

Autodesk View and Data API

Interaktives 3D Modell in beliebige Webseiten einbetten

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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.

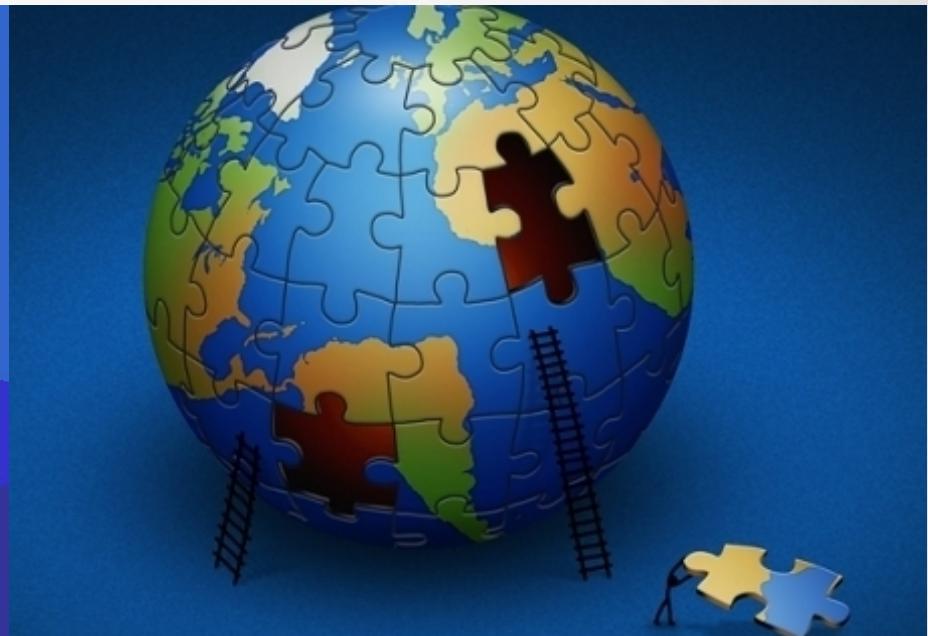
Appetisers

- 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

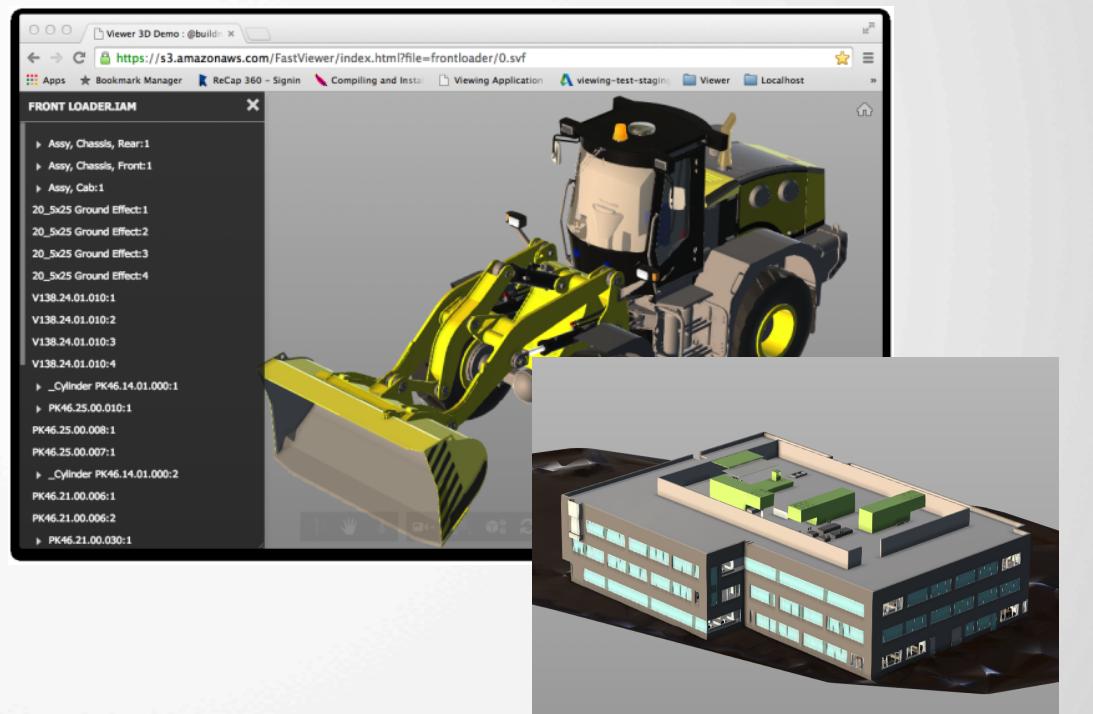
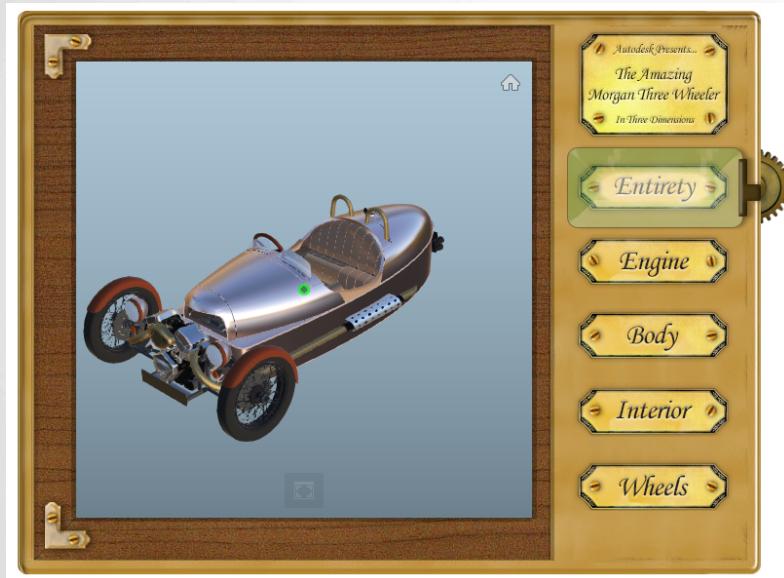


WEBGL and Three.js



