From Desktop to the Cloud with Forge

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This class will introduce the Forge platform from the perspective of an early adopter – starting with business aspects, paradigm shift, cloud concepts, and the future of Autodesk cloud platform strategy. We will cover some of the technical challenges with web programming from the perspective of someone migrating from a desktop programming environment to the cloud, and discuss how to overcome them. We will then walk through some simple yet representative code samples helping you to get started with the Forge platform through the Viewer, Model Derivative API and Design Automation APIs.
Key learning objectives

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

- Understand web paradigms and challenges
- Learn how to efficiently move to the cloud
- Explore Autodesk Forge platform
- Learn how to use Viewer, Model Derivative and Design Automation
Agenda

- From Desktop to the Cloud
- Cloud resources
- The Forge platform
- Viewer, Design Automation and Model Derivative
- Conclusions
From Desktop to the Cloud
“It’s clear now that while organizations may have come to the cloud to reduce costs, it’s not why they stay. The true potential of cloud lies in an organization’s ability to leverage this agile delivery model to transform the business.”

Rick Wright, Principal and Global Cloud Enablement Leader at KPMG
From Desktop to the Cloud - Usage

The top ways businesses are using cloud to drive business transformation in 2014

- Drive cost efficiencies
- Better enable mobile workforce
- Improve alignment with customers/partners
- Better leverage data to provide insight
- New product development/innovation
- Develop new business models
- Shift to a global shared services model
- Faster time to market

Source: 2014 KPMG Cloud Survey Report

*KPMG: 2014 Cloud Survey Report*
From Desktop to the Cloud – Improvements

Most successful areas of business improvement as a result of cloud implementation

- 73% Improve business performance
- 72% Improve levels of service automation
- 70% Reduce costs
  - 68% Better integrate systems
  - 68% Introduce new features/functions
  - 67% Enhance ability to interact with constituents
  - 67% Rapidly deploy new solutions
  - 66% Replace legacy systems

Source: 2014 KPMG Cloud Survey Report

*KPMG: 2014 Cloud Survey Report*
From Desktop to the Cloud – Challenges

Most challenging areas when adopting cloud

Data loss and privacy risks

Risk of intellectual property theft

Impact on IT organization

48% Measuring on ROI

48% High cost of implementation

46% Legal and regulatory compliance

46% Integration with existing architecture

46% Lack of clarity of total cost of ownership

Source: 2014 KPMG Cloud Survey Report

*KPMG: 2014 Cloud Survey Report*
From Desktop to the Cloud – Facts

**Desktop**
- Download & install
- High resource demand
- Security and setup time
- High initial investment
- Poor file/data sharing
- Vulnerable information
- Per user license
- Complex backups

**Cloud**
- Fast disaster recovery
- Centralized maintenance
- Low initial investment
- Enhances teamwork
- Centralized file storage
- Accessible to small businesses
From Desktop to the Cloud – Development

- New **languages** and paradigms
- **Libraries** and packages
- **Client-server** architecture

Packages people 'npm install' a lot

- **browserify**
  - browser-side require() the node...
  - 13.0.0 published 4 months ago by feross

- **grunt-cli**
  - The grunt command line interf...
  - 0.1.13 published 2 years ago by bellen

- **bower**
  - The browser package manager
  - 1.7.7 published 4 months ago by sheerun

- **gulp**
  - The streaming build system
  - 3.9.0 published 11 months ago by phated

- **express**
  - Fast, unopinionated, minimal...
  - 4.13.4 published 4 months ago by dougwilson

- **npm**
  - a package manager for JavaSc...
  - 3.7.1 published 3 months ago by iarna

- **cordova**
  - Cordova command line interf...
  - 6.0.0 published 4 months ago by stevegill

- **forever**
  - A simple CLI tool for ensuring ..
  - 0.15.1 published 10 months ago by indexeszero
From Desktop to the Cloud – Data Security

- **Access** control (login/password)
- **Token** based authentication
- **Encrypted** data storage
From Desktop to the Cloud – Debug / Test

