Autodesk Web Services
View & Data API

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The Challenge – Big Data

2D and/or 3D

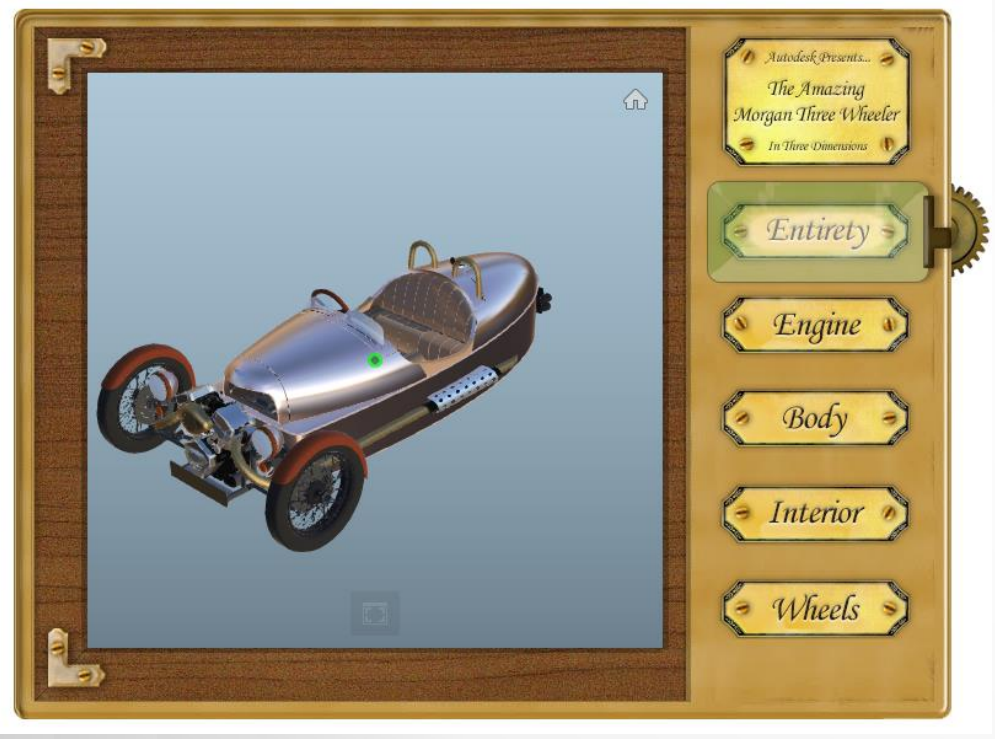
Different formats

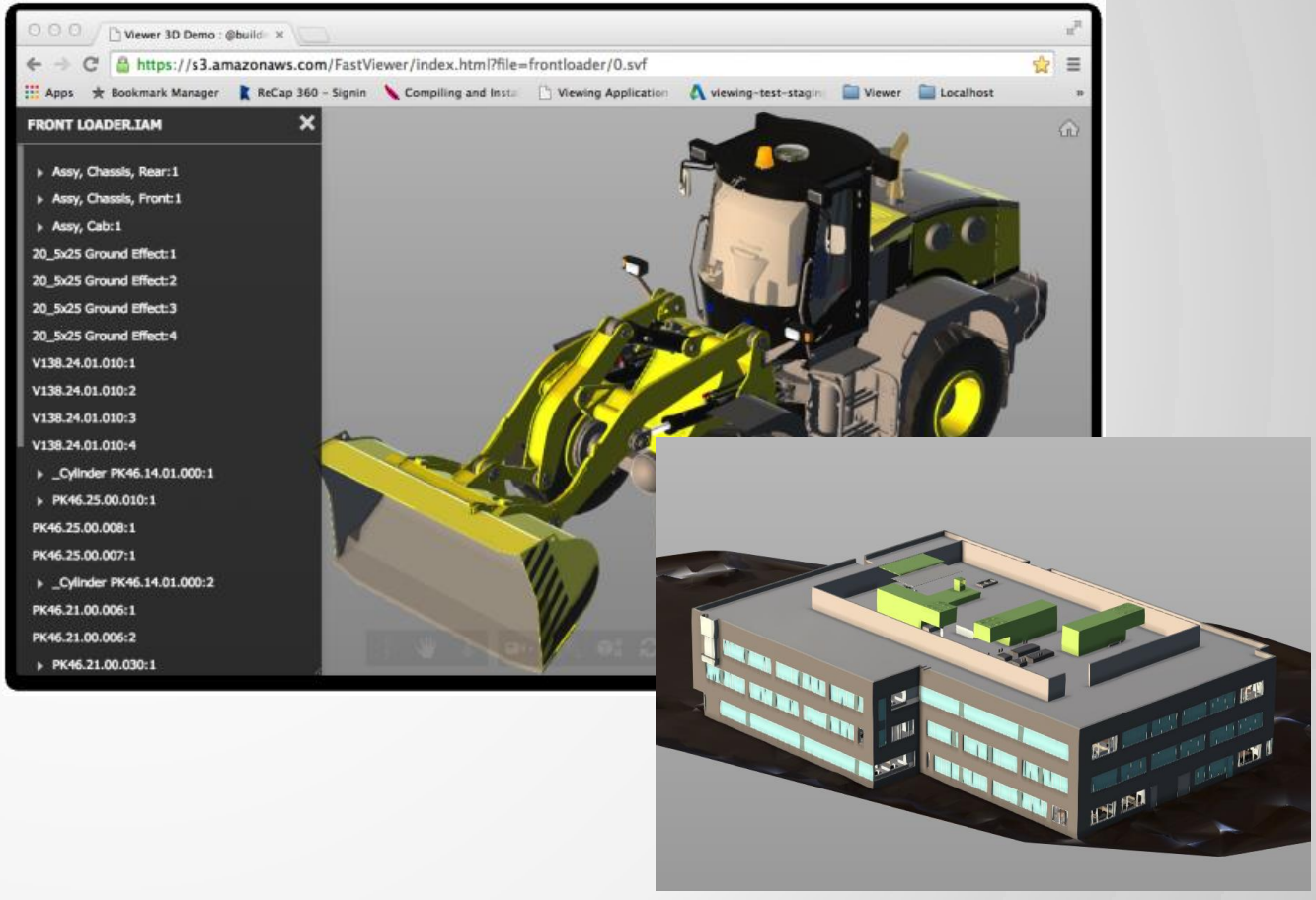
- So many formats, so many software, 只是为了查看模型，大材小用

