Autodesk View and Data API

Interaktives 3D Modell in beliebige Webseiten einbetten

Jeremy Tammik
Technical Evangelist

About this class

- The cloud is around us!
- The palette of available Autodesk web services is increasing, including rendering, coordination and viewing
- This class provides an overview of the APIs to use Autodesk Viewer web service, including authentication, file upload, translation and viewer customisation
- Programming skills are recommended

About the Presenter

Jeremy Tammik
Principal Developer Consultant
Developer Technical Services
EMEA, Autodesk SARL

Jeremy is a member of the AEC workgroup of the Autodesk Developer Network ADN team, providing developer support, training, conference presentations, and blogging on the Revit API.

He joined Autodesk in 1988 as the technology evangelist responsible for European developer support to lecture, consult, and support AutoCAD application developers in Europe, the U.S., Australia, and Africa. He was a co-founder of ADGE, the AutoCAD Developer Group Europe, and a prolific author on AutoCAD application development. He left Autodesk in 1994 to work as an HVAC application developer, and then rejoined the company in 2005.

Jeremy graduated in mathematics and physics in Germany, worked as a teacher and translator, then as a C++ programmer on early GUI and multitasking projects. He is fluent in six European languages, vegetarian, has four kids, plays the flute, likes reading, travelling, theatre improvisation, yoga, carpentry, loves mountains, oceans, sports, dancing, and especially climbing.

Appetisers

- ADN Gallery →
- Frontloader tractor →
  https://s3.amazonaws.com/FastViewer/index.html?file=frontloader/0.svf
  - Zoom, rotate, isolate, focus, explode, embedded data
- Waltham office building →
  https://s3.amazonaws.com/FastViewer/index.html?file=Waltham/0.svf
  - Large building model, model structure, disciplines, metadata
- SAP → http://54.191.41.170/sapdemo
  - Linking to external database and real time price update
- Morgan steampunk → http://safe-reef-1847.herokuapp.com
  - Huge model with highly customised UI using js libs

