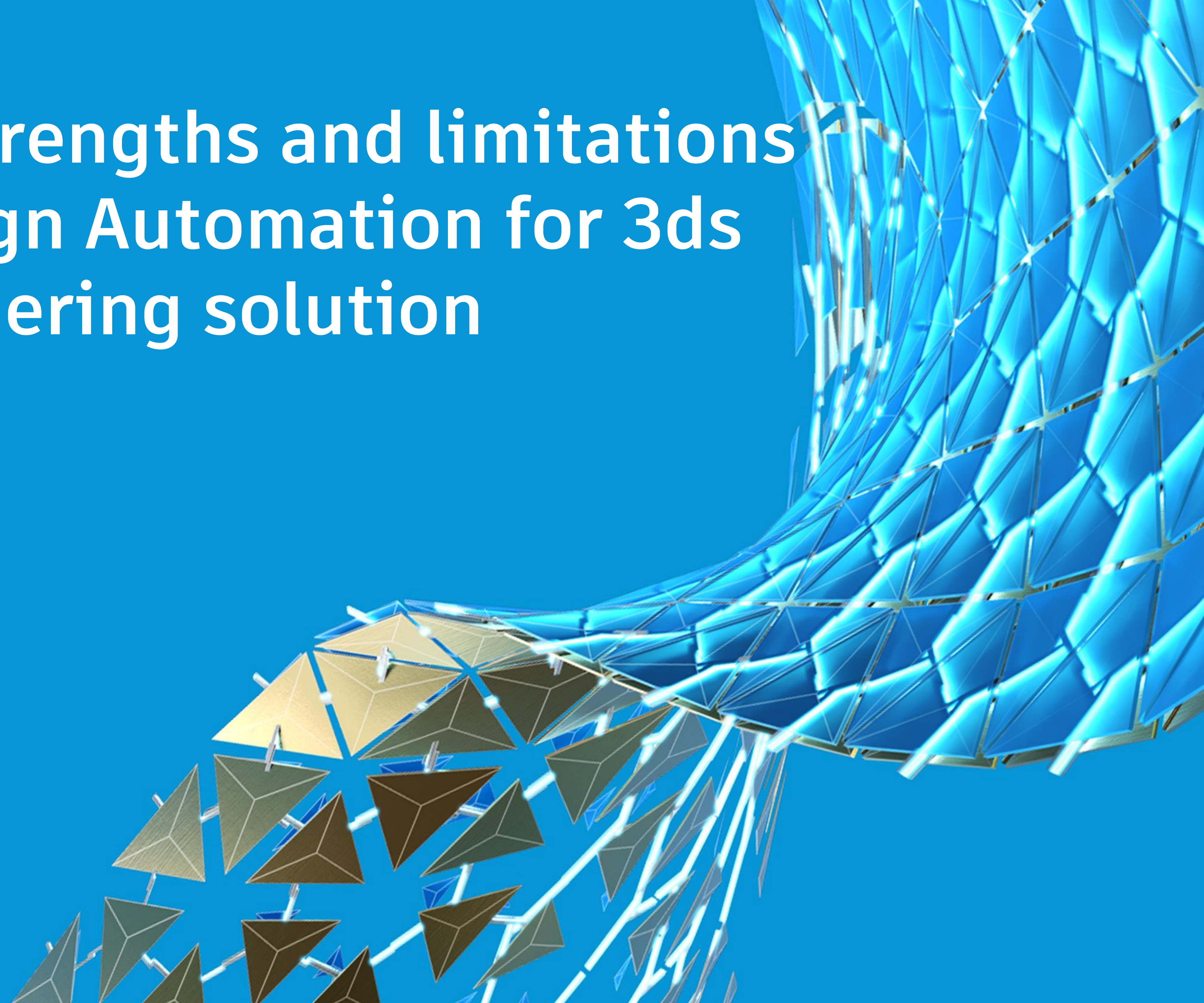
Demo

Use Forge Viewer to setup scene
and send jobs to Design Automation
for 3ds Max