- DWG – AutoCAD
- RVT – Revit
- DWF
- NWD
- IPT
- …

Autodesk Large Model Viewer

Add interactive 3D viewing to your web application





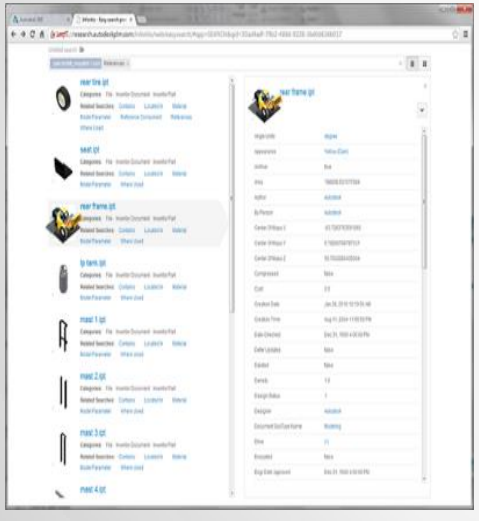
- Autodesk View & Data API
- Getting Started
- Resources

- *Additional resources in appendix*

Autodesk View & Data API

Single Pipeline for Integrated Viewing, Search and Data

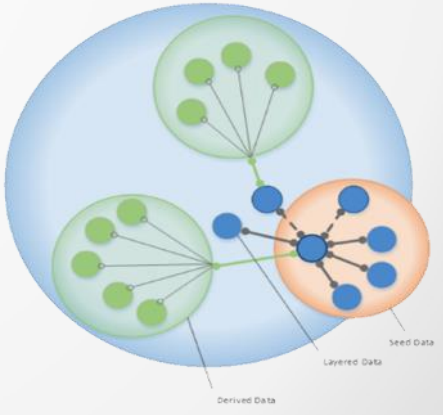
Find it



See it

Empower your application with Autodesk Web Services

Extend it



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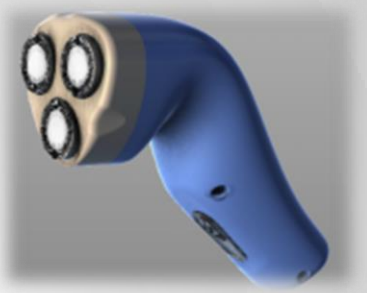
View and Data API

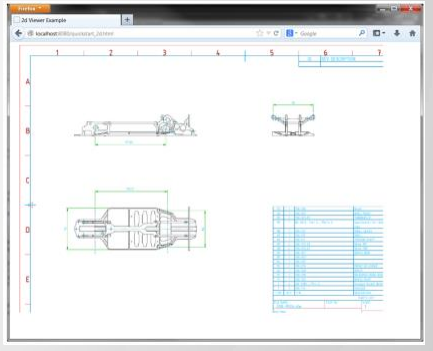
- **REST** Server and Management API
  - Authenticate using oAuth 2.0
  - Upload and translate files
  - Manage access rights
- **JavaScript** Web Client API
  - Viewing technology based on Three.js
  - Embed and control viewer in HTML5 applications
  - Implement user interaction, access documents, manipulate objects, camera, …

