

# From AutoCAD I/O to View and Data

Fernando Malard

Chief Technology Officer – ofcdesk, LLC.

@fpmalard

# Class summary

This class will explore the brand new Autodesk, Inc., web APIs. Attendees will explore AutoCAD I/O API and View and Data capabilities, learning how to use these technologies, but also how to use both together. We will explore the potential of these APIs to empower your cloud solutions by enriching them with visualization features, asynchronous processing, and zero-client products.

# Key learning objectives

At the end of this class, you will be able to:

- Learn how to use AutoCAD I/O API
- Learn how to use View & Data API
- Learn how to use both APIs together
- Learn how to empower your cloud solutions

# Introduction



# Current scenario

- Autodesk products have **strong core engines**
- The web is now **fast and reliable**
- Users need **mobility**
- Solutions need to be **simple yet powerful**
- **Cloud** based services are stronger every day
- Low **cost ownership** is required
- Unlimited **computing power** is now a reality

# Autodesk APIs as web services

- Powerful **core engines**
- Consumed via **web services**
- **Zero-client** installs
- **Web based** interfaces
- Major **Browsers** supported
- **WebGL** for viewing
- **JavaScript** for client programming

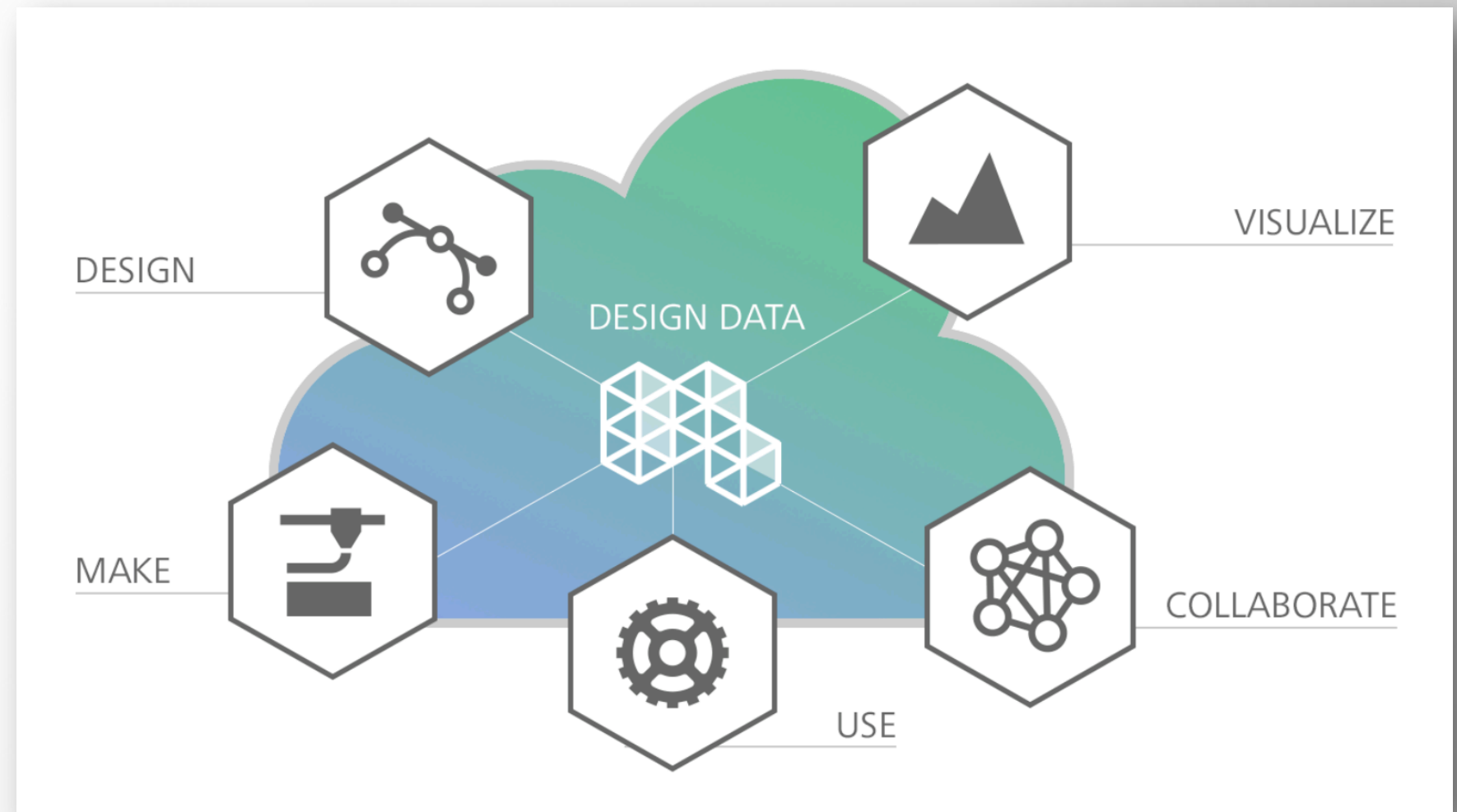
# Autodesk FORGE

# FORGE

Powering a connected ecosystem for product development

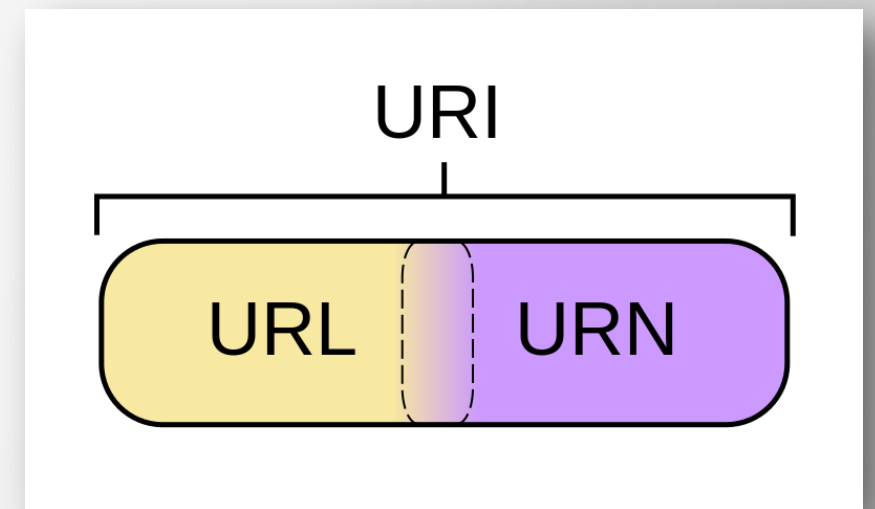
<http://forge.autodesk.com>

- **Design (AutoCAD I/O)**
- **Visualize (View&Data)**
- Collaborate
- Use
- Make



# Background technologies - REST

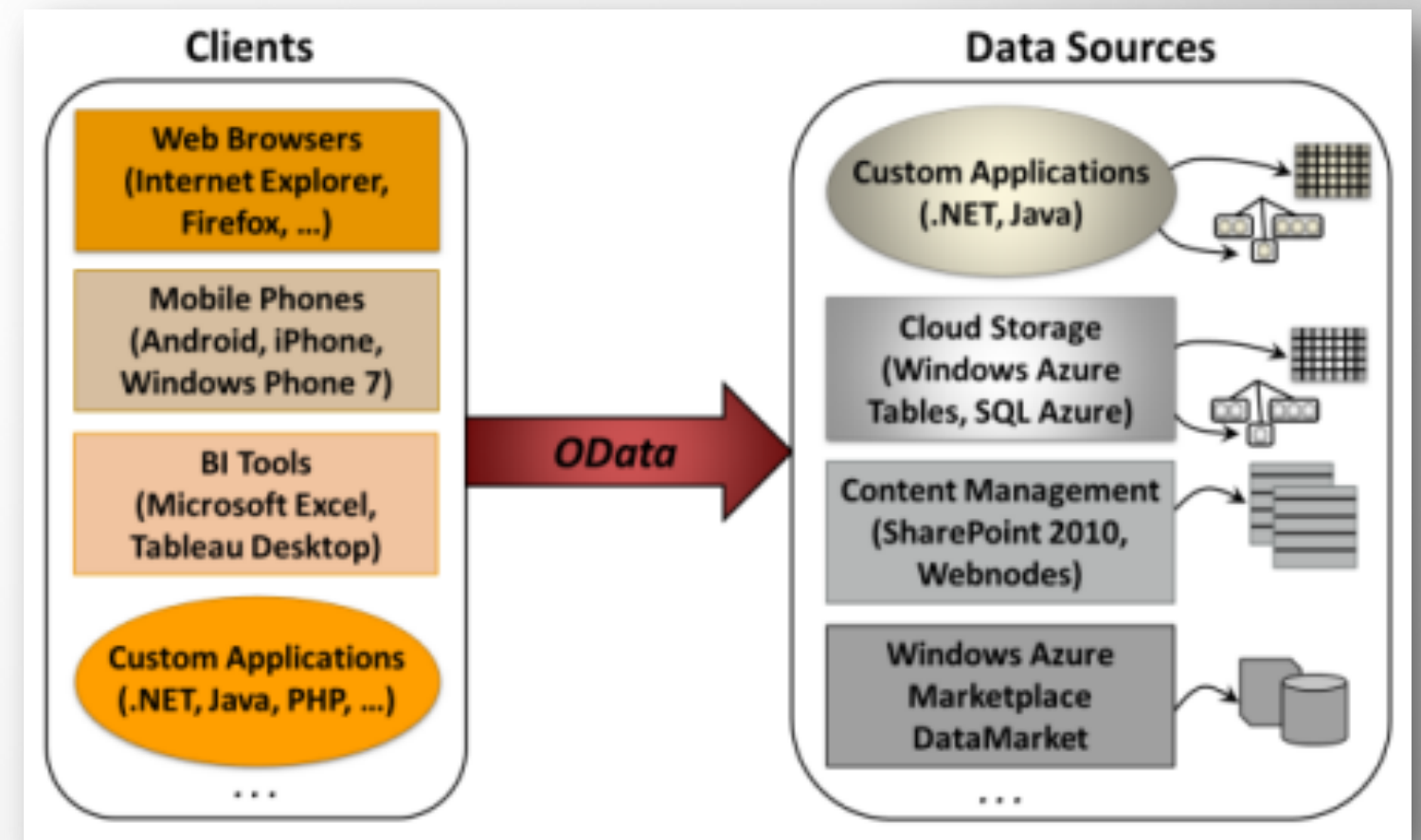
- REST = *Representational State Transfer*
- Architectural style **based on resources**
- **Simple** and used for cloud solutions through web services
- Web services calls: **GET**, **PUT**, **POST** and **DELETE**
- Work with **HTTP** responses
- Uniform Resource Identifier (**URI**) is either a Uniform Resource Locator (**URL**), a Uniform Resource Name (**URN**), or both.