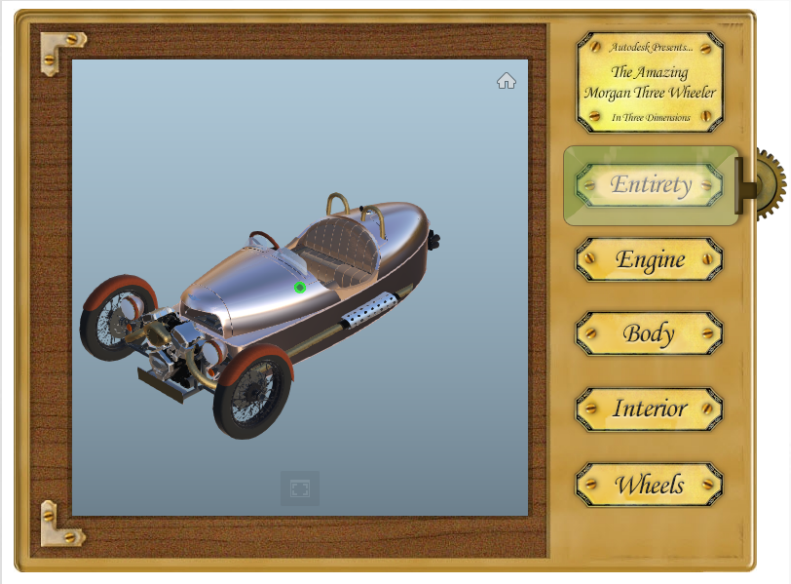
The Challenge – Big Data

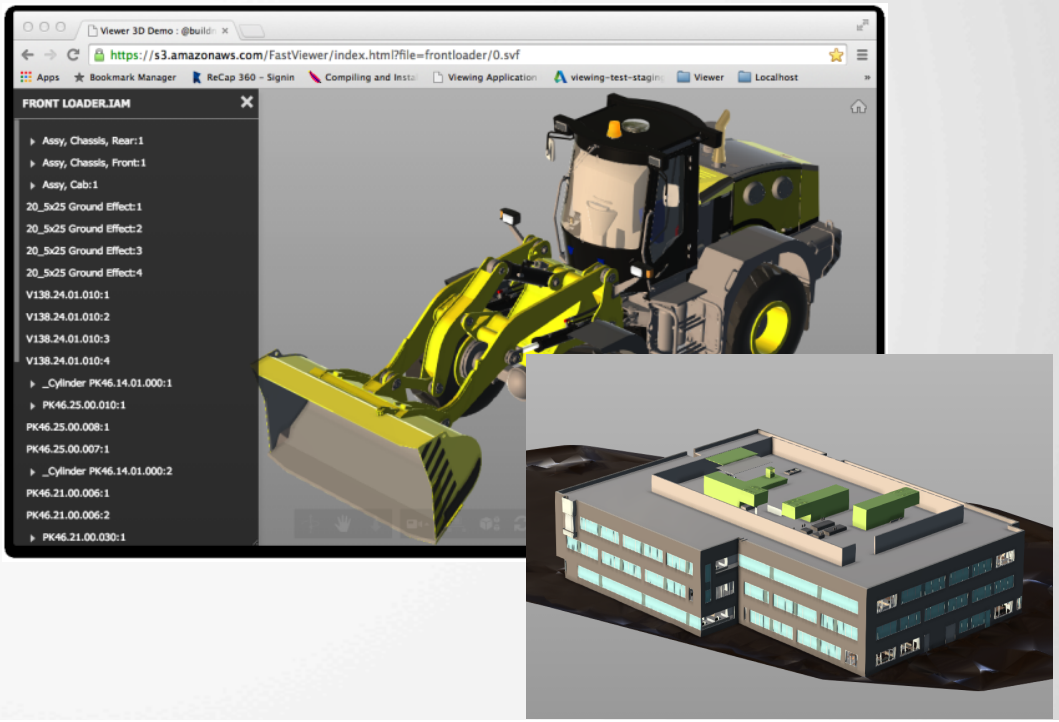
2D and/or 3D

WEBGL and Three.js

Autodesk Large Model Viewer

Add interactive 3D viewing to your web application



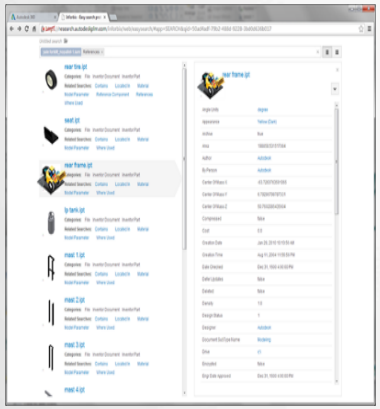


- Autodesk View and Data API
- Getting Started
  - Server Side
  - Client Side
  - Extensions
- Resources

Autodesk View and Data API

Single Pipeline – Integrated Viewing, Search & Data

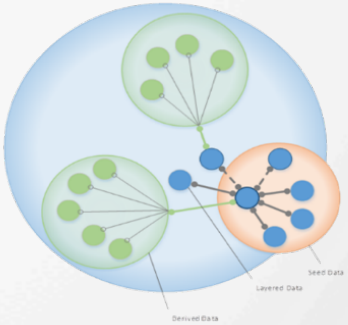
Find it



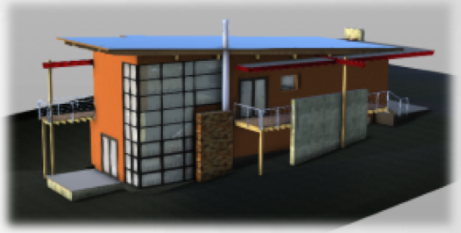
See it

Empower your application with Autodesk Web Services

Extend it



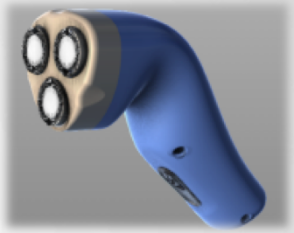
Two APIs available



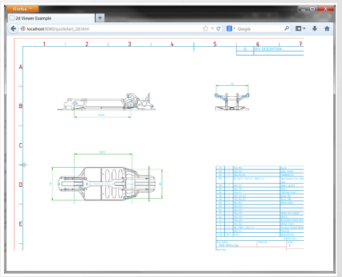
- **REST** Server and Management API
  - Upload and translate files
  - Manage access rights
  - Authenticate using oAuth 2.0