WEBGL and Three.js

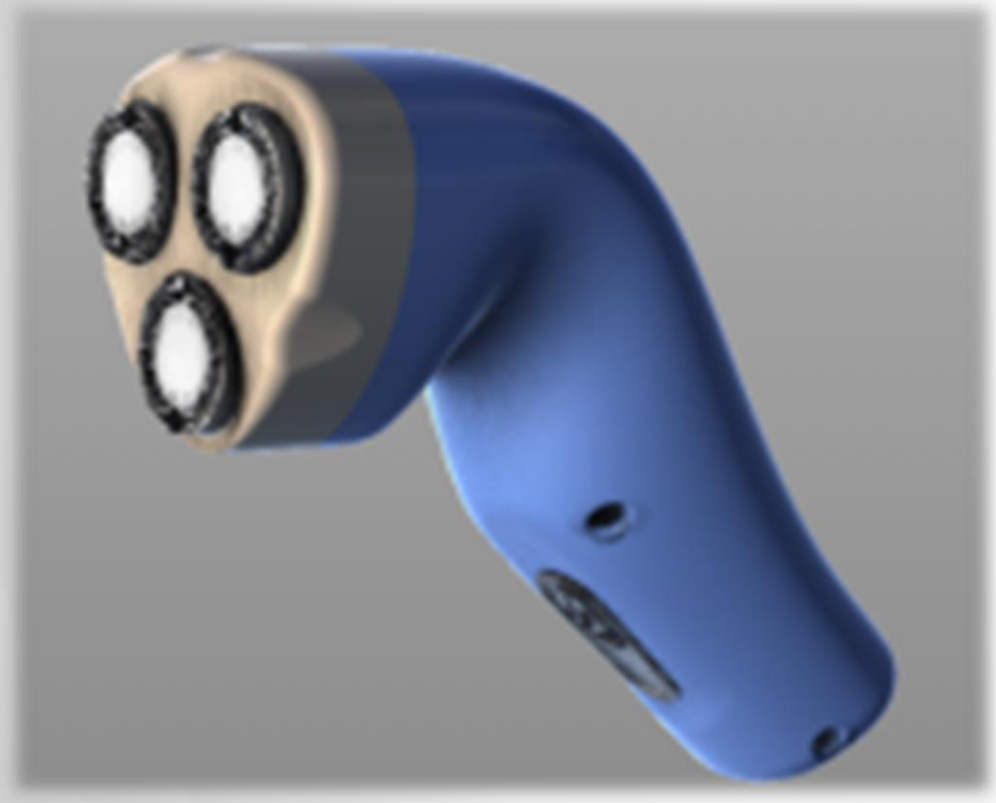
3D First

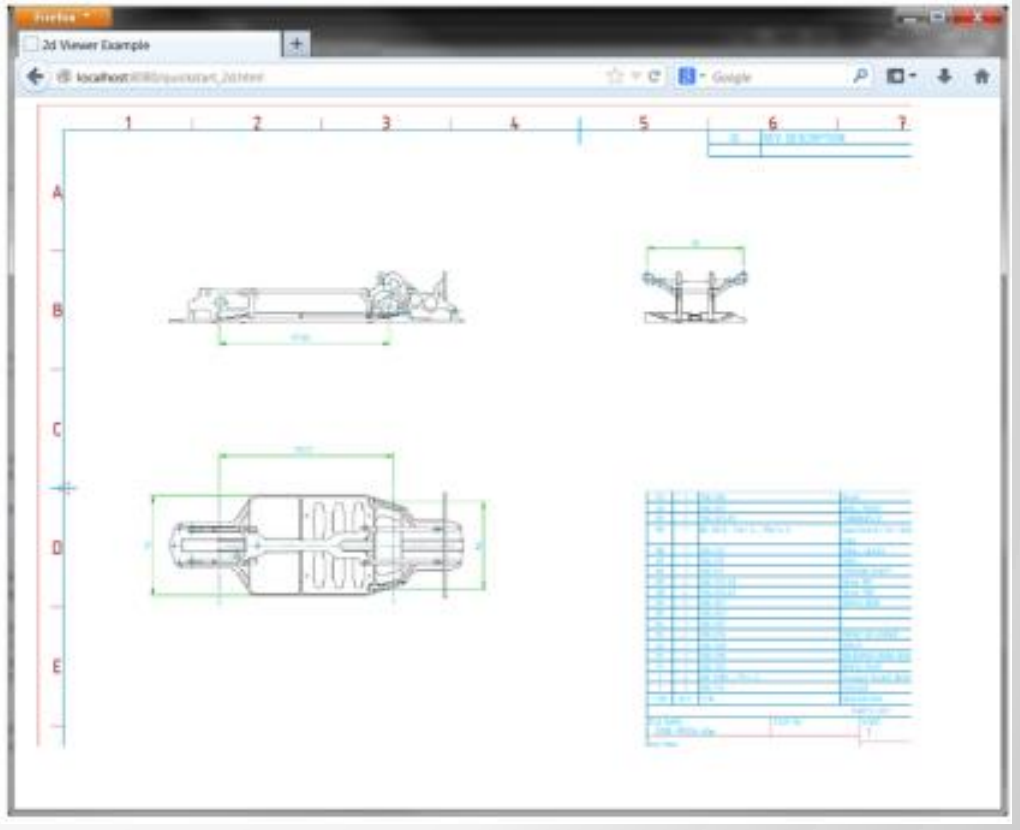


- 3D Functionality
  - Select, view properties, zoom, pan, orbit, isolate, focus, highlight
  - Access to underlying 3D model, e.g. meshes and materials
- 2D Functionality
  - Raster image – zoom and pan only
  - Vector graphics soon – select, view properties, zoom, pan, isolate, focus, highlight



3D First





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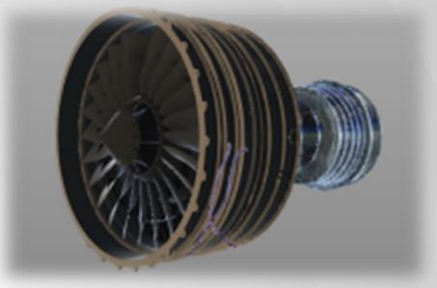
Supported Formats



- dwg, dwt, dwf, dwfx, rvt, iam, ipt, nwc, nwd, f3d, fbx, 3ds, dae, obj, zip, stl, ifc, ige, iges, igs, 3dm, asm, catpart, catproduct, cgr, dlv3, exp, g, jt, model, neu, prt, sab, sat, session, skp, sldasm, sldprt, smb, smt, ste, step, stla, stlb, stp, wire, x_b, x_t, xas, xpr, cam360, sim, sim360
- More coming …

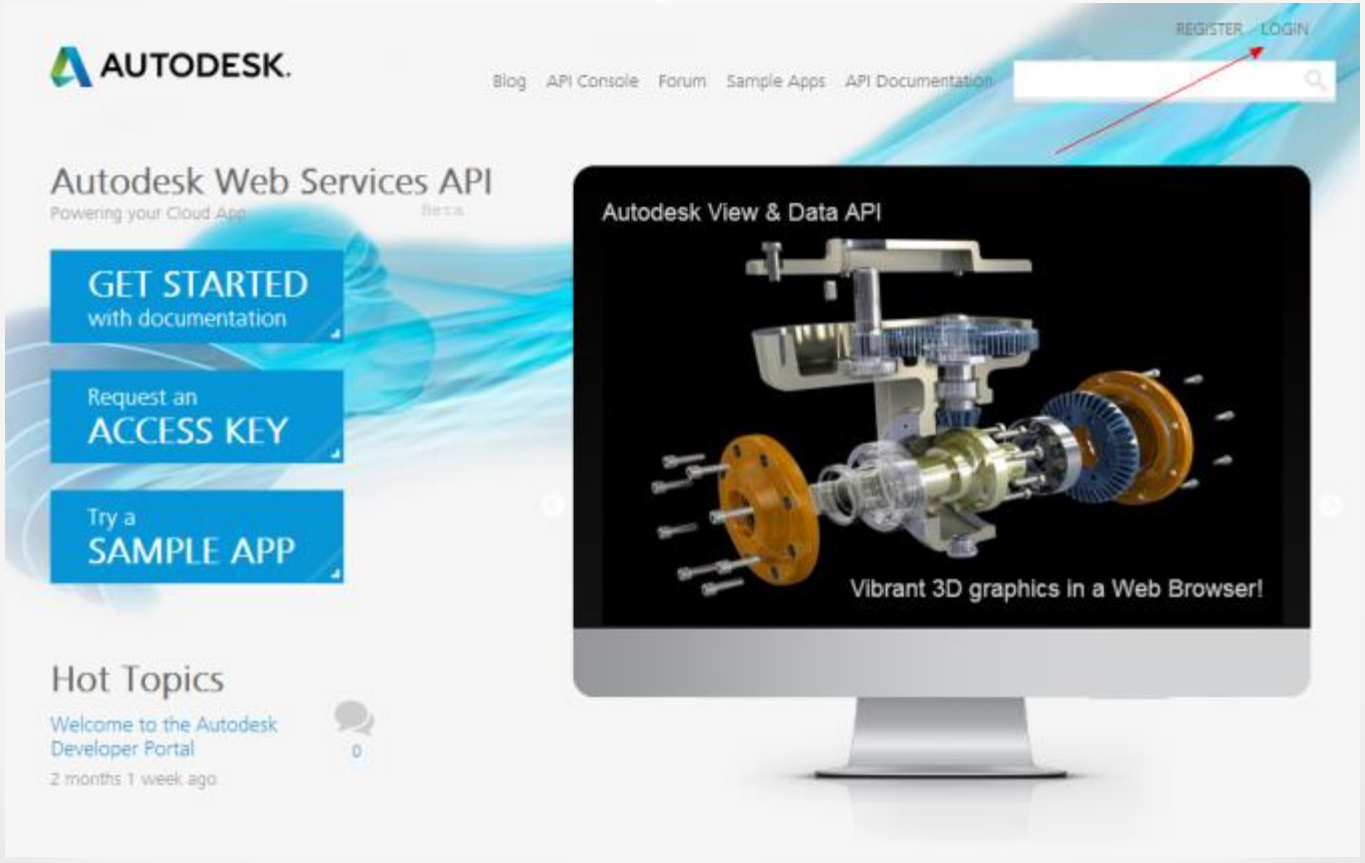
Demos

- Basic viewer
- Simple embedding
- Full workflow demo
- Integration with custom data sources
- Client-side APIs