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

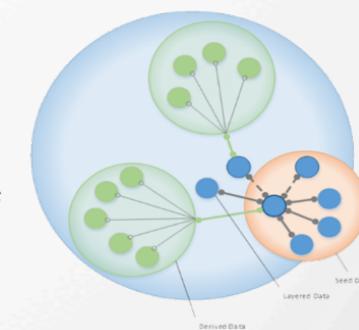
Find it



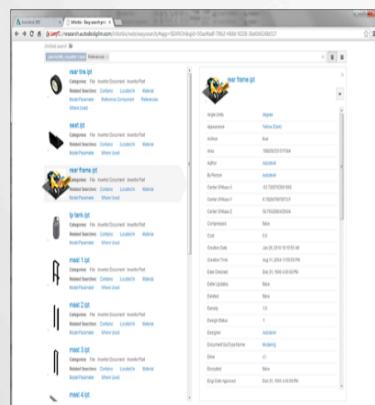
See it



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**

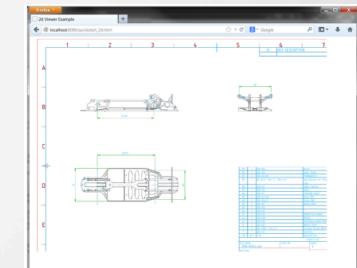
- Viewing technology based on Three.js
- Embed and control viewer in HTML5 applications
- Implement user interaction, access documents, manipulate objects, camera, ...