- **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, …

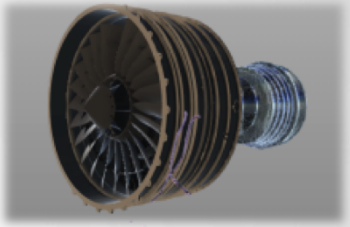
3D First



- 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



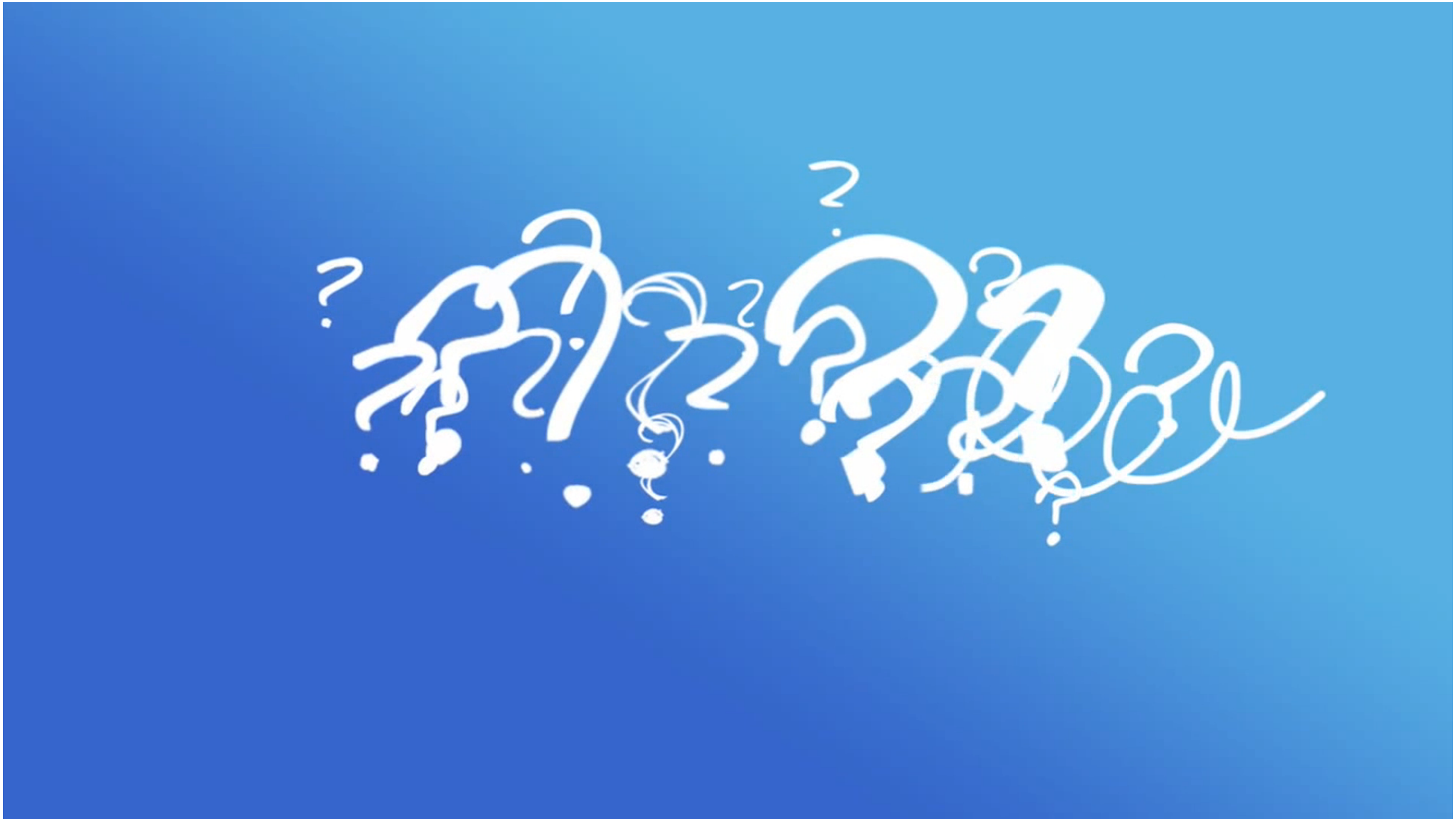
Supported Formats



- 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

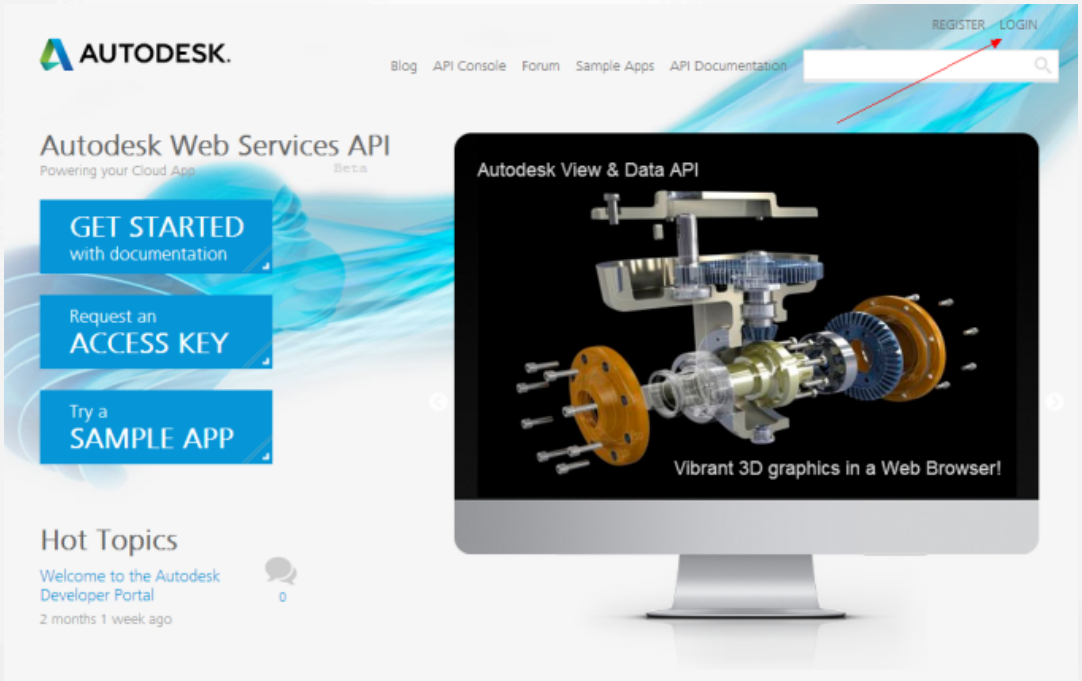
- Basic viewer
- Simple embedding
- Full authentication and translation workflow
- Integration with custom data sources
- Client-side APIs