Getting Started
Server side

Getting Started

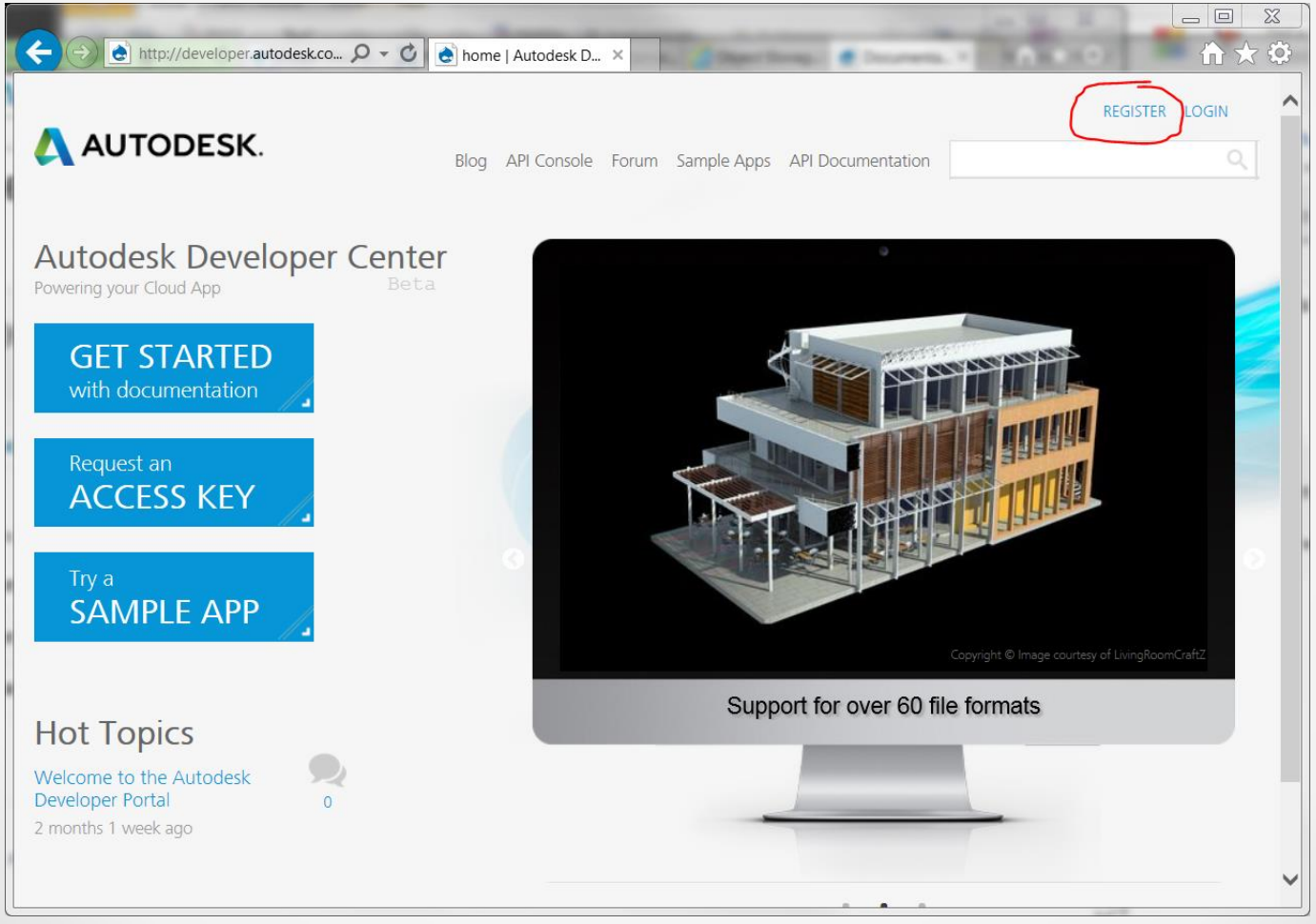
- http://developer.autodesk.com



Getting Started – Server/Management Workflow

Step 1: Register and Create an Application

http://developer.autodesk.com



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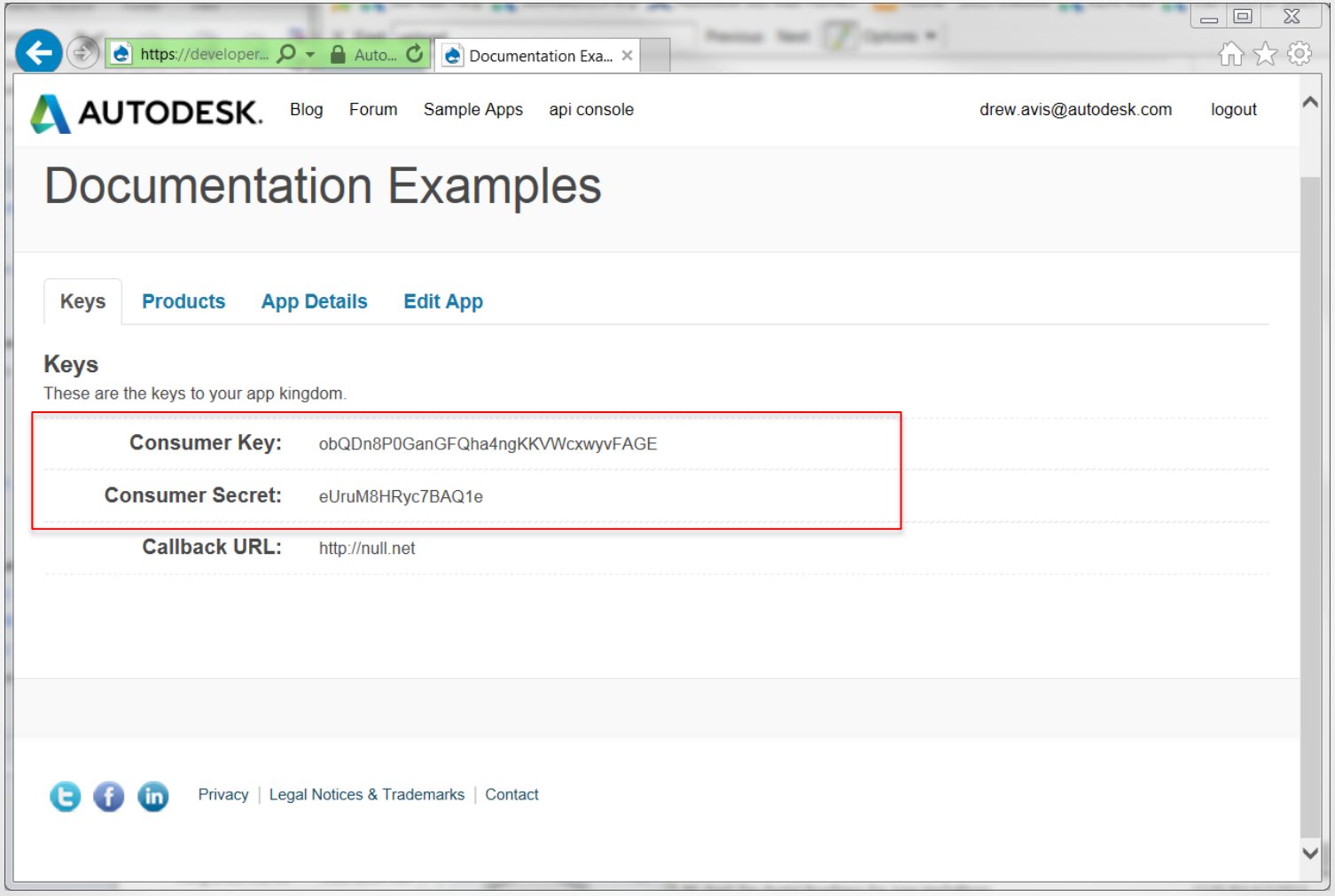
List of Registered Applications



Step 2: Obtain an Access Token

- ***Header***

  Content-Type: application/x-www-form-urlencoded

- ***Body***

  client_id=xxxxxxxxxxxx
  &client_secret=xxxxxxxxxxxx
  &grant_type=client_credentials

- ***POST***

  https://developer.api.autodesk.com/authentication/v1/authenticate

Step 3: Create a Bucket

- ***Header***

  ```
  Content-Type: application/json
  Authorization: Bearer xxxxxxxxxxxx
  ```

- ***Body***

  ```
  '{\"bucketKey\":\"mybucket\",\"policy\":\"transient\"}'
  ```

- ***POST***

  https://developer.api.autodesk.com/oss/v1/buckets

Bucket Policy

- Transient: persists for 24 hours
- Temporary: persists for 30 days
- Persistent: persists until deleted

Step 4: Upload a Model File

- ***Header***

  ```
  Authorization: Bearer xxxxxxxxxxxxxxxx
  Content-Length: 308331
  Content-Type: application/octet-stream
  ```

- ***Body***
  - File content

- ***PUT***

  https://developer.api.autodesk.com/oss/v1/buckets/{bucketkey}/objects/{objectkey}

Response to Upload Request

- Determine the URN from the upload response


```
{
  "bucket-key" : "mybucket",
  "objects" : [ {
    "location" : "https://developer-
stg.api.autodesk.com/oss/v1/buckets/mybucket/objects/skyscpr1.3d
s",
    "size" : 308331,
    "key" : "skyscpr1.3ds",
    "id" : "urn:adsk.objects:os.object:mybucket/skyscpr1.3ds",
    "sha-1" : "e84021849a9f5d1842bf792bbcbc6445c280e15b",
    "content-type" : "application/octet-stream"
  } ]
}
```


- The URN is the Base64 encoded id

Step 5: Register the Model for Viewing

- ***Header***

  Content-Type: application/json
  Authorization:Bearer xxxxxxxxxxxx

- ***Body***

  {\"urn\":\"{base64 encoded id in previous step}\"}

- ***POST***

  https://developer.api.autodesk.com/viewingservice/v1/register

Check Progress

- ***Header***