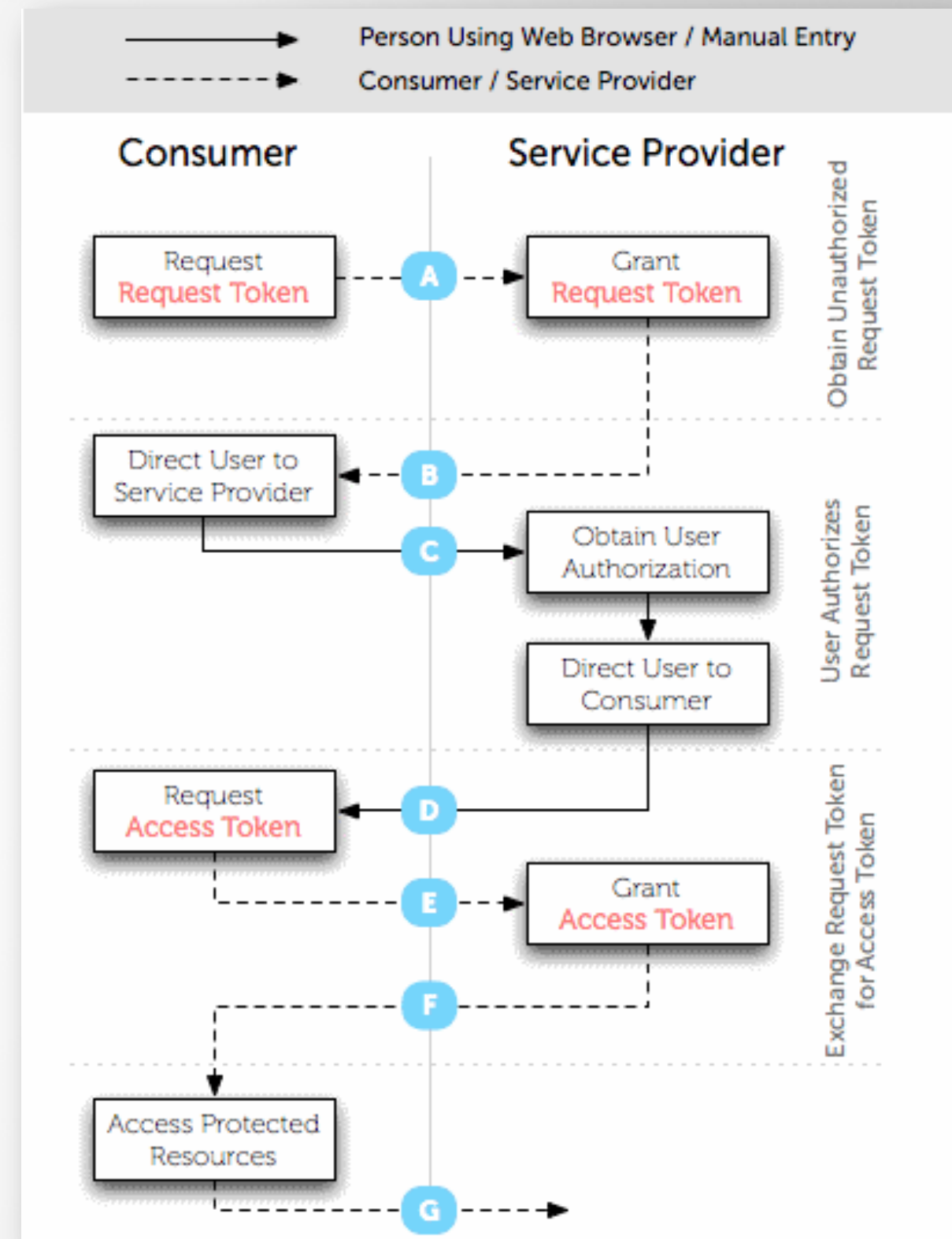
# Background technologies - OData

- Odata = ***Open Data Protocol***
- **Standard** that defines the best practices for building and consuming RESTful APIs
- Simplifies **business logic** while building RESTful APIs



# Background technologies - OAuth

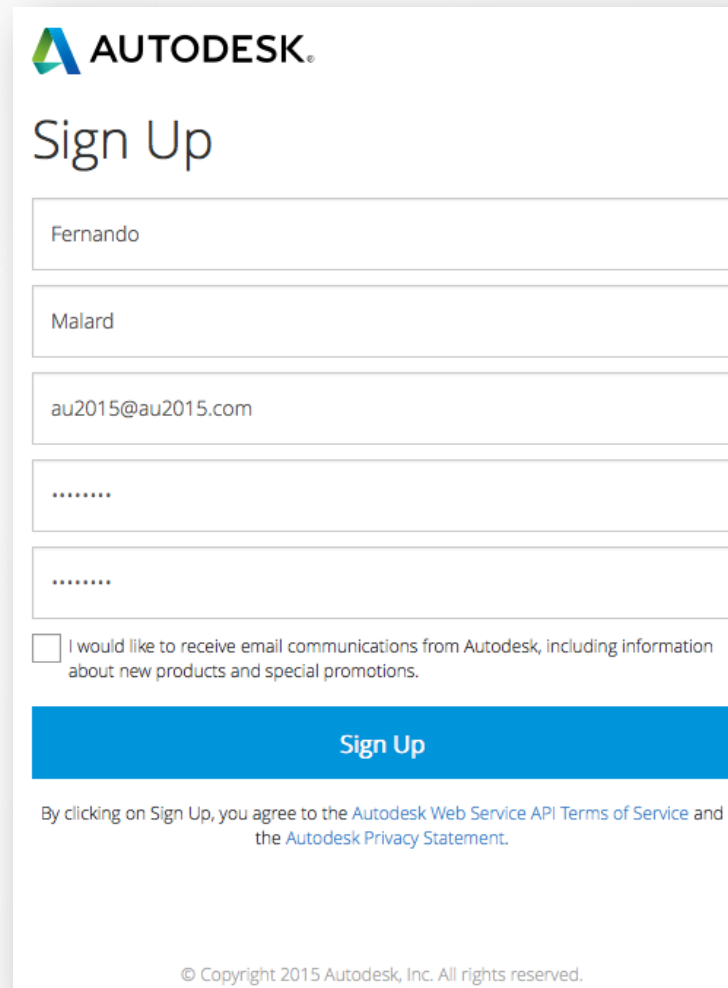
- OAuth = *Open Standard for Authorization*
- Secure delegated access to resources
- Based on access tokens issued
- Uses an authorization server



