



Autodesk View and Data API

Interaktives 3D Modell in beliebige Webseiten einbetten

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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.

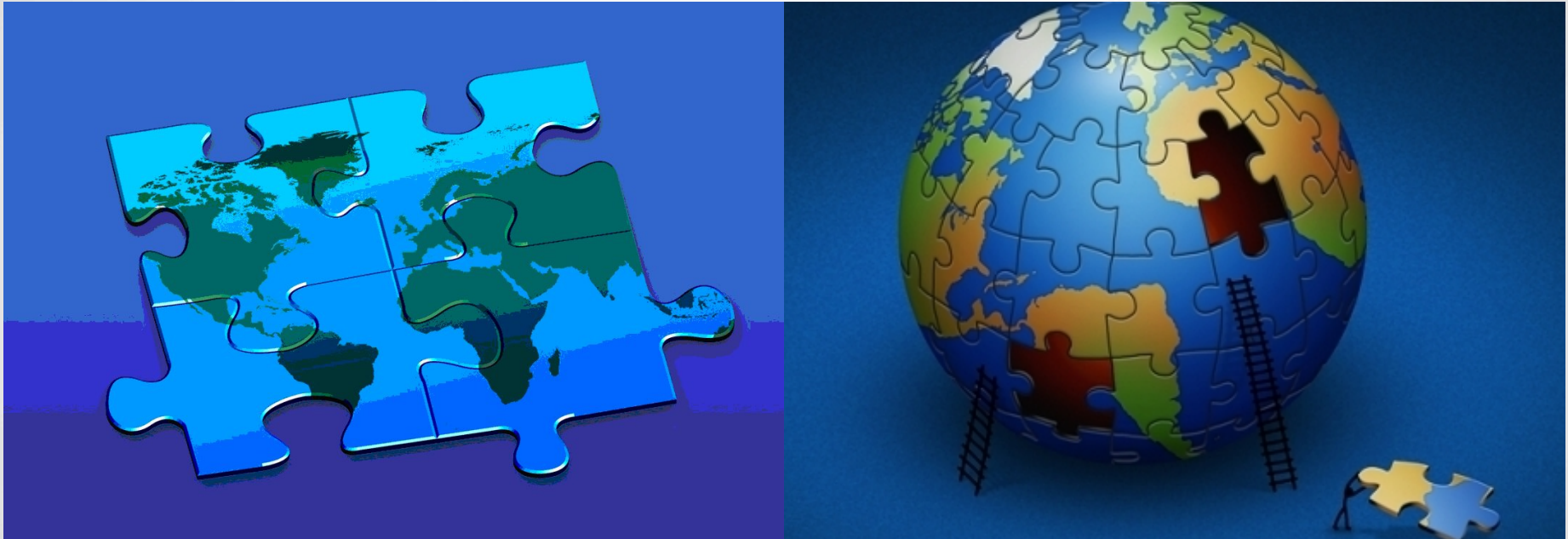
Appetisers

- 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

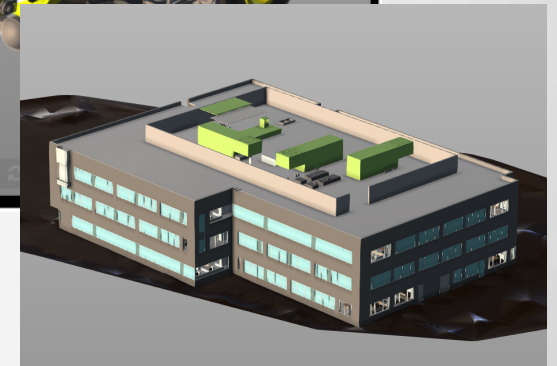
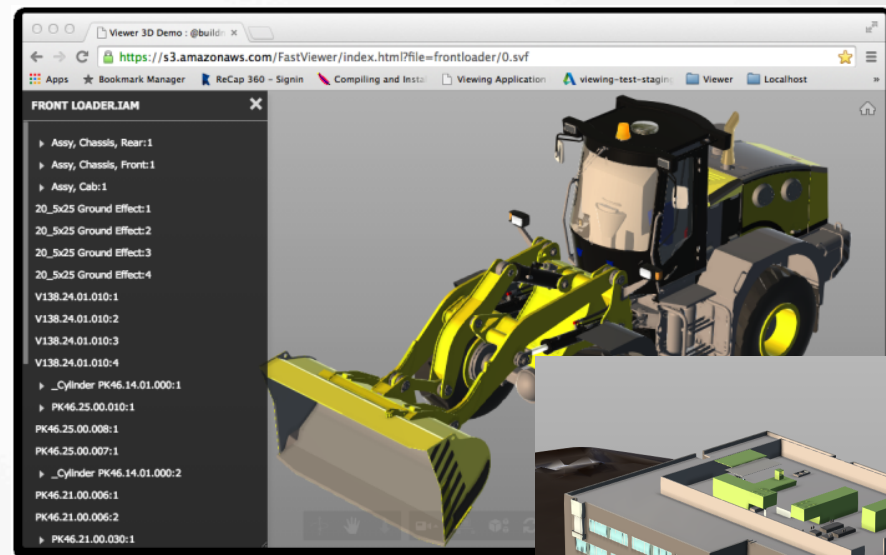
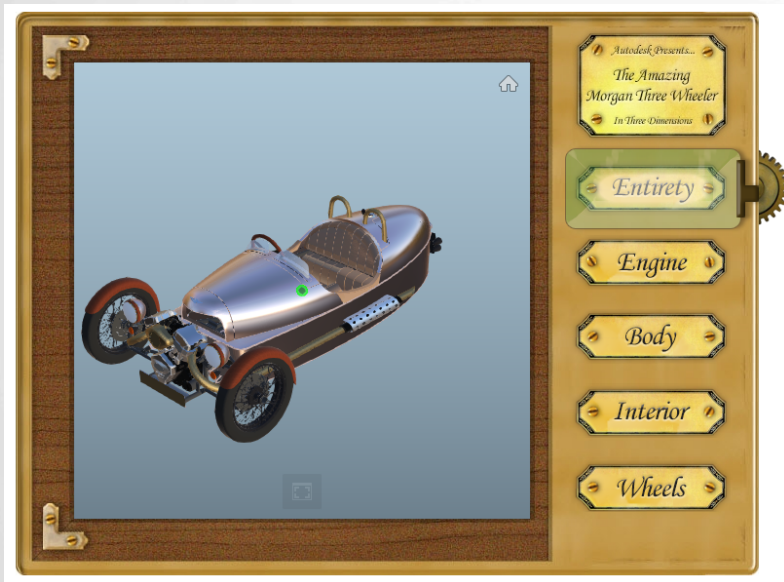


WEBGL and Three.js



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

An aerial perspective of a cityscape. In the foreground, a multi-lane bridge with a rainbow-colored line along its edge spans a river. A red car is visible on the bridge. To the right of the bridge is a green park area with trees and a blue pond. In the background, a large stadium with a white roof is visible, followed by a dense cluster of skyscrapers under a clear blue sky.

Autodesk View and Data API

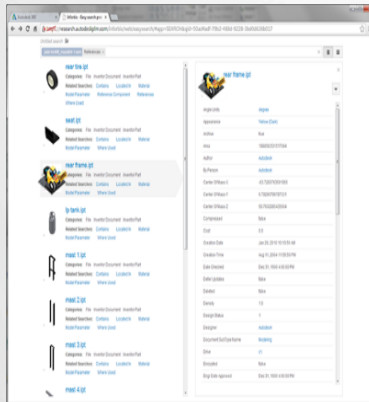


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Single Pipeline – Integrated Viewing, Search & Data