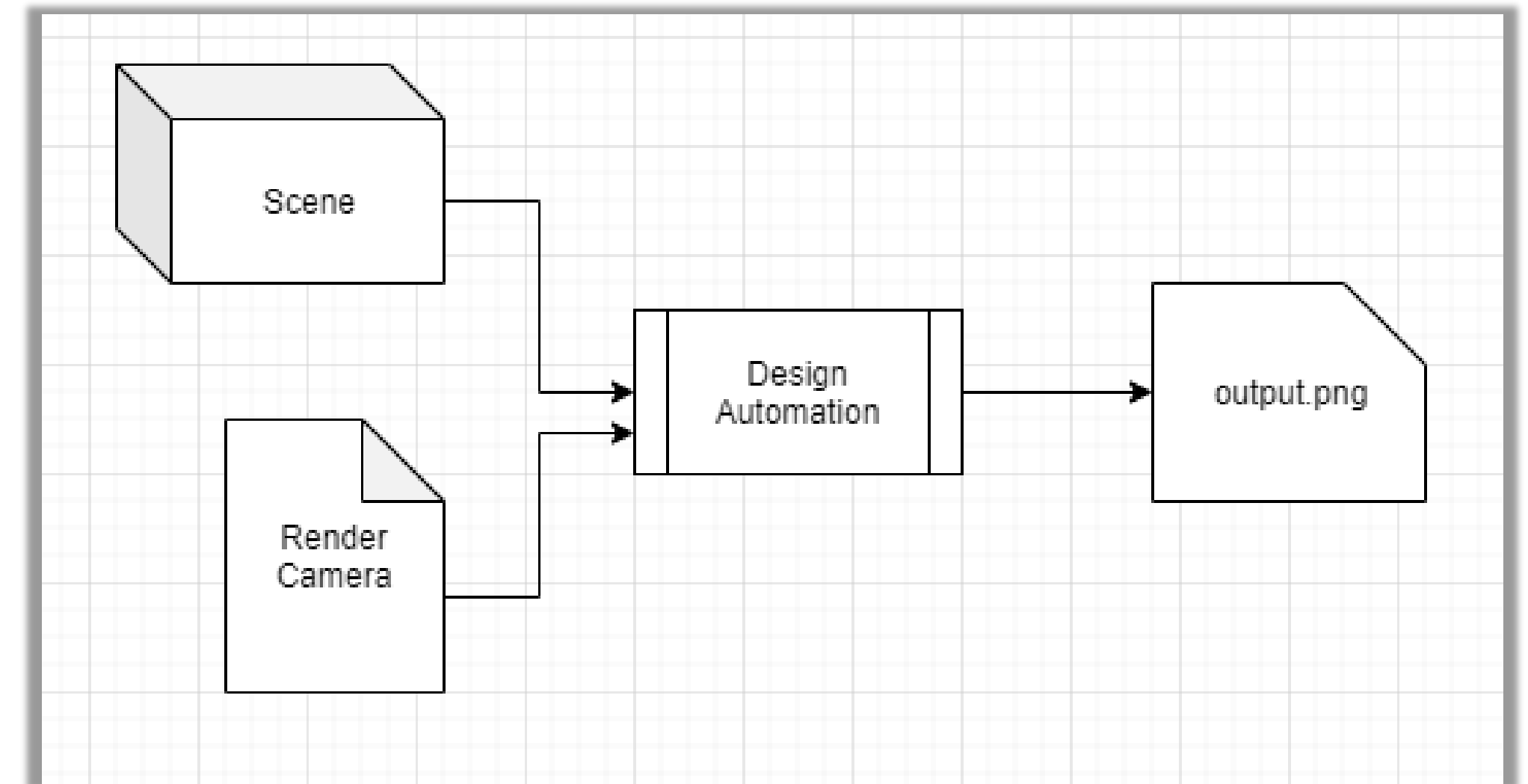
Demo

Review the strengths and limitations of using Design Automation for 3ds Max as a rendering solution