# Autodesk APIs - FORGE

# Autodesk APIs – Developer Portal

- Sign up
- **Register** your apps
- Consumer **Key**
- Consumer **Secret**



The image shows the Autodesk Sign Up form. It includes fields for Name (Fernando), Surname (Malard), Email (au2015@au2015.com), Password, and Confirm Password. There is a checkbox for email communications and a blue Sign Up button. Below the button is a disclaimer about terms of service and privacy statement. The footer contains the copyright notice: © Copyright 2015 Autodesk, Inc. All rights reserved.

**AUTODESK.**

## Sign Up

Fernando

Malard

au2015@au2015.com

.....

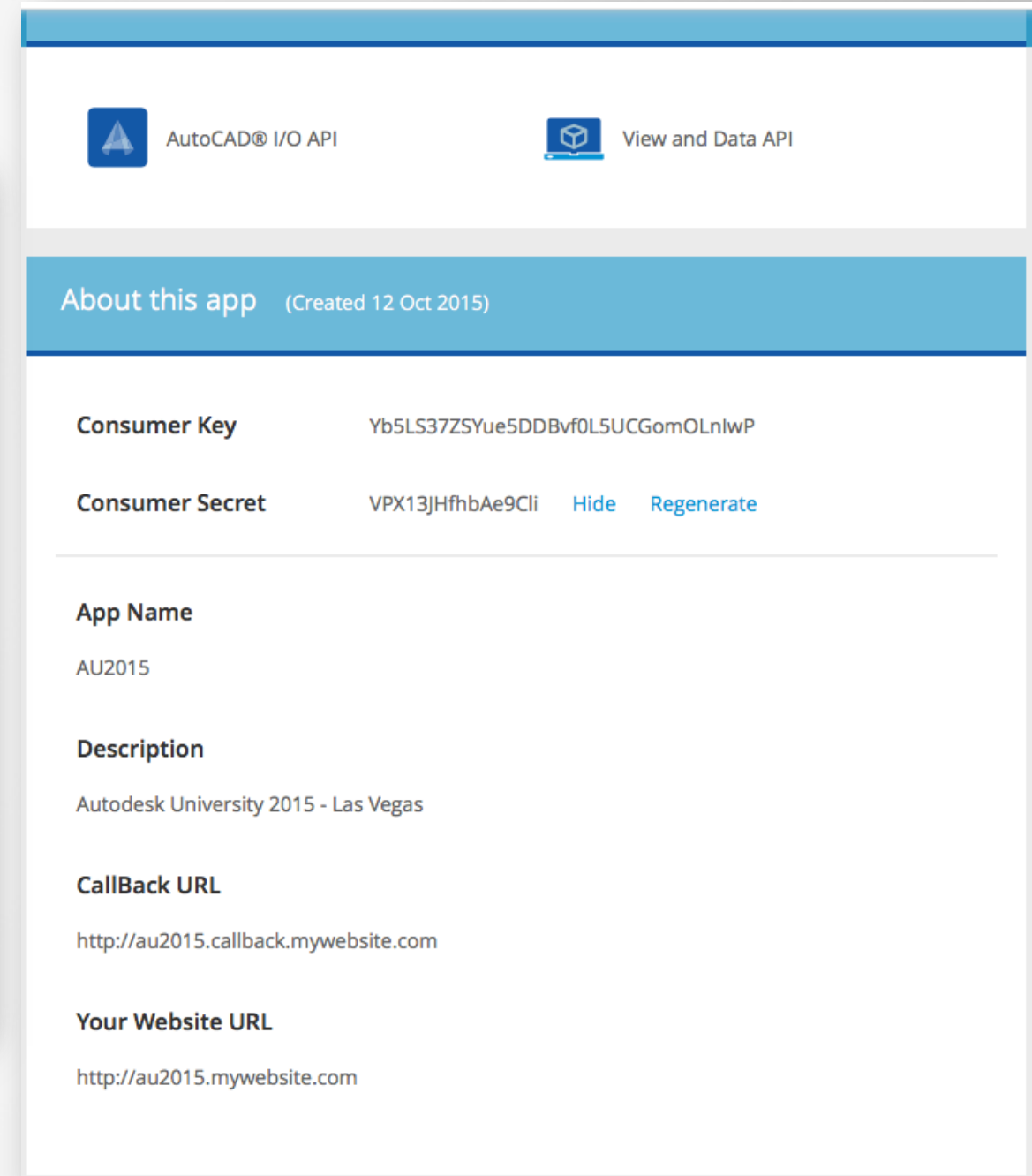
.....

☐ I would like to receive email communications from Autodesk, including information about new products and special promotions.

**Sign Up**

By clicking on Sign Up, you agree to the [Autodesk Web Service API Terms of Service](#) and the [Autodesk Privacy Statement](#).