Getting Started – Server Side REST

Getting Started

- http://developer.autodesk.com

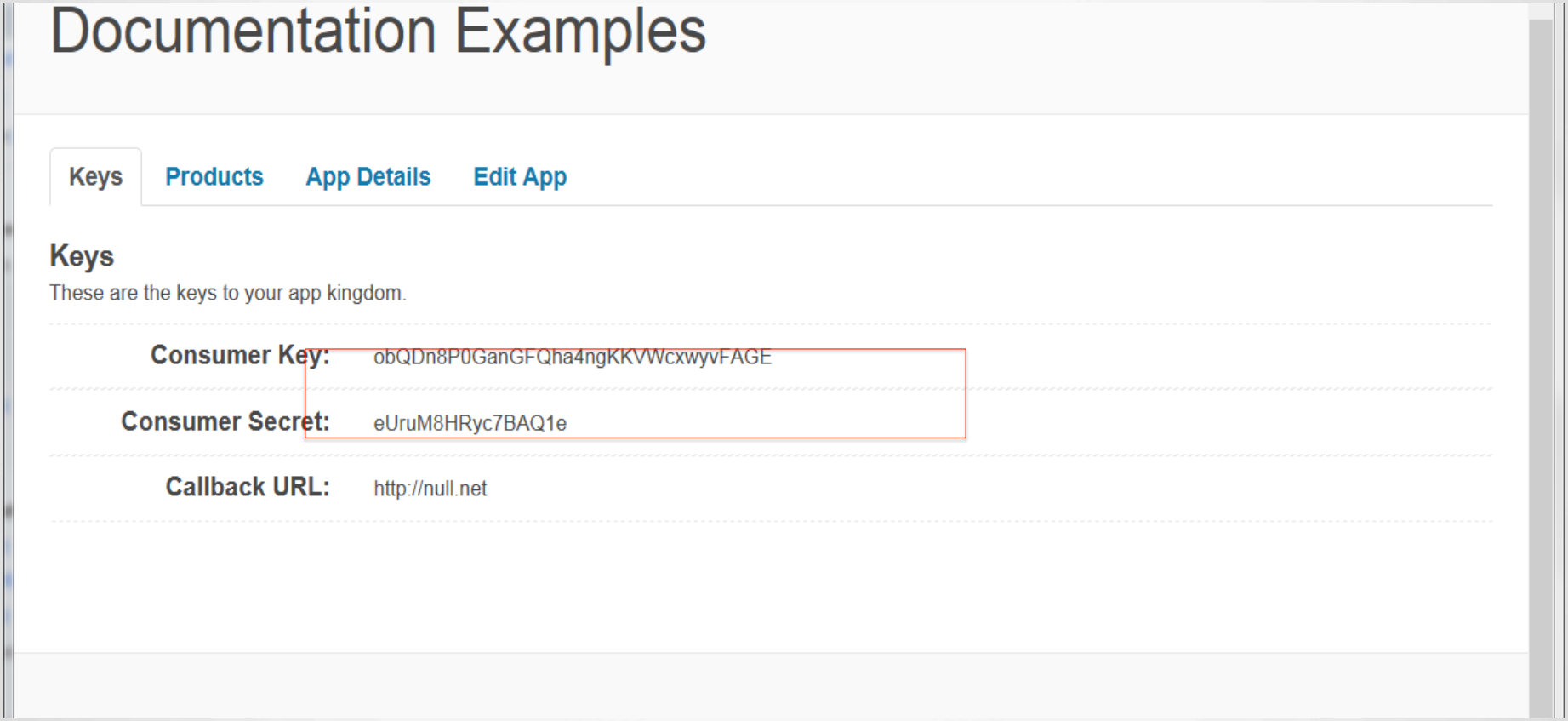


Getting Started – Server/Management Workflow

Step 1: Register and Create an Application

http://developer.autodesk.com

List of Registered Applications



Step 2 Details: 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 Details: 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 Details: Upload a Model File

- Header

```
Authorization: Bearer xxxxxxxxxxxxxxx
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

- Retrieve 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 Details: 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

Step 5 Details: 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

Step 5 Details: Retrieve Thumbnail Image

- Header

  `Authorization: Bearer xxxxxxxxxxxx`

- GET

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

Getting Started – Client Side JavaScript

Compatibility Requirements

- The viewer requires a WebGL canvas compatible browser, e.g.:
  - Internet Explorer 11.0+
  - Chrome 18.0+
  - Opera 15.0+
  - Firefox 4.0+
  - Chrome on Android

Load URN in JavaScript Viewer

- Create a HTML5 page or web application

- Add references
  - CSS style sheet
  - 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>
```