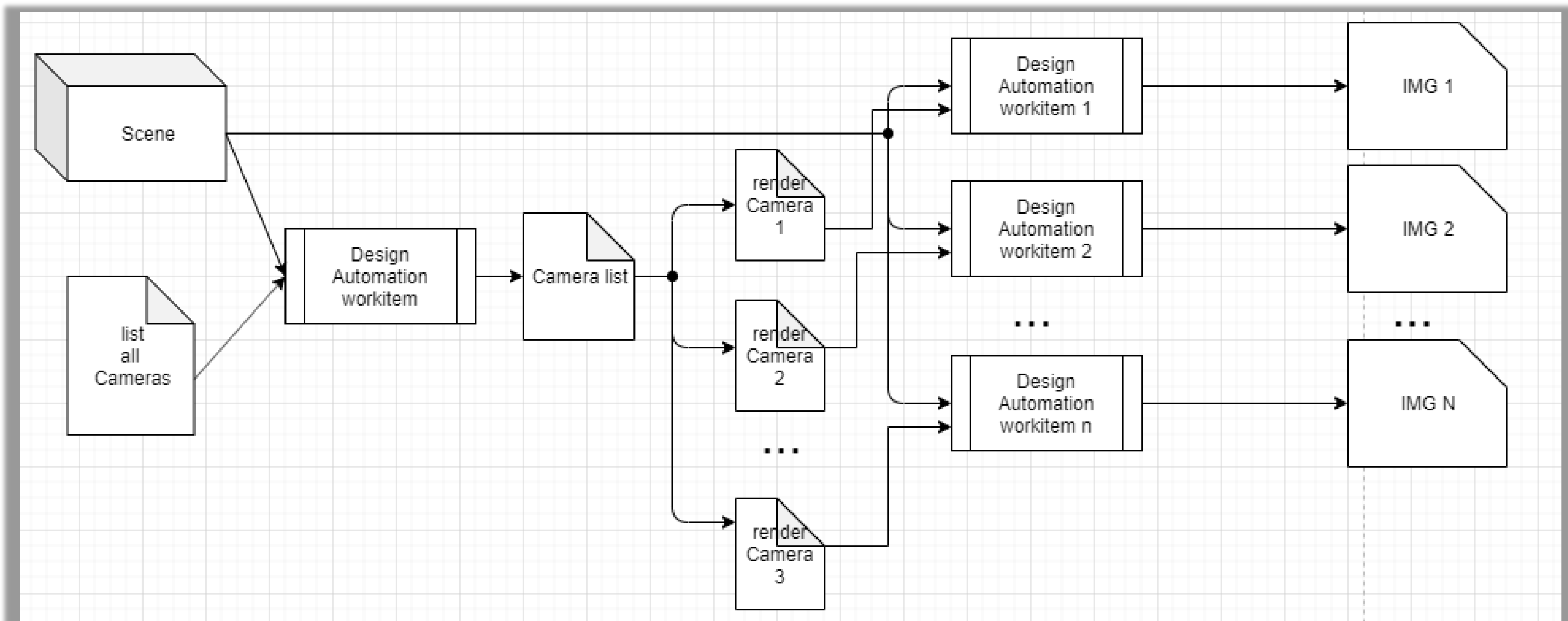
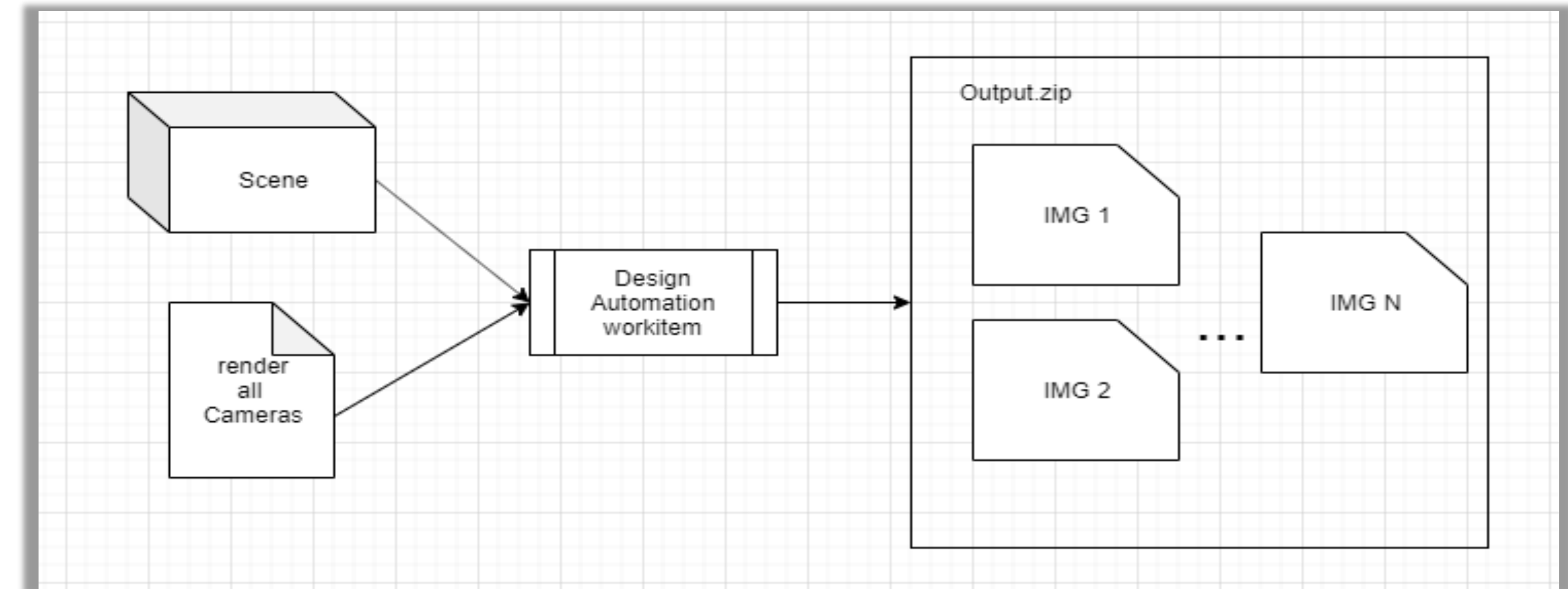
Single rendering tasks