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The image shows the Autodesk Developer Portal app configuration page. It displays the app name (AU2015), description (Autodesk University 2015 - Las Vegas), callback URL (http://au2015.callback.mywebsite.com), and website URL (http://au2015.mywebsite.com). It also shows the consumer key and secret, with options to hide or regenerate the secret.

**AutoCAD® I/O API** **View and Data API**

## About this app (Created 12 Oct 2015)

|                        |                                                                  |
|------------------------|------------------------------------------------------------------|
| <b>Consumer Key</b>    | Yb5LS37ZSYue5DDBvf0L5UCGomOLnlwP                                 |
| <b>Consumer Secret</b> | VPX13JHfhbAe9Cli <a href="#">Hide</a> <a href="#">Regenerate</a> |

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**App Name**

AU2015

**Description**

Autodesk University 2015 - Las Vegas

**CallBack URL**

http://au2015.callback.mywebsite.com

**Your Website URL**

http://au2015.mywebsite.com



# Autodesk APIs – AutoCAD I/O

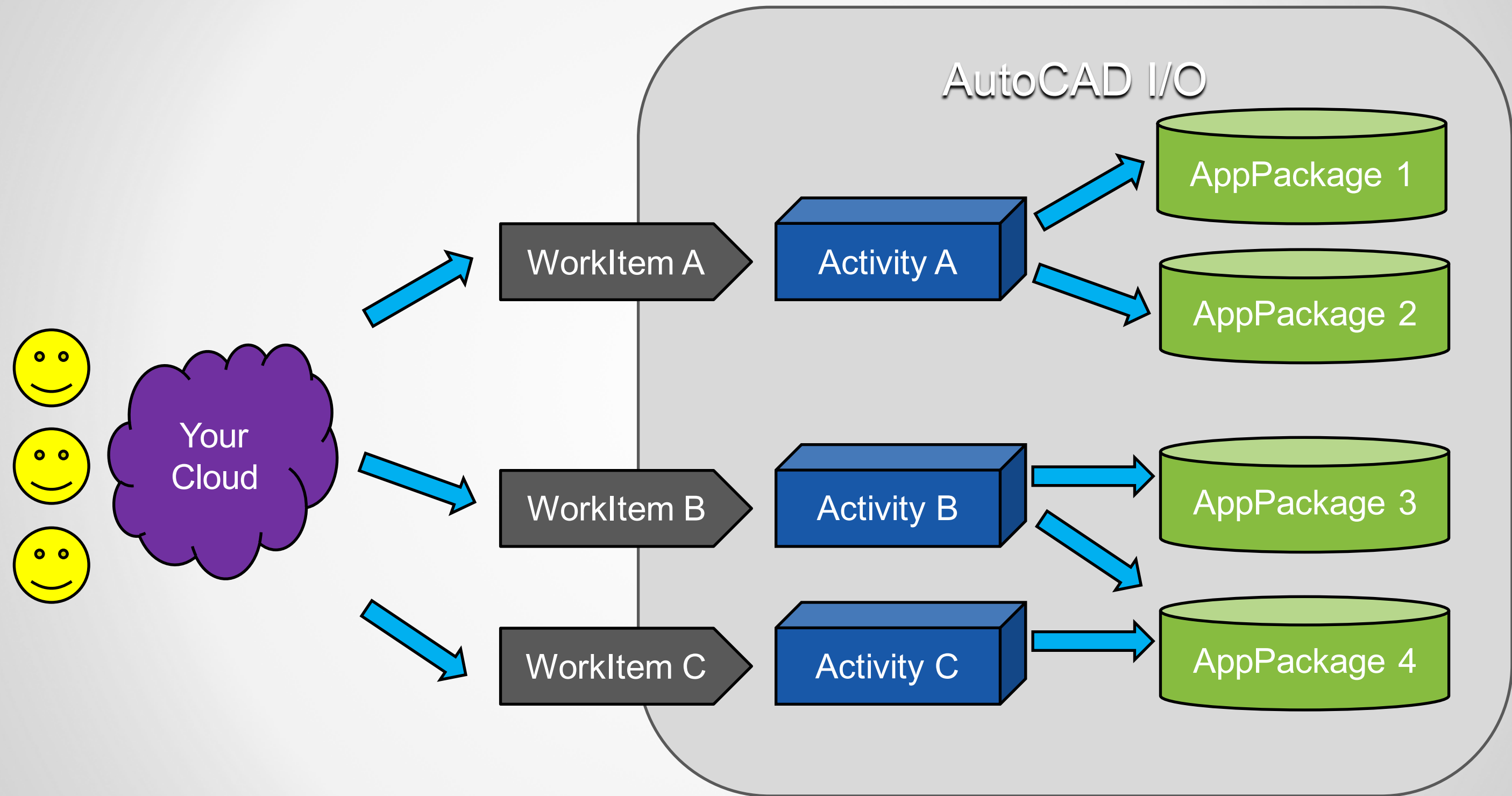
- Perform **operations** on DWG content
- Create **new DWG** files
- **Query** any information from an existing DWG file
- **Change** drawings and save them to other formats
- Run AutoCAD native **commands** (except UI dependent)
- **Simplify** the DWG manipulation process
- **Scalable** resources (run at Autodesk cloud)
- **Extensible** with custom apps (CRX, DBX, LSP and DLL)

# Autodesk APIs – AutoCAD I/O

## Abstractions:

- **AppPackage**: Extensions in DBX, CRX, LSP or DLL modules, written in AutoLISP, C++ or .NET
- **Activity**: Pre-configured action, in AutoCAD script language, that can refer to one or more AppPackages
- **WorkItem**: Represents each execution of your Activities (actions) providing input and output parameter values