3D First

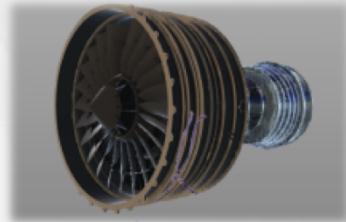


- 3D Functionality
 - Select, view properties, zoom, pan, orbit, isolate, focus, highlight
 - Access to underlying 3D model, e.g. meshes and materials
- 2D Functionality
 - Raster image – zoom and pan only
 - Vector graphics soon – select, view properties, zoom, pan, isolate, focus, highlight



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

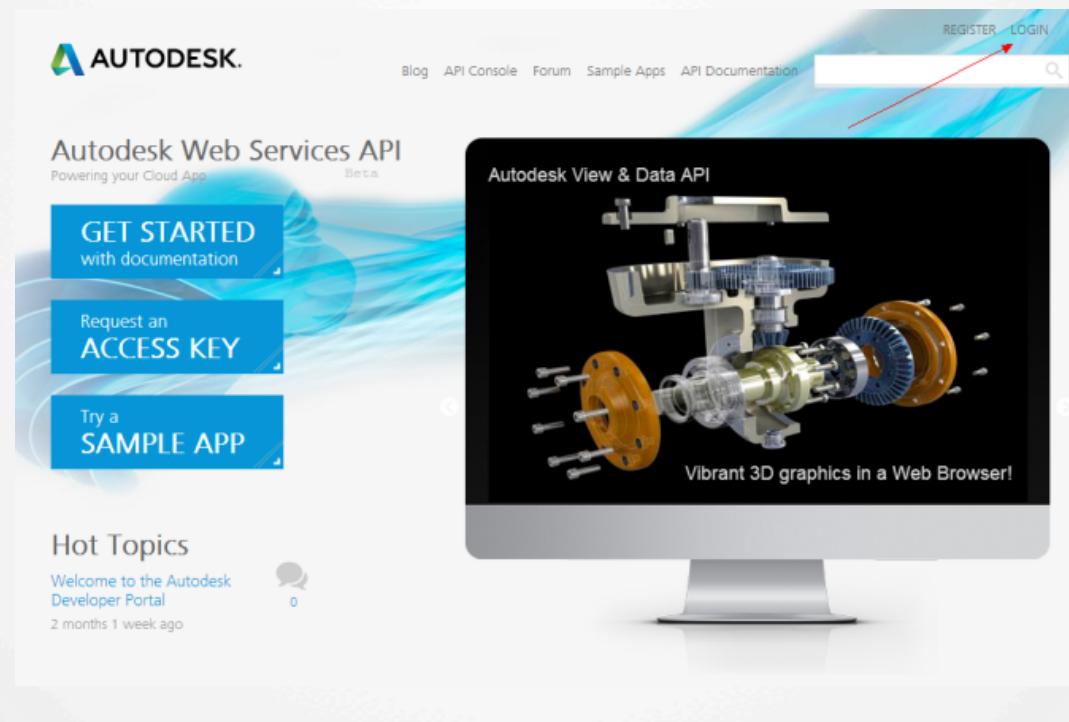




Getting Started – Server Side REST

Getting Started

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



Getting Started – Server/Management Workflow



Step 1: Register and Create an Application

<http://developer.autodesk.com>

The screenshot shows the Autodesk Developer Center website, which is currently in Beta. The main navigation bar includes links for "Autodesk Developer Center", "Powering your Cloud App", and "Beta". Below the navigation, there are three prominent blue buttons: "GET STARTED with documentation", "Request an ACCESS KEY", and "Try a SAMPLE APP". To the right of these buttons is a large image of a modern, multi-story building with glass walls and a complex structural framework, set against a dark background. A copyright notice at the bottom of this image reads "Copyright © Image courtesy of LivingRoomCraftZ". Below the image, a grey banner states "Support for over 60 file formats". At the bottom left, there is a "Hot Topics" section.