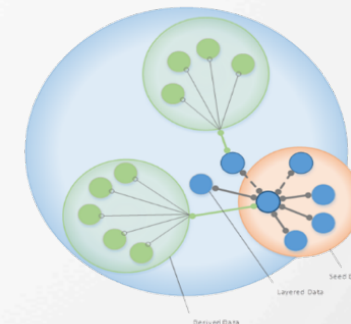
Find it



See it



Extend it



Empower your application with Autodesk Web Services

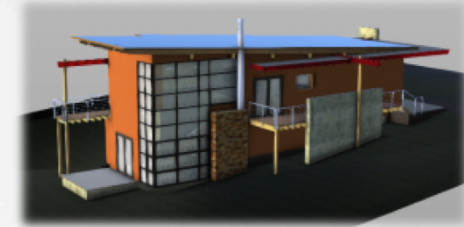
Two APIs available

- **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

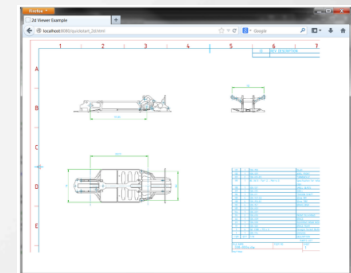


- 3D Functionality

- Select, view properties, zoom, pan, orbit, isolate, focus, highlight
- Access to underlying 3D model, e.g. meshes and materials

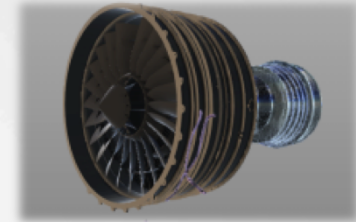
- 2D Functionality

- 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



An aerial perspective of a city skyline across a river. A multi-lane bridge with a rainbow-colored line along its edge spans the river. In the background, a dense cluster of skyscrapers is visible under a clear blue sky. The foreground shows green grassy banks and a small landscaped area with purple flowers.