# Autodesk APIs – AutoCAD I/O



# Autodesk APIs – View & Data

- **Upload** models via REST API
- Return a **viewing stream**
- Access to **model data** using JavaScript
- Rich **2D** and **3D** models into the **web browser**
- Runs in **Chrome**, Safari, Internet Explorer and Firefox
- More than **60 design file formats**
- **Zero plug-in install**, no downloads

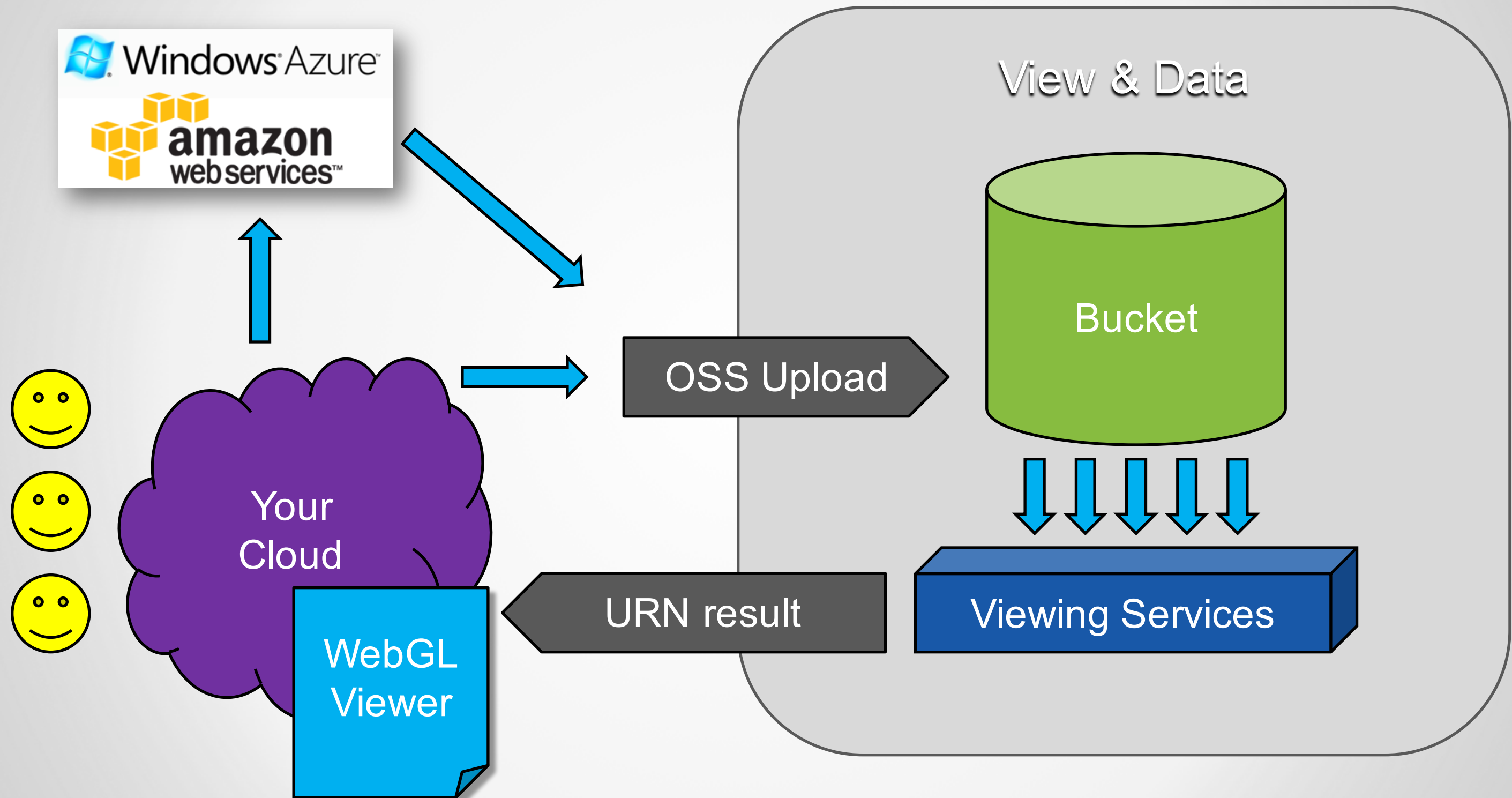
# Autodesk APIs – View & Data

Abstractions and concepts:

- **Bucket**: It is basically a storage folder where you upload the input files. Can be Transient, Temporary or Persistent
- **OSS**: *Object Storage Service* is responsible for storing and maintaining, secured by OAuth 2.0, uploaded files
- **Viewing Services**: Run the translation service with the input URN (Uniform Resource Name). Return a result URN to stream the resulting model