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=xxxxxxxxxxxxxx  
&client_secret=xxxxxxxxxxxxxx  
&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 xxxxxxxxxxxxxxxx

- 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 xxxxxxxxxxxxxxxxxx

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 xxxxxxxxxxxxxxxx

- 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 xxxxxxxxxxxxxxxx

- 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 xxxxxxxxxxxxxxxx

- 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

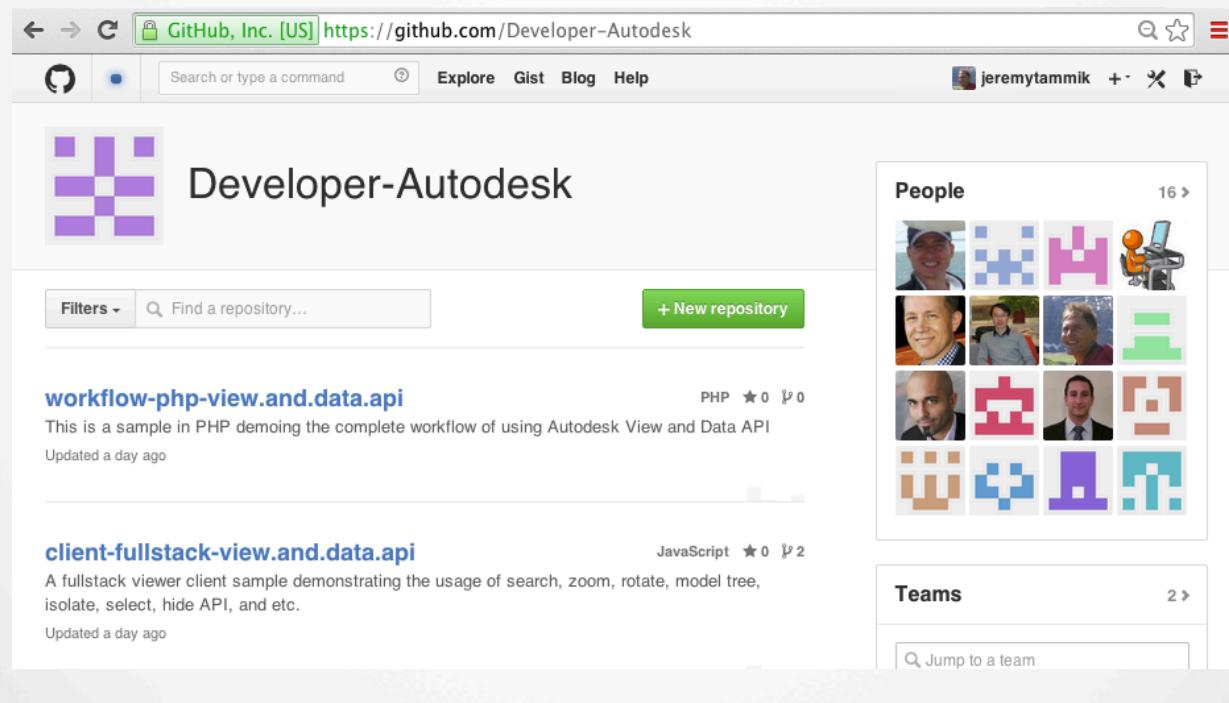
Getting Started and Full Documentation

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



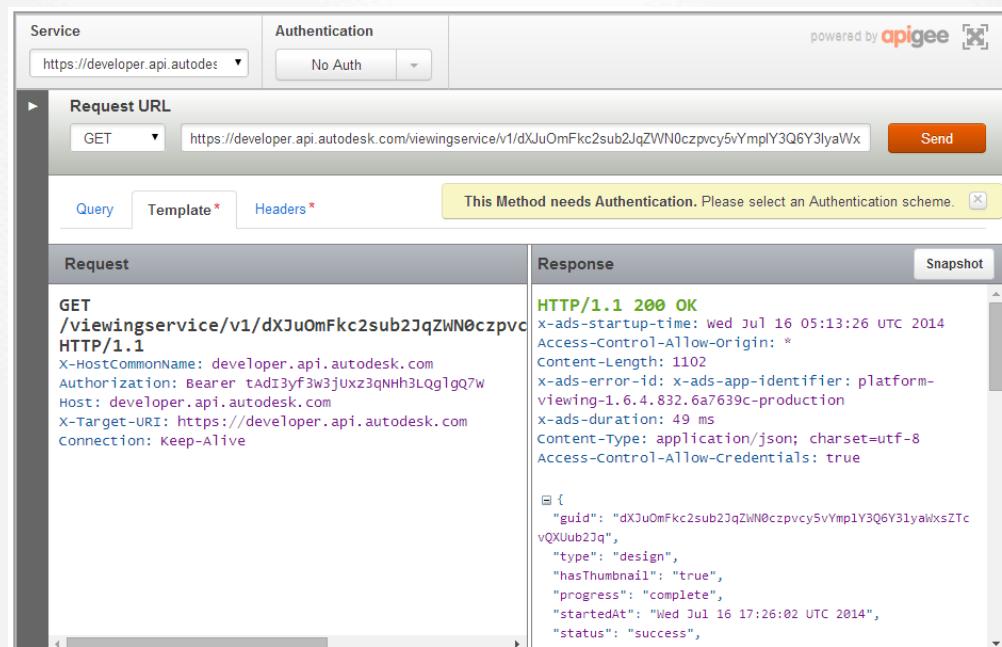
Demo Code and Sample Applications on GitHub

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



Test the API Online in the API Console

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



The screenshot shows the API Console interface. At the top, it says "Service https://developer.api.autodesk.com" and "Authentication No Auth". It also says "powered by apigee". Below this, the "Request URL" section shows a GET request to "https://developer.api.autodesk.com/viewingservice/v1/dXJuOmFkc2sub2JqZWN0czpvcy5YmplY3Q6Y3IyaWxvQXJuub21q". A "Send" button is next to it. Below the URL, there are tabs for "Query", "Template*", and "Headers*". A message says "This Method needs Authentication. Please select an Authentication scheme." In the "Request" pane, the full HTTP request is shown:

```
GET /viewingservice/v1/dXJuOmFkc2sub2JqZWN0czpvcy5YmplY3Q6Y3IyaWxvQXJuub21q
HTTP/1.1
X-HostCommonName: developer.api.autodesk.com
Authorization: Bearer tAdI3yf3w3juxz3qnH3LQqlgQ7w
Host: developer.api.autodesk.com
X-Target-URI: https://developer.api.autodesk.com
Connection: Keep-Alive
```