Getting Started – Server Side REST

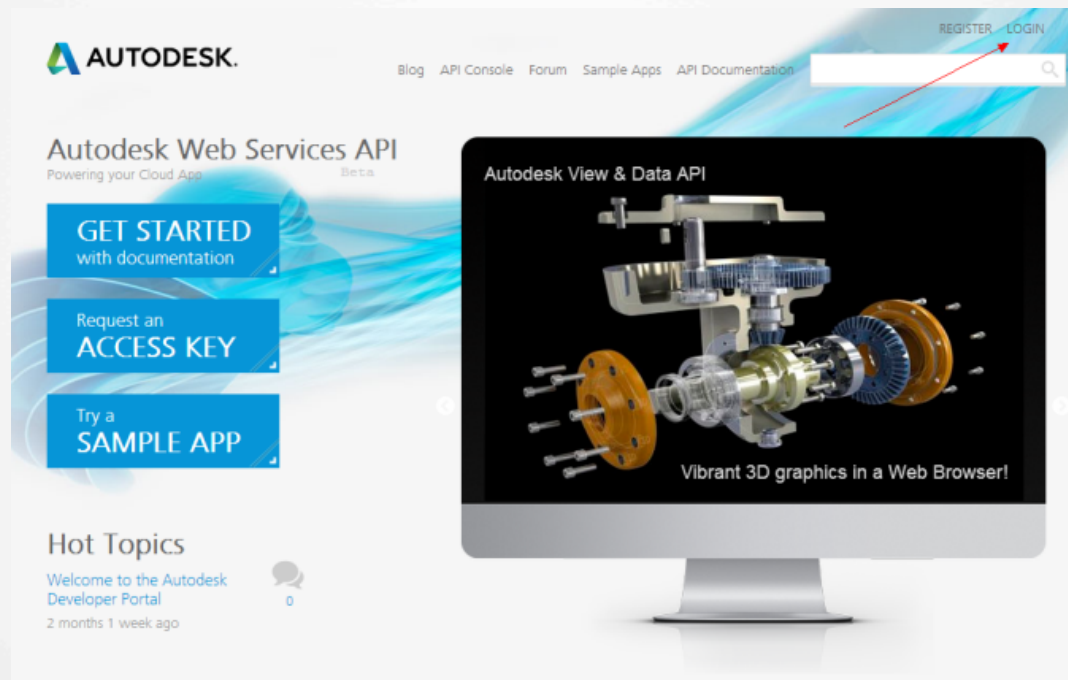


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Getting Started

- <http://developer.autodesk.com>



Getting Started – Server/Management Workflow

Register an account/create an application

Step 2 - Get an access token

Step 3 - Create a bucket

Step 4 - Upload an object

Step 5 - Request translation

Access from client



Step 1: Register and Create an Application

<http://developer.autodesk.com>

Autodesk Developer Center

Powering your Cloud App

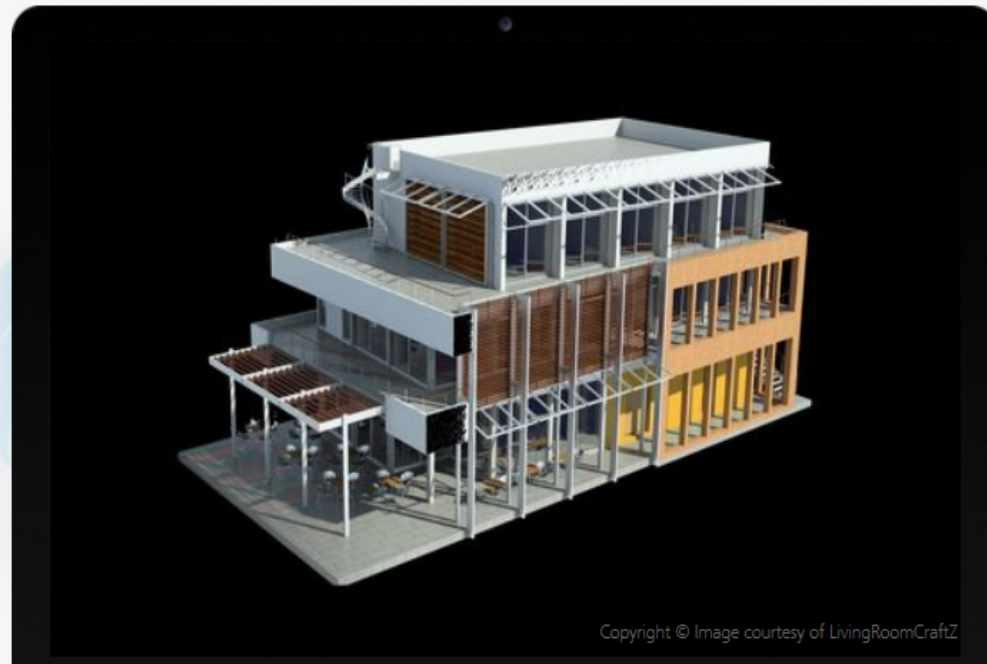
Beta

GET STARTED
with documentation

Request an
ACCESS KEY

Try a
SAMPLE APP

Hot Topics



Copyright © Image courtesy of LivingRoomCraftZ

Support for over 60 file formats



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AUTODESK.

List of Registered Applications

Documentation Examples

Keys

Products

App Details

Edit App

Keys

These are the keys to your app kingdom.