# Autodesk APIs – View & Data



# Using AutoCAD I/O with View & Data

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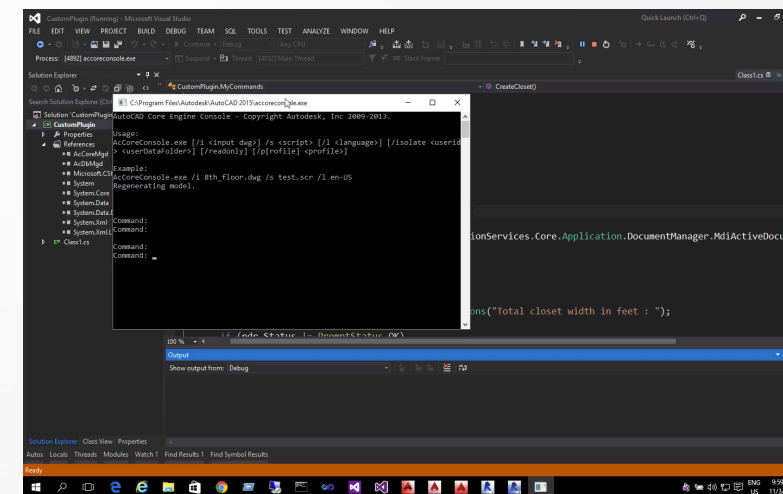
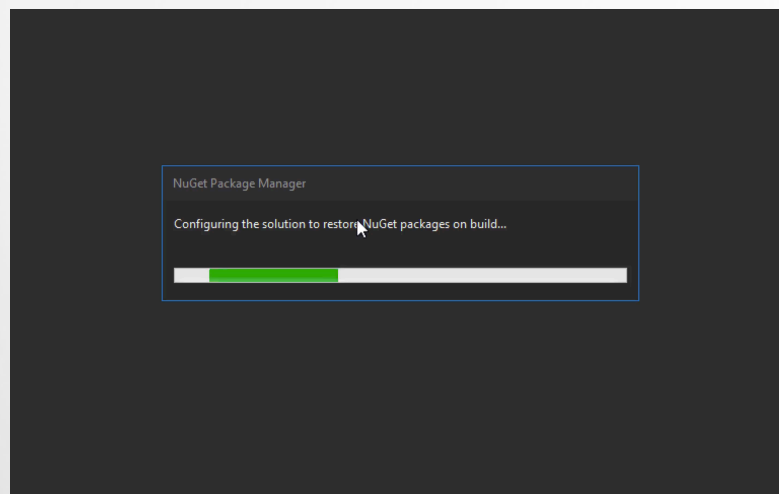
## Demo

- **ASP.NET** website and **Amazon S3** storage
- Base on Autodesk **Github** samples:  
<https://github.com/Developer-Autodesk/library-dotnet-autocad.io>  
<https://github.com/Developer-Autodesk/workflow-aspdotnet-autocad.io>  
<https://github.com/Developer-Autodesk/workflow-winform-autocad.io>
- Custom AppPackage to **create a cabinet**
- Resulting DWG saved into a **S3 folder**
- DWG used as input to **View & Data**
- Model displayed at the website with a **client viewer**

# Using AutoCAD I/O with View & Data

## Demo – Step 1: NuGet and Custom Plugin

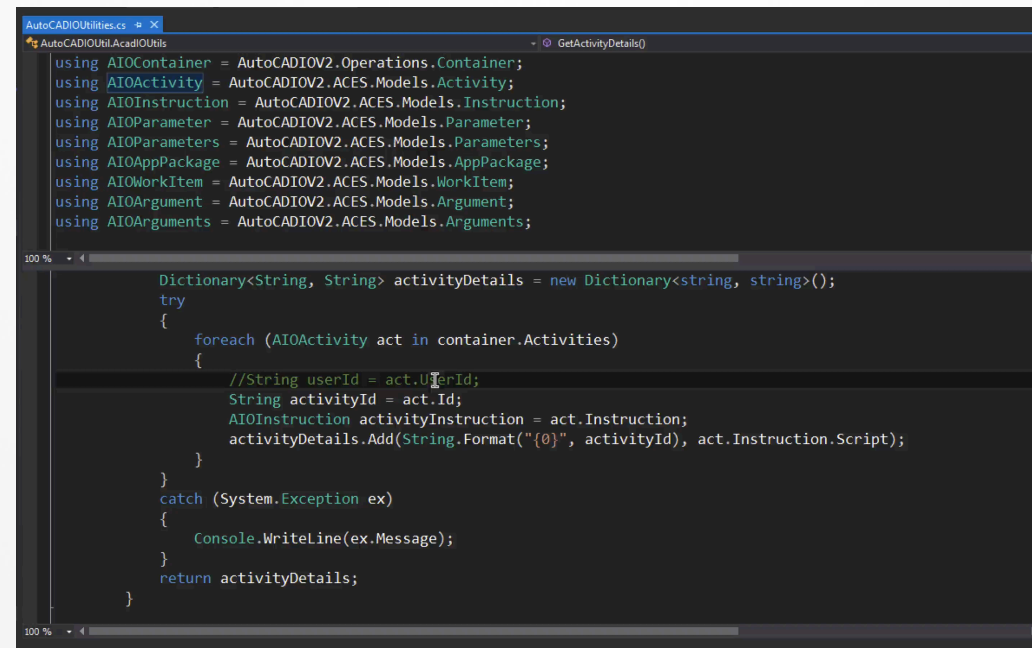
- **NuGet** Plugin will take care of **libraries and updates**
- AppPackage will include a **custom Plugin**
- The Plugin must run on **AutoCAD Core Console**
- Input data can be provided via **Script**