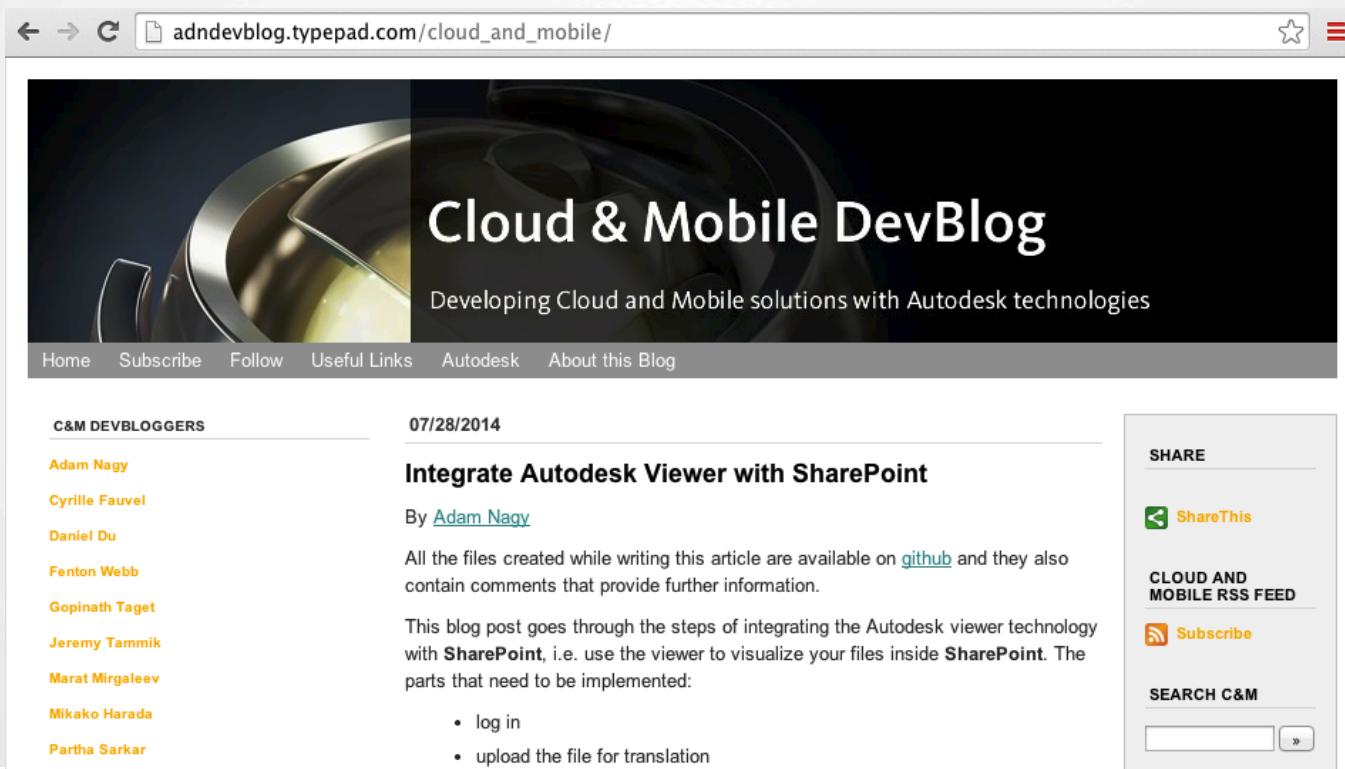
In the "Response" pane, the response is shown as:

```
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": "dXJuOmFkc2sub2JqZWN0czpvcy5YmplY3Q6Y3IyaWxsZTcvQXJuub21q",
  "type": "design",
  "hasThumbnail": "true",
  "progress": "complete",
  "startedAt": "Wed Jul 16 17:26:02 UTC 2014",
  "status": "success",
  "version": "1000"
}
```

Cloud and Mobile DevBlog for Q&A and More

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



The screenshot shows a blog homepage with a dark header featuring a metallic gear-like background image. The title "Cloud & Mobile DevBlog" is prominently displayed in white, along with the subtitle "Developing Cloud and Mobile solutions with Autodesk technologies". Below the header is a navigation bar with links: Home, Subscribe, Follow, Useful Links, Autodesk, and About this Blog. The main content area has a date "07/28/2014" and a post titled "Integrate Autodesk Viewer with SharePoint" by Adam Nagy. The post discusses integrating Autodesk's viewer technology with SharePoint. A sidebar on the right contains sections for "SHARE" (with a ShareThis button), "CLOUD AND MOBILE RSS FEED" (with a "Subscribe" button), and "SEARCH C & M" (with a search input field).

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

**Facebook
TypePad
Sharepoint
Model** <https://www.facebook.com/a360viewer>
http://adndevblog.typepad.com/cloud_and_mobile/stephens-test-page.html
<https://share.autodesk.com/IPG/CloudPlatforms/SitePages/Test%20Page.aspx>
<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





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