Details: Load URN in JavaScript Viewer

- Add a HTML container for the viewer

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

- Must be a **`div`**, not a canvas

Details: Load URN in JavaScript Viewer

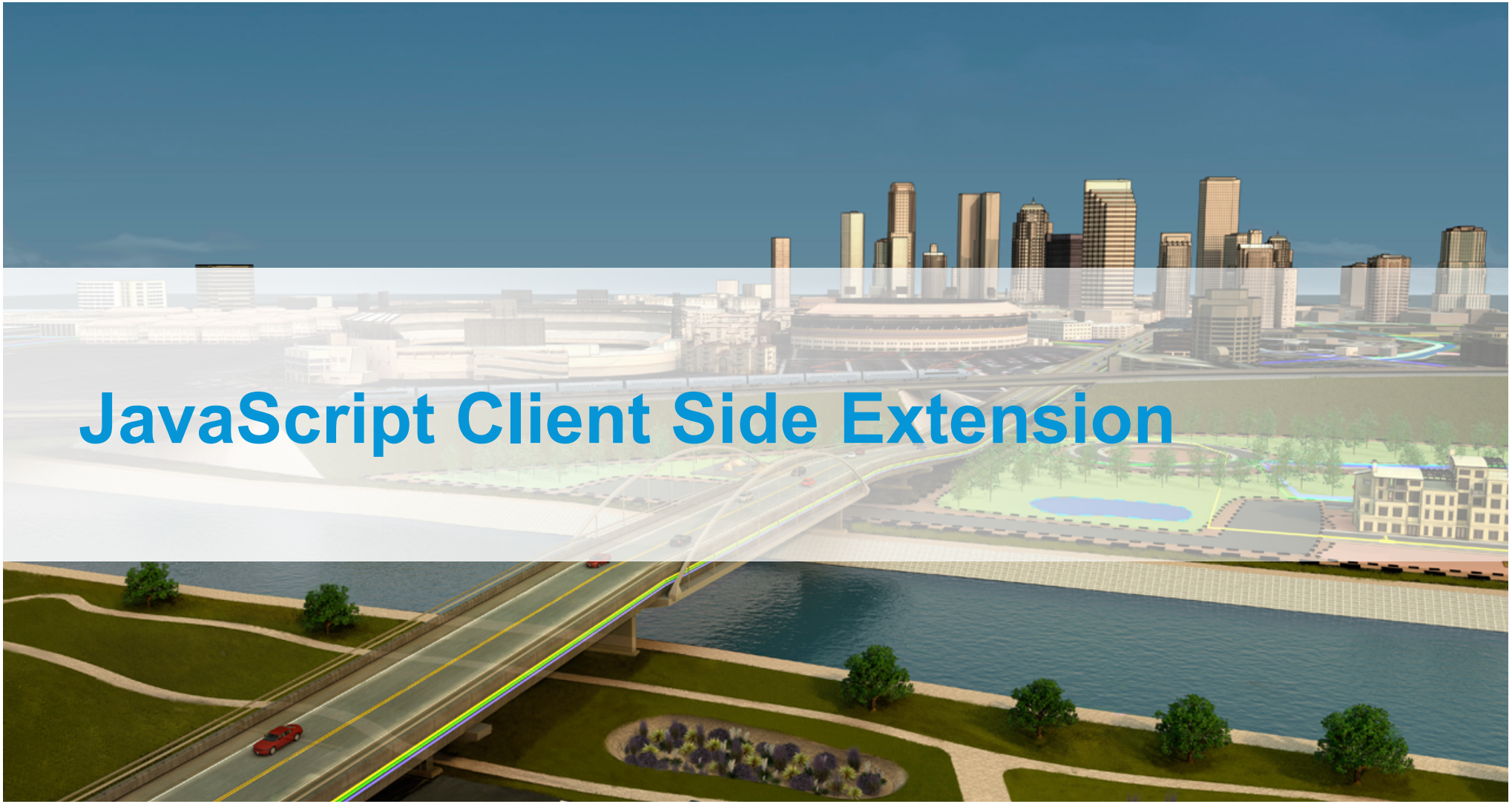
- Initialize Viewer

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

Details: Load URN in JavaScript Viewer

- Load model into viewer

```
function loadDocument (viewer, auth, documentId) {
  // Find the first 3d geometry and load that.