  `Authorization: Bearer xxxxxxxxxxxx`

- ***GET***

  https://developer.api.autodesk.com/viewingservice/v1/{URN}

- You can start viewing the object as soon as some parts have a ‘complete’ status

Retrieve Thumbnail Image

- ***Header***

  Authorization: Bearer xxxxxxxxxxxx

- ***GET***

  https://developer.api.autodesk.com/viewingservice/v1/thumbnails/{URN}

Getting Started
Client side

Compatibility Requirements

- The A360 Viewer requires a WebGL canvas compatible browser, such as:
  - Chrome 18.0+
  - Opera 15.0+
  - Firefox 4.0+

Load URN in JavaScript Viewer

- Create a html5 page or web application
- Add references to CSS style sheet and JavaScript library

```
<link rel="stylesheet"
    href="https://developer.api.autodesk.com/viewingservice/v1/viewers/style.css"
    type="text/css">

<script
    src="https://developer.api.autodesk.com/viewingservice/v1/viewers/viewer3D.min.js"
    ></script>
```

Load URN in JavaScript Viewer

- Add a html container

```
<body onload="initialize()">
    <div id="viewer"></div>
</body>
```

- Should be a div for now (vs. a canvas)

Load URN in JavaScript Viewer

- Initialize Viewer

```
function initialize () {
    var options ={“accessToken”: “XXXXX”, "document" : "urn:XXXXXXXXXX“ } ;
    var viewerElement =document.getElementById ("viewer") ;
    var viewer =new Autodesk.Viewing.Viewer3D (viewerElement, {}) ;
   Autodesk.Viewing.Initializer (options, function () {
      viewer.initialize () ;
      loadDocument (
         viewer,
         options.document) ;
    }) ;
}
```

Load URN in JavaScript Viewer

- Load model into viewer

```
function loadDocument (viewer, documentId) {
  // Find the first 3d geometry and load that.
  Autodesk.Viewing.Document.load (documentId,
    function (doc) {
      var geometryItems =[] ;
      geometryItems =Autodesk.Viewing.Document.getSubItemsWithProperties (
        doc.getRootItem (), { "type" : "geometry", "role" : "3d" }, true
      ) ;
      if ( geometryItems.length > 0 )
        viewer.load (doc.getViewablePath (geometryItems [0])) ;
    },
    function (errorMsg) {
      alert ("Load Error: " + errorMsg) ;
    }) ;
}
```