# Using AutoCAD I/O with View & Data

## Demo – Step 2: AutoCADIOUtils

- **.NET OData** wrapper for AutoCAD I/O access
- **Simplify** coding when creating .NET based applications
- Can be used from either **Desktop or Web** projects
- Negative: Keep a **static link** with the OData API



```
using AIOContainer = AutoCADIOV2.Operations.Container;
using AIOActivity = AutoCADIOV2.ACES.Models.Activity;
using AIOInstruction = AutoCADIOV2.ACES.Models.Instruction;
using AIOParameter = AutoCADIOV2.ACES.Models.Parameter;
using AIOParameters = AutoCADIOV2.ACES.Models.Parameters;
using AIOAppPackage = AutoCADIOV2.ACES.Models.AppPackage;
using AIOWorkItem = AutoCADIOV2.ACES.Models.WorkItem;
using AIOArgument = AutoCADIOV2.ACES.Models.Argument;
using AIOArguments = AutoCADIOV2.ACES.Models.Arguments;

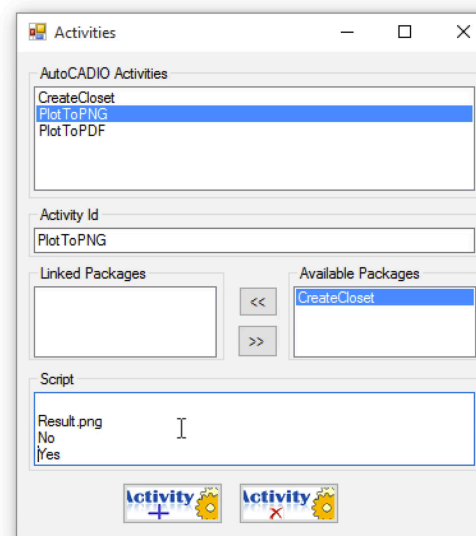
Dictionary<String, String> activityDetails = new Dictionary<string, string>();
try
{
    foreach (AIOActivity act in container.Activities)
    {
        //String userId = act.UserId;
        String activityId = act.Id;
        AIOInstruction activityInstruction = act.Instruction;
        activityDetails.Add(String.Format("{0}", activityId), act.Instruction.Script);
    }
}
catch (System.Exception ex)
{
    Console.WriteLine(ex.Message);
}
return activityDetails;
```



# Using AutoCAD I/O with View & Data

## Demo – Step 3: AutoCAD I/O Manager App

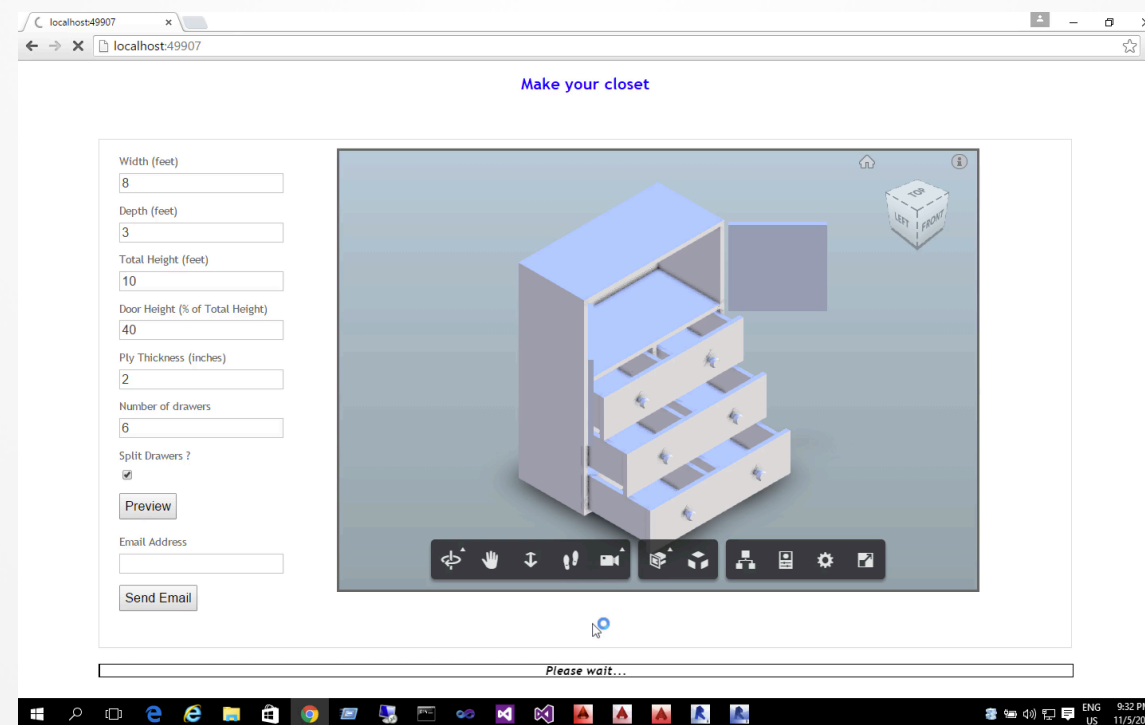
- **Windows Form** based app
- Allow **Activity** management
- Allow **AppPackage** management
- Can **test drive** your Activities



# Using AutoCAD I/O with View & Data

## Demo – Step 4: Asp.NET website

- Can take advantage of existing **.NET modules**
- Will access **AutoCAD I/O** through utility module
- Will access **View & Data** through REST calls
- **Amazon S3** will be used as remote storage



# Conclusion

# Conclusion

- **Powerful APIs**
- Available as **web services**
- More **FORGE** APIs soon
- Still in **early** versions
- **Pricing** model to be defined soon
- **Enrich** your cloud solutions
- Hide **unnecessary complexity** from users
- Reduce **cost ownership** and maintenance

# Be heard! Provide AU session feedback.

- Via the Survey Stations, email or mobile device.
- AU 2016 passes awarded daily!
- Give your feedback after each session.
- Give instructors feedback in real-time.





# More Questions? Visit the AU Answer Bar

- Seek answers to all of your technical product questions by visiting the **Answer Bar**.
- Open daily 8am-10am and Noon-6pm and located just outside of Hall C on Level 2.
- Staffed by Autodesk developers, QA, & support engineers ready to help you through your most challenging technical questions.