- Desktop debugging
- Web debugging
- Browser cache…Refresh!
Cloud Resources
Cloud Resources – Computing

Cloud computing isn’t a new thing, Project **SETI@home** was launched in 1999.
Cloud Resources – Servers and Services

- Amazon AWS
- Microsoft Azure
Cloud Resources – Storage, CPU and Costs

- Overall cost reduction
- T.C.O. – The IT guy?
Cloud Resources – Storage, CPU and Costs

- New storage technologies: Project Natick
Cloud Resources – Storage, CPU and Costs

- New power sources: Sonoma Mountain Village
Autodesk Forge
Autodesk Forge – Platform

- 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 – Platform

- [Link](http://forge.autodesk.com)
- Security (OAuth)
- Create (Design Automation)
- Visualize (Viewer)
- Collaborate
- Use
- Make
Autodesk Forge – Technologies

- **REST** = Representational State Transfer
- Based on **resources**
- Used for cloud solutions through **web services**
- Web services calls: **GET**, **PUT**, **POST** and **DELETE**
- Work with **HTTP responses**
- Uniform Resource Identifier (**URI**)  
- Uniform Resource Locator (**URL**)  
- Uniform Resource Name (**URN**)
Autodesk Forge – Technologies

- **OData** = Open Data Protocol
- Simplifies **business logic**
- **Easy access** to data and services from any client
Autodesk Forge – Technologies

- **OAuth** = Open Standard for Authorization
- Based on tokens
- Uses an **Authorization Server**
- 2-legged / 3-legged
- Access **scope**
Autodesk Forge – Technologies

- 2-legged
- 3-legged

End-user access your app, which redirects to Autodesk sign-in and he/she allow access his/her data.
Viewer, Design Automation and Model Derivative
Forge – Viewer / Model Derivative

- Model upload via public URL (AWS/Azure)
- Model upload via Autodesk Bucket
- SVF file creation via Model Derivative
- SVF streaming via URN
- Model data access in viewer via three.js
- 2D and 3D models into the Browser via WebGL
- Zero Plug-in install
Forge – Viewer / Model Derivative

Abstractions:

- **Model Derivative**: Model translation service;
- **SVF**: file format that can be visualized on client’s machine;
- **Bucket**: Autodesk data storage folder.
Forge – Viewer / Model Derivative

Model

Your Cloud

WebGL Viewer

URN

SVF

Model Derivative

Viewer

Autodesk Bucket

URL
Forge – Design Automation

- **AutoCAD** ”on the Cloud”
- Create, edit or query **DWG** files
- Save DWG files to **other formats**
- Run AutoCAD native **commands** (non-UI)
- Simplify the DWG **manipulation** process
- **Scalable** resources (run at Autodesk cloud)
- **Extensible** with apps (CRX, DBX, LSP and DLL)
Forge – Design Automation

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 AppPackage
- **WorkItem**: Represents each execution of your Activities (actions) providing input and output parameter values
Forge – Design Automation

Your Cloud

Design Automation

- WorkItem A
  - Activity A
    - AppPackage 1
  - WorkItem B
    - Activity B
      - AppPackage 2
  - WorkItem C
    - Activity C
      - AppPackage 3
Sample
Sample - Workflow

- Upload a base **DWG to AWS** and get its URL
- Collect **input data** via web page
- Post URL+script (with input data) to **Design Automation**
- Receive the **processed DWG**
- Submit processed DWG to **Model Derivative**
- Get **SVF streaming** URN to show into Viewer
Forge – More information

- Register & get a key

- See documentation & tutorials

- Reuse code

- Ask questions
  [Stack Overflow](https://stackoverflow.com)
  Tag: autodesk-model-derivative
Conclusion
Conclusion

- Cloud is a **business evolution**
- **Scalable**, ubiquitous, reliable
- **Hide complexity** from users
- Reduce **cost of ownership** and maintenance
- **Forge APIs** available as web services
- Bring the **power of desktop** apps to the cloud
- **Enrich** cloud solutions
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