- Easy to setup
- Fire and forget
- Scalable
- Each job is running on a single instance
- No data is reused
- There are no GPUs on Design Automation machines



Multiple rendering tasks

- Easy to setup
- Fire and forget
- Scalable
- Each job is running on a single instance
- There are no GPUs on Design Automation machines
- No data is reused
- Not cost effective



Questions and Resources

Questions?

- **During AU**

- There will be a scheduled Q&A for the version of this English class.
 - Check the English class page for details
 - English class is identified as SD473715 - 3ds Max Design Automation: Add Beautiful Renders to Your Web Site
- Comments / Questions section on the Class page
- Forge Answer Bar
 - Search for the Answer Bar from AU site, and then find the Forge specific one
 - Time slots will be available around the clock during this year's Virtual AU event!
 - Also languages and experts will be advertised, so we can help you as much as possible in a “live” setting



Questions?

- **Anytime**

- Look for related topics in the Forge blog, documentation and code samples:
 - https://forge.autodesk.com/en/docs/design-automation/v3/developers_guide/overview/
- Forge Help: <https://forge.autodesk.com/en/support/get-help>
- Have an idea for an awesome Forge App, but need help getting started?
 - Join an accelerator: <https://forge.autodesk.com/accelerator-program>



> Developer's Guide

▼ Step-by-Step Tutorials

▼ Design Automation API for 3ds Max

About this Tutorial

Task 1 - Obtain an Access Token

Task 2 - Create a Nickname

Task 3 - Publish an Activity

Task 4 - Prepare Cloud Storage

Task 5 - Submit a WorkItem

Task 6 - Download the Results

> Design Automation API for AutoCAD

> Design Automation API for Inventor

> Design Automation API for Revit

> Common Tutorials (Advanced)

> Code Samples & Blog Posts

> API Reference

> Change History

FORGE

Accelerator Program

Benefit from dedicated time to develop your Forge application – with direct help from Forge engineering experts.



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