  Autodesk.Viewing.Document.load (documentId, auth,
    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);
    }
  );
}
```



JavaScript Client Side Extension

Client Side JavaScript API Possibilities

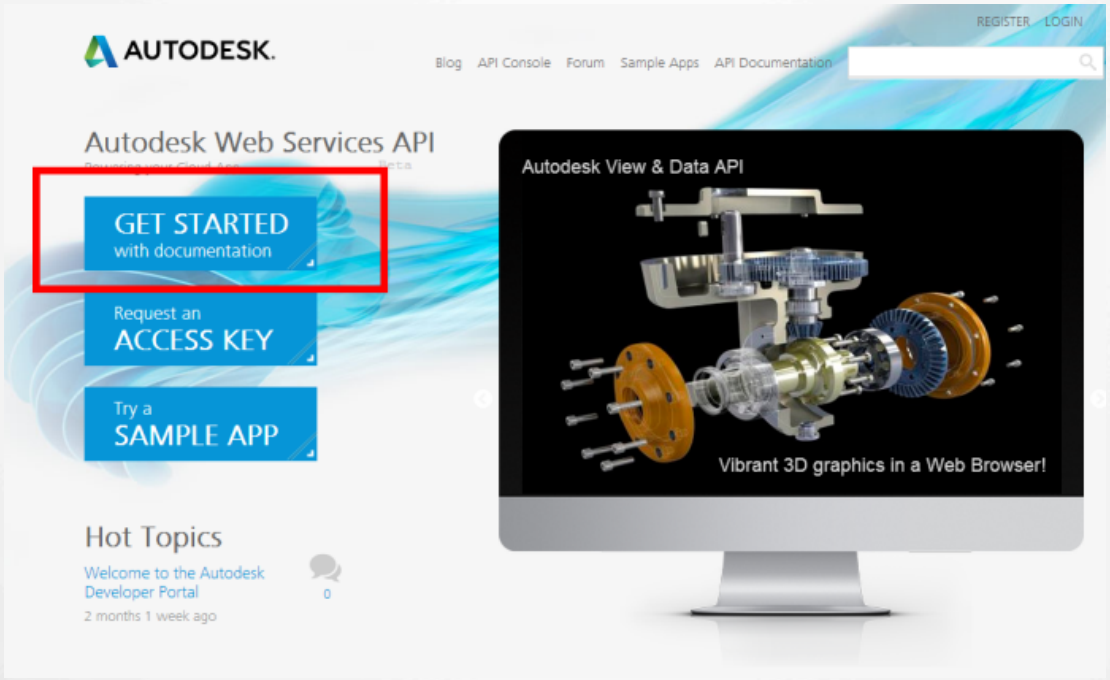
- This is where it gets really interesting!
- Unlimited possibilities
- Access to everything
  - Model hierarchy
  - Metadata and properties
  - Events
  - Camera control, zoom, navigation, etc.
  - Geometry, textures, …