Consumer Key: obQDn8P0GanGFQha4ngKKVWcxwyvFAGE

Consumer Secret: eUruM8HRyc7BAQ1e

Callback URL: http://null.net



Step 2 Details: Obtain an Access Token

- Header

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

- Body

client_id=xxxxxxxxxxxxx
&client_secret=xxxxxxxxxxxxx
&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 xxxxxxxxxxxxxx

- 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 xxxxxxxxxxxxxxxxxxxx

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/skyscpr1.3ds",  
    "size" : 308331,  
    "key" : "skyscpr1.3ds",  
    "id" : "urn:adsk.objects:os.object:mybucket/skyscpr1.3ds",  
    "sha-1" : "e84021849a9f5d1842bf792bbcbcb6445c280e15b",  
    "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 xxxxxxxxxxxxxx

- 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 xxxxxxxxxxxxxx

- 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 xxxxxxxxxxxxxx

- GET

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



An aerial perspective of a city skyline across a river. A multi-lane bridge with a rainbow-colored line along its edge spans the river. In the background, a dense cluster of skyscrapers is visible under a clear blue sky. The foreground shows green grassy banks and a small landscaped area with purple flowers.

Getting Started – Client Side JavaScript



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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



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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

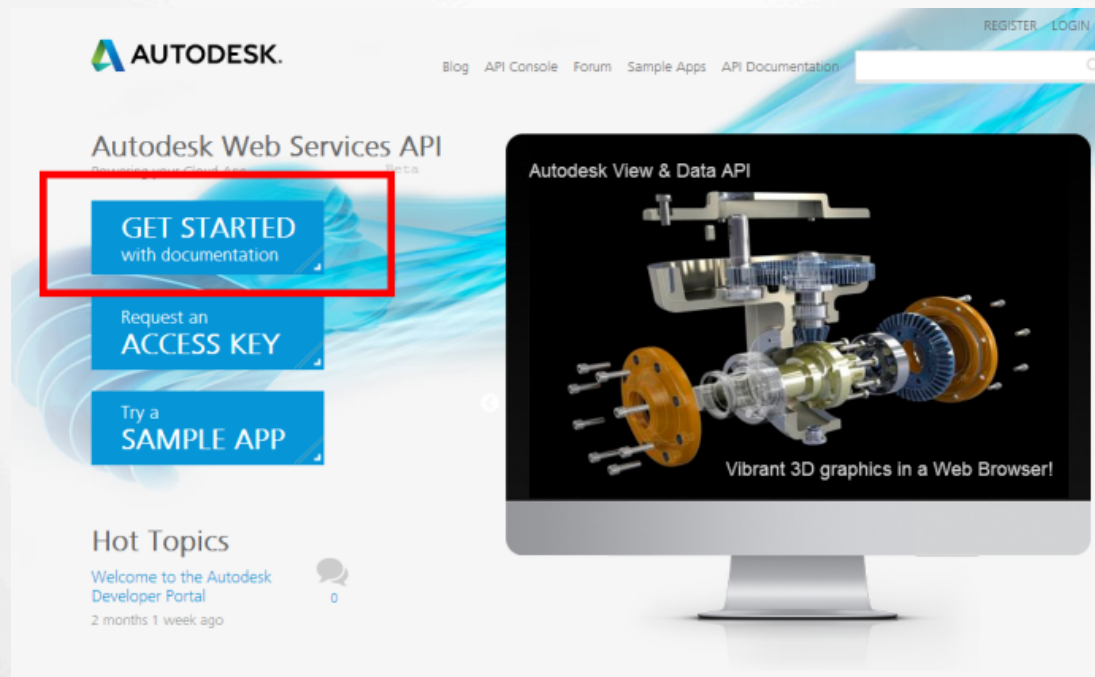


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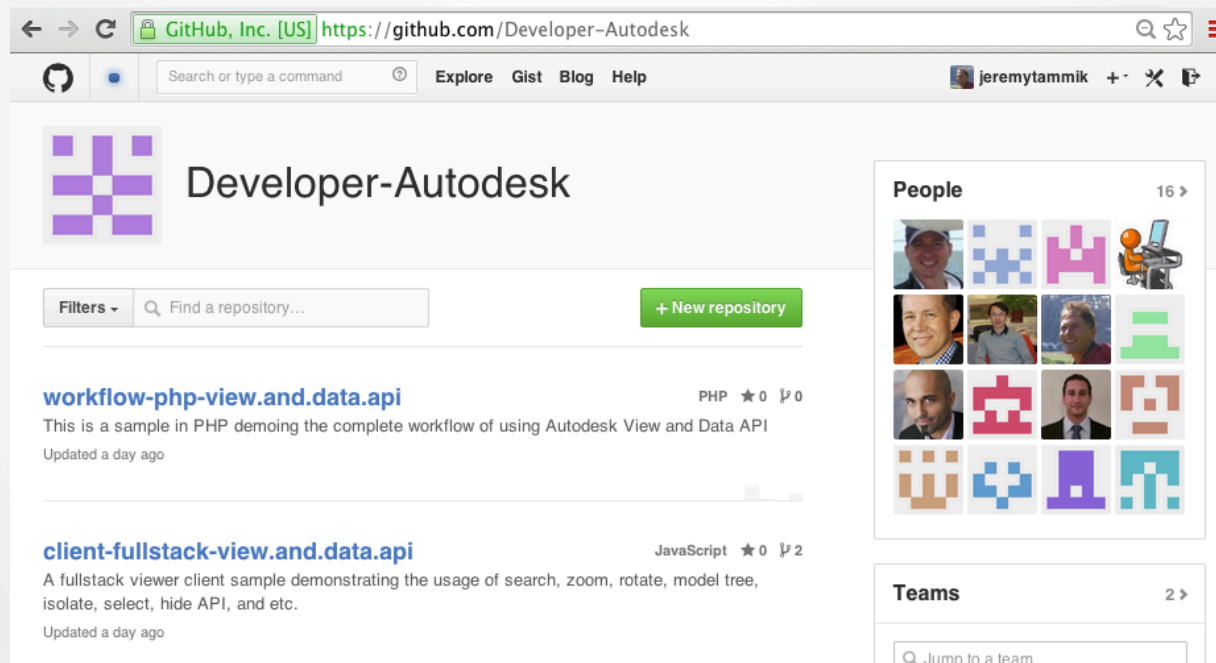
Getting Started and Full Documentation