Extend
Client side API

Client Side API

- Model hierarchy
- Metadata and properties
- Events
- Camera / Zoom / Navigation
- Access to geometry, textures, …
- …

http://developer.api.autodesk.com/documentation/v1/viewers/index.html

Client Side API – Get properties

Example

```
viewer.getProperties(dbId, propsCallback);


function propsCallback(result) {
        if (result.properties) {
                for (var i = 0; i < result.properties.length; i++) {
                        var prop = result.properties[i];
                        if (prop.displayName == name) {
                                alert(prop.displayValue);
                        }
                }

        }
}
```

Client Side API - Events

- **Add Event Listener**

```
viewer.addEventListener('selection', onViewerItemSelected);
function onViewerItemSelected(event) {
    var dbIdArray = event.dbIdArray;
    for (var i = 0; i < dbIdArray.length; i++) {
        var dbId = dbIdArray[i];
        alert(dbId);
    }
}
```

Example

- **Remove Event Listener**
  - **viewer.removeEventListener(type, listener)**

Viewer Events

- Viewer
  - Autodesk.Viewing.**ESCAPE**_EVENT
  - Autodesk.Viewing.**PROGRESS_UPDATE**_EVENT
  - Autodesk.Viewing.**FULLSCREEN_MODE**_EVENT
  - Autodesk.Viewing.**NAVIGATION_MODE_CHANGED**_EVENT

Viewer3D events

- Autodesk.Viewing.**GEOMETRY_LOADED**_EVENT
- Autodesk.Viewing.**OBJECT_TREE_CREATED**_EVENT
- Autodesk.Viewing.**SELECTION_CHANGED**_EVENT
- Autodesk.Viewing.**ISOLATE**_EVENT
- Autodesk.Viewing.**HIDE**_EVENT
- Autodesk.Viewing.**SHOW**_EVENT
- Autodesk.Viewing.**HIGHLIGHT**_EVENT
- Autodesk.Viewing.**CAMERA_CHANGE**_EVENT
- Autodesk.Viewing.**RENDER_OPTION_CHANGED**_EVENT

Client Side API - Camera

- **Viewer3D**
  - **getCamera() → {THREE.camera}**
    - Gets the camera so it can be modified by the client.
  - **applyCamera(boolean)**
    - Applies the camera to the current viewer's camera.
- setViewFromArray
  setViewFromFile
  getFOV/setFOV
  getFocalLength/setFocalLength

Client Side API - More

- detectWebGL
- resize
- search
- isolate
- setBackgroundColor
- select/deselect/clearSelection
- hide/show/showAll/hideAll
- explode