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

Resources

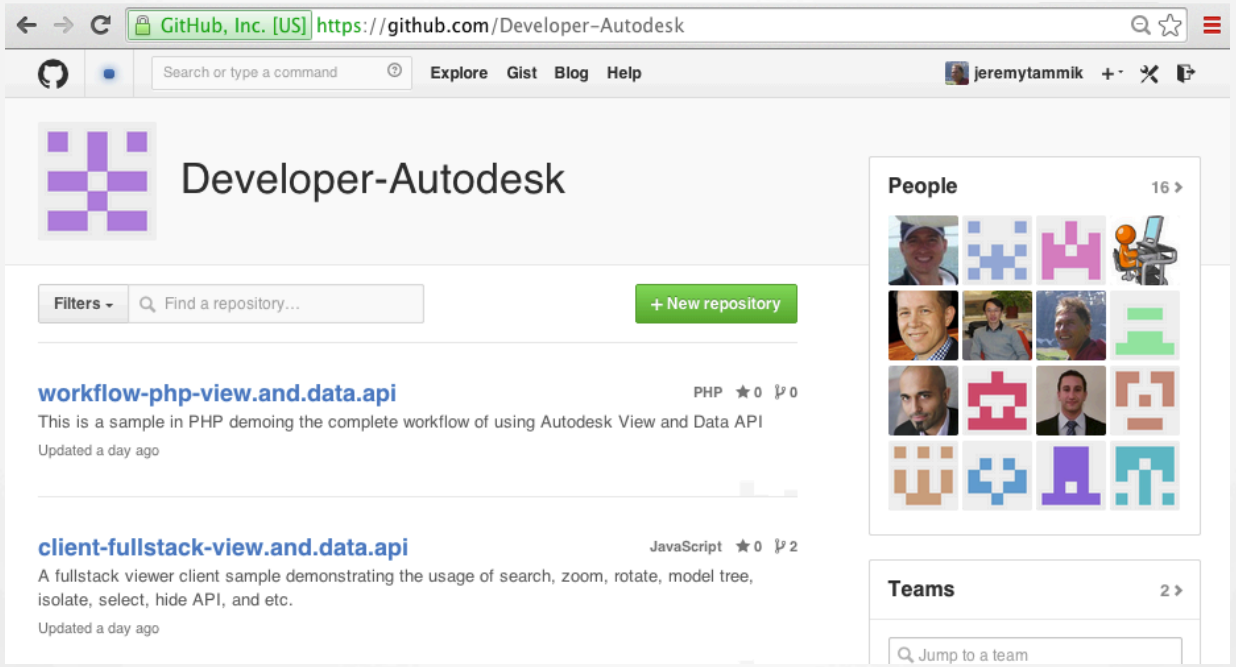
Getting Started and Full Documentation

- http://developer.autodesk.com



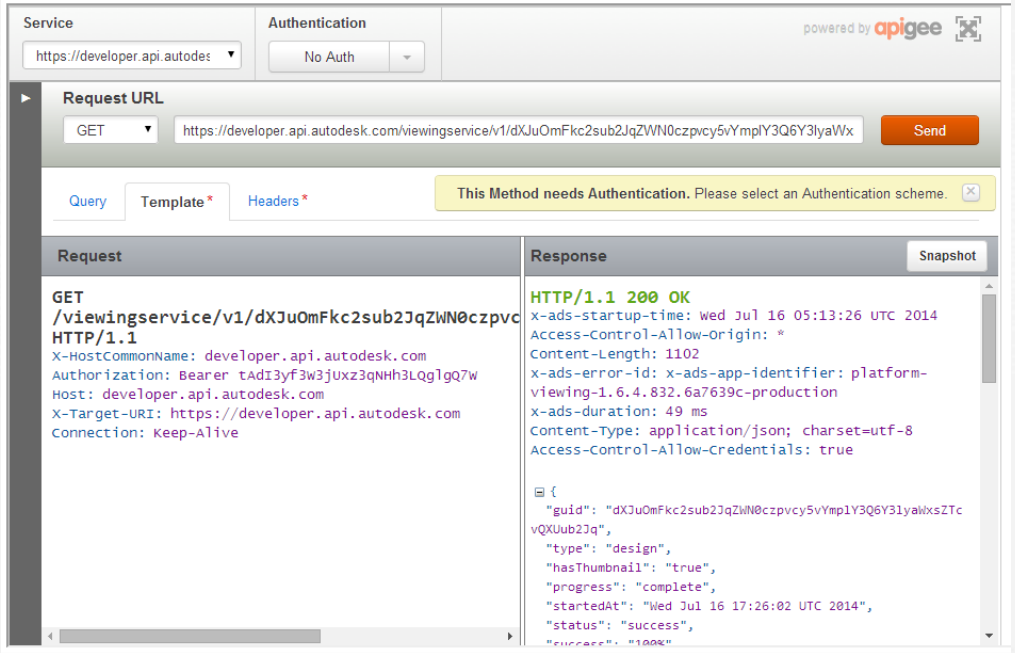
Demo Code and Sample Applications on GitHub