- <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

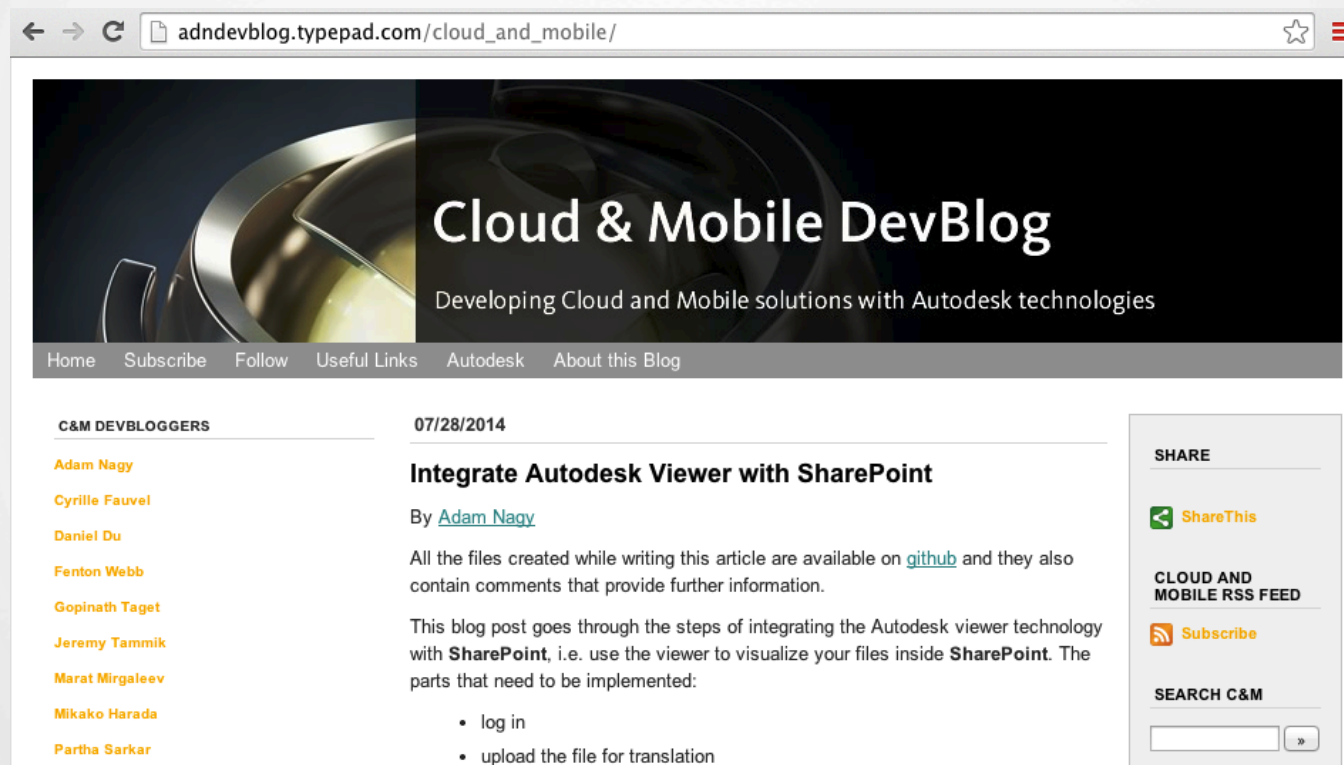
- <https://developer.autodesk.com/api-console>

The screenshot displays the Autodesk API Console interface. At the top, the 'Service' dropdown is set to 'https://developer.api.autodesk.com' and 'Authentication' is set to 'No Auth'. The 'Request URL' section shows a GET request to 'https://developer.api.autodesk.com/viewingservice/v1/dxJuOmFkc2sub2JqZWN0czpvcy5vYmplY3Q6Y3lyaWx'. A yellow warning box states 'This Method needs Authentication. Please select an Authentication scheme.' Below this, the 'Request' tab is active, showing the full request details including headers like 'Authorization: Bearer tAdI3yf3w3juxz3qNHh3Lqg1gq7w'. The 'Response' tab is also active, showing an 'HTTP/1.1 200 OK' status and a JSON body with details about a design object, including its GUID, type, and status.

Request	Response
<pre>GET /viewingservice/v1/dxJuOmFkc2sub2JqZWN0czpvcy5vYmplY3Q6Y3lyaWx HTTP/1.1 X-HostCommonName: developer.api.autodesk.com Authorization: Bearer tAdI3yf3w3juxz3qNHh3Lqg1gq7w Host: developer.api.autodesk.com X-Target-URI: https://developer.api.autodesk.com Connection: Keep-Alive</pre>	<pre>HTTP/1.1 200 OK x-ads-startup-time: wed Jul 16 05:13:26 UTC 2014 Access-Control-Allow-Origin: * Content-Length: 1102 x-ads-error-id: x-ads-app-identifier: platform-viewing-1.6.4.832.6a7639c-production x-ads-duration: 49 ms Content-Type: application/json; charset=utf-8 Access-Control-Allow-Credentials: true { "guid": "dxJuOmFkc2sub2JqZWN0czpvcy5vYmplY3Q6Y3lyaWxvQXUub2Jq", "type": "design", "hasThumbnail": "true", "progress": "complete", "startedAt": "Wed Jul 16 17:26:02 UTC 2014", "status": "success", "success": "100%" }</pre>

Cloud and Mobile DevBlog for Q&A and More

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



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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, Mechanical 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