…

Client Side API - UI

- ModelStructurePanel
- ToolBar
- DockingPanel
- ObjectContextMenu

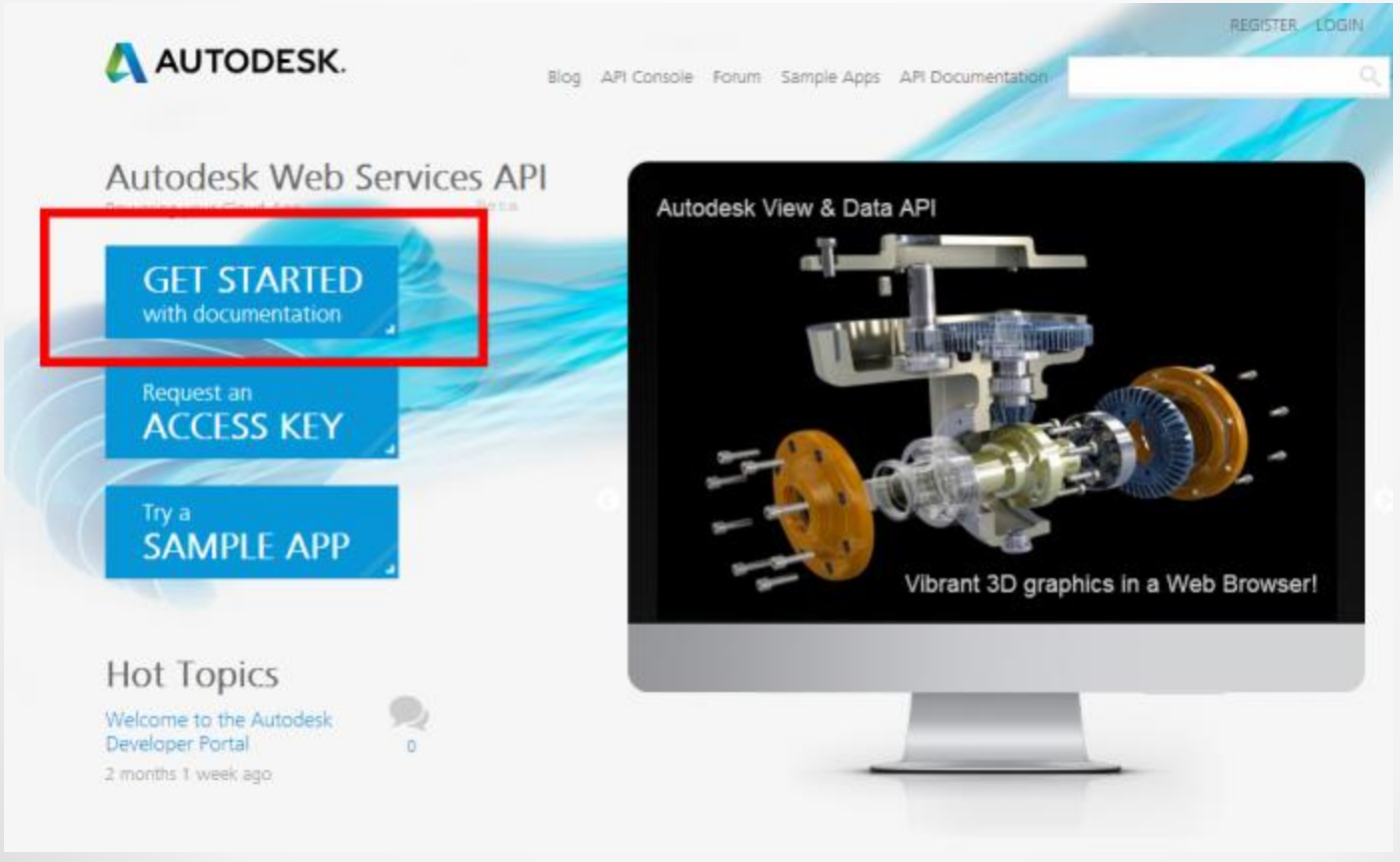
博客：

为Autodesk Viewer添加自定义工具条
为Autodesk Viewer添加自定义工具条的更好方法

Resources

Resource & Documents

- http://developer.autodesk.com



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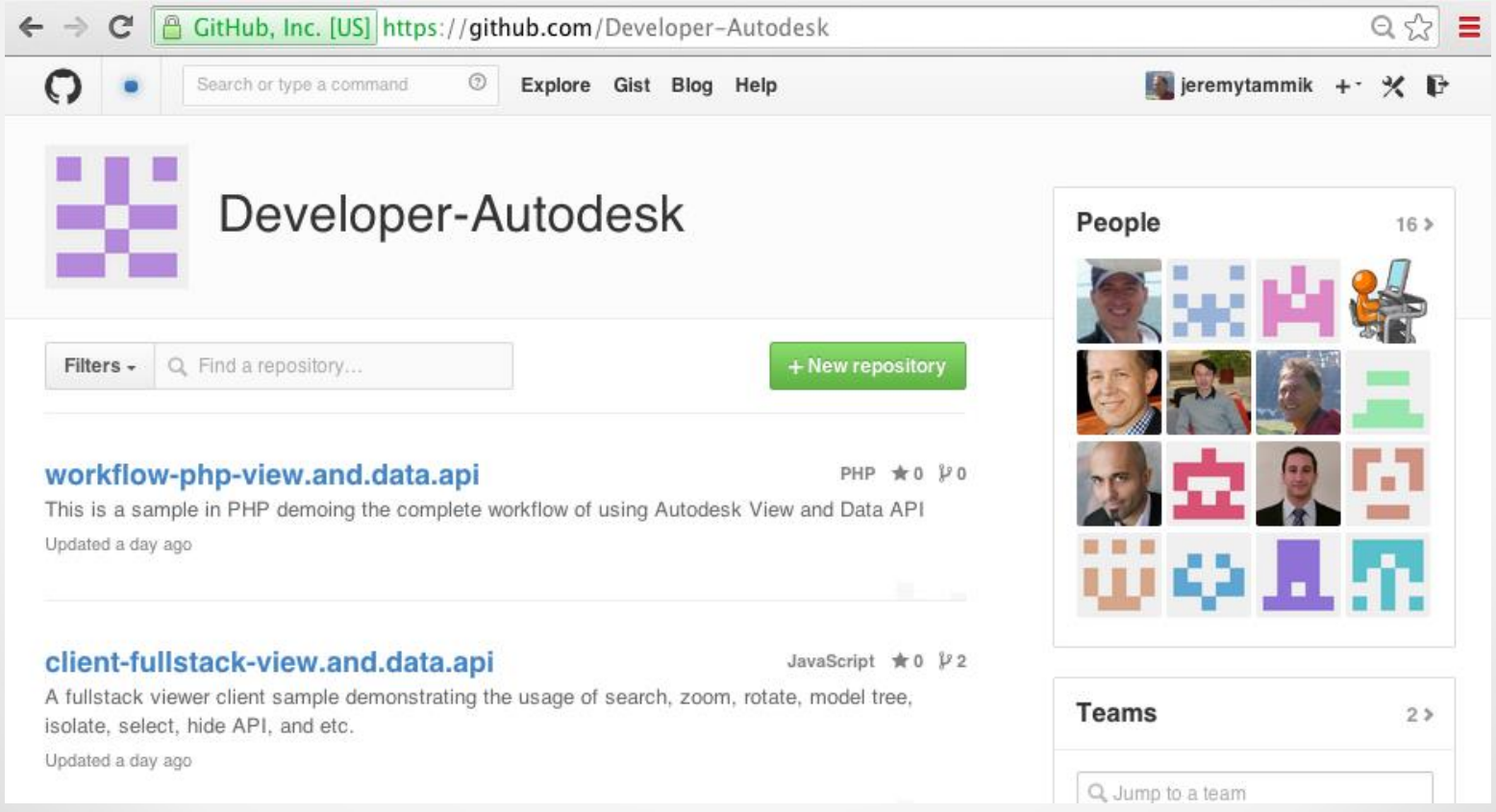
Demo Code and Sample Applications on GitHub