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



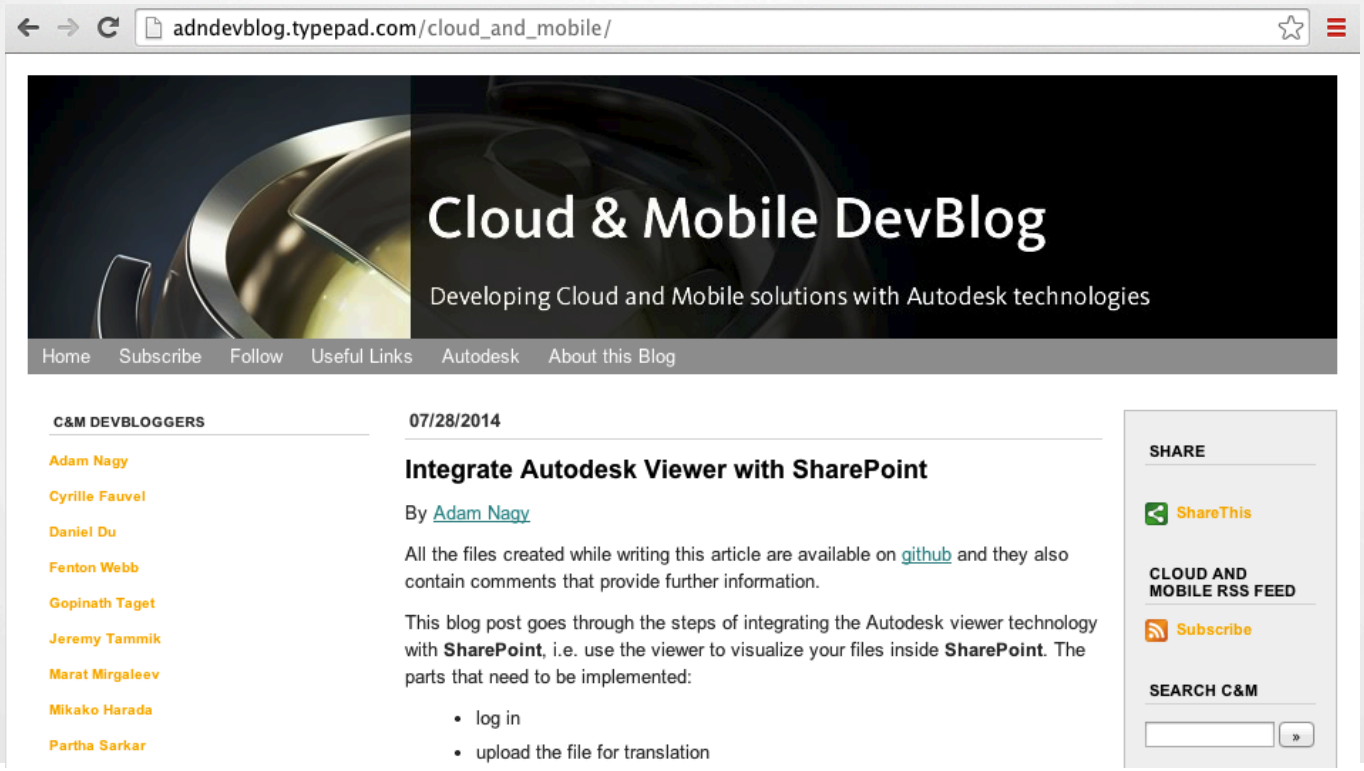
Test the API Online in the API Console

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



Cloud and Mobile DevBlog for Q&A and More

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



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

ADN Gallery

- Full JavaScript client/server
- Integration of multiple js UI libs
  - Bootstrap, jquery layout, slickgrid, jsTree
- Load/upload of 2D and 3D models
- Save/load of named views in MongoDB
- Multiple user interaction to share control of view and camera settings in real time

Questions and Answers