- http://autode.sk/viewerapisamples
- https://github.com/developer-autodesk



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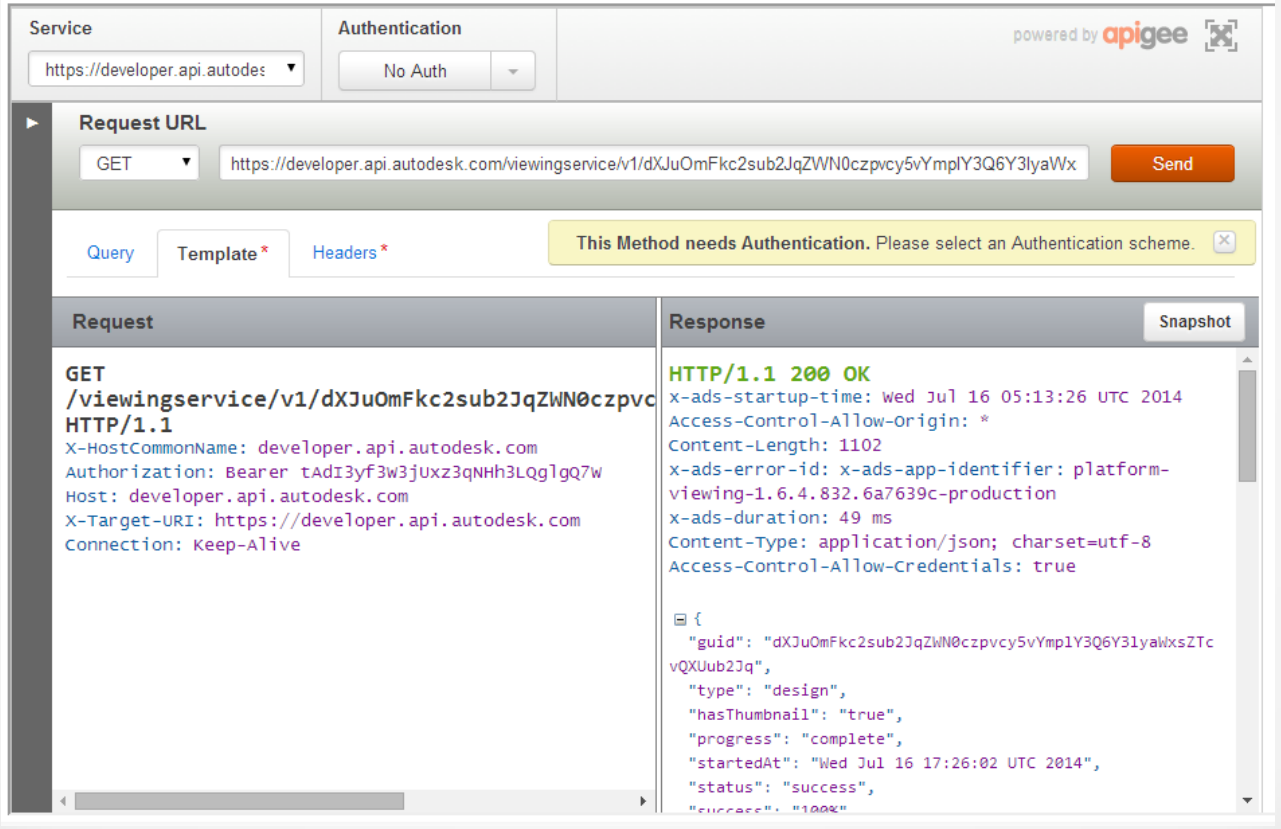
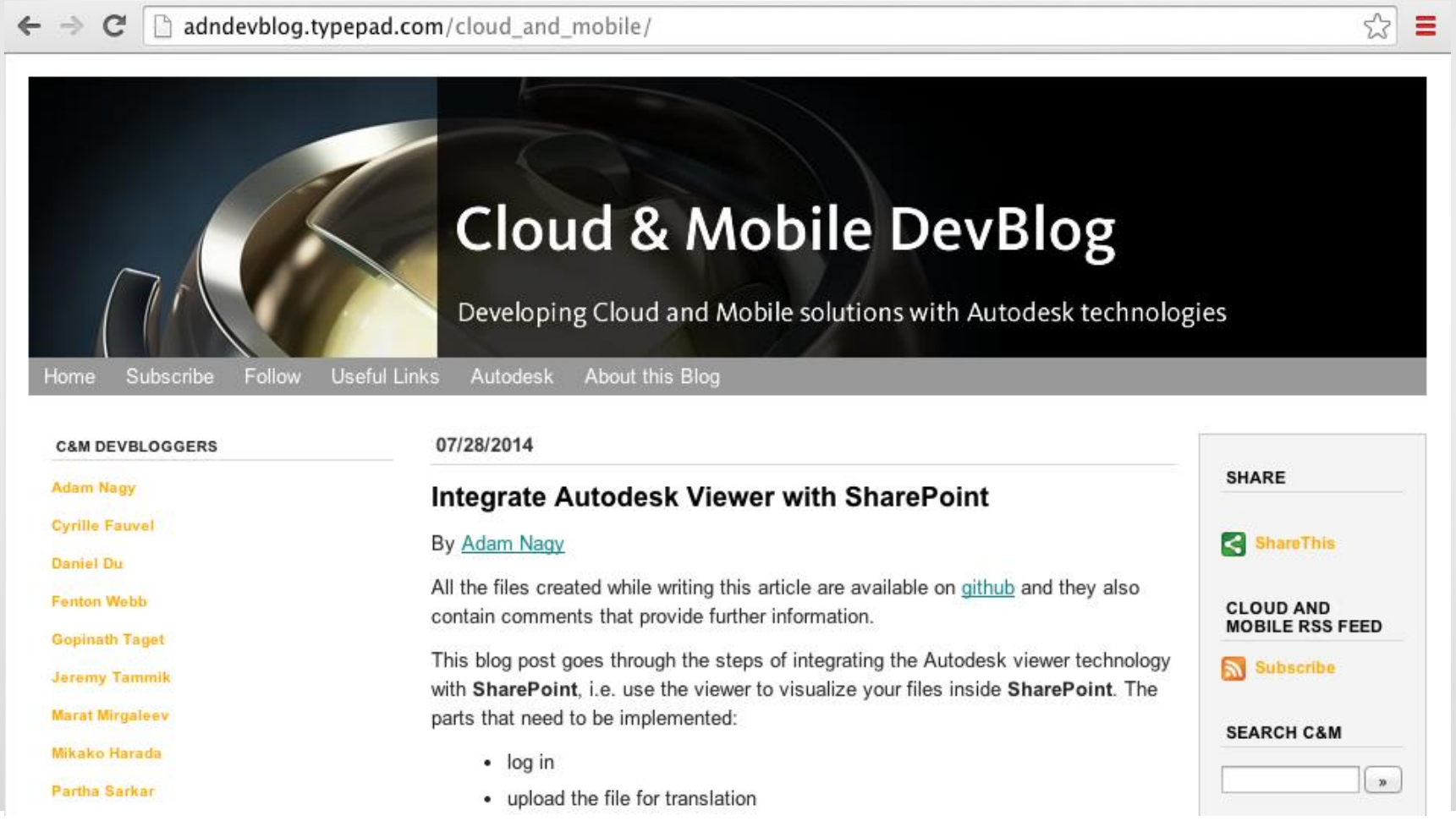
Test the API online in the API Console

- https://developer.autodesk.com/api-console



Blog

- http://adndevblog.typepad.com/cloud_and_mobile



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Blog

- http://junqilian.cnblogs.com/

Demos Embedded Everywhere

Blog

http://through-the-interface.typepad.com/through_the_interface/2014/05/a-sneak-peek-at-the-new-autodesk-360-viewer.html

Facebook https://www.facebook.com/a360viewer
TypePad http://adndevblog.typepad.com/cloud_and_mobile/stephens-test-page.html
Sharepoint https://share.autodesk.com/IPG/CloudPlatforms/SitePages/Test%20Page.aspx
Model https://s3.amazonaws.com/FastViewer/index.html?file=frontloader/0.svf

Architectural, Engineering, Construction, HVAC, Mecahnical Equipment in Buildings

https://s3.amazonaws.com/FastViewer/index.html?file=Revit_Kitchen/0.svf
https://s3.amazonaws.com/FastViewer/index.html?file=Waltham/0.svf

Infraworks model

https://s3.amazonaws.com/autodesk.viewingservice.viewers.prod/0.1.68/viewer3d.html?&file=https://s3.amazonaws.com/temporary-model-artifact-storage/11044/LMVGeneratorPlugin/proposals/master/model.svf

Database Integration http://54.191.41.170/sapdemo2

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