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Building a Design-to-Make 3D Printing Workflow

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Learning Objectives

- ❏ Understand how to build CAD-to-part workflows using Autodesk Forge and MakerBot APIs
- ❏ Understand how to architect and develop software solutions for digital collaborative experiences
- ❏ Develop a high-level understanding of MakerBot's auto-scaling, high-availability Cloud Slicer infrastructure
- ❏ Explore the ease of use in implementing Cloud Slicer's RESTful API
- ❏ Observe an example of a workflow utilizing Cloud Slicer in real time

Description

Discover how MakerBot used the Fusion 360 APIs and to link the MakerBot Cloud Services to create seamless CAD-to-Part Workflows. Learn how you can tie Fusion 360 product development process to browser-based printing experience, which enables desktop design and prototyping collaboration.

Speakers

Ivan leads the software team at MakerBot. Prior to joining MakerBot he was co-founder at Inpher Inc. where he was responsible for product development and design. Previously he served as Senior Platform Manager at Autodesk's BIM 360 cloud products group. He was co-founder and CTO of Horizontal Systems, Inc., acquired by Autodesk in 2011. Ivan holds Doctoral, Master's and Bachelor's degrees all from Harvard University. His hobbies and interests include snowboarding, sailing, and blockchain.

Ben is a software engineer and web developer with a passion for software architecture, dev-ops and functional programming. At MakerBot he specializes in developing Node.js software to deliver reliable, robust technical solutions on the web services team. He has a diverse range of experience in everything from cloud service CI pipelines to hybrid mobile app development.

3D Printing Workflows

Desktop 3D printing has allowed designers to collapse long prototyping cycles in order to iterate faster and benefit from the low-cost and accessibility of the technology. However 3D printing workflows have remained disconnected and have relied on import/export capabilities of CAD applications where valuable metadata is typically lost. Additionally, there is limited real-time feedback from 3D print preparation applications back to CAD tools to inform designers of "printability" and preview of sliced model data.

The current sessions provides an overview of how APIs were used to enable data flows between Fusion 360 and MakerBot's Cloud Slicer service.

The need for CAD-to-Part workflows

Integrating CAD and 3D printing systems allows for better data retention and documentation of design decisions. The cloud data model in Fusion 360 enables team members to work in parallel and iterate on designs rapidly. Seamlessly creating 3D printed outputs of designs at anypoint in time requires close coordination. Keeping track of design vs. printed versions of models comes with high overhead in disconnected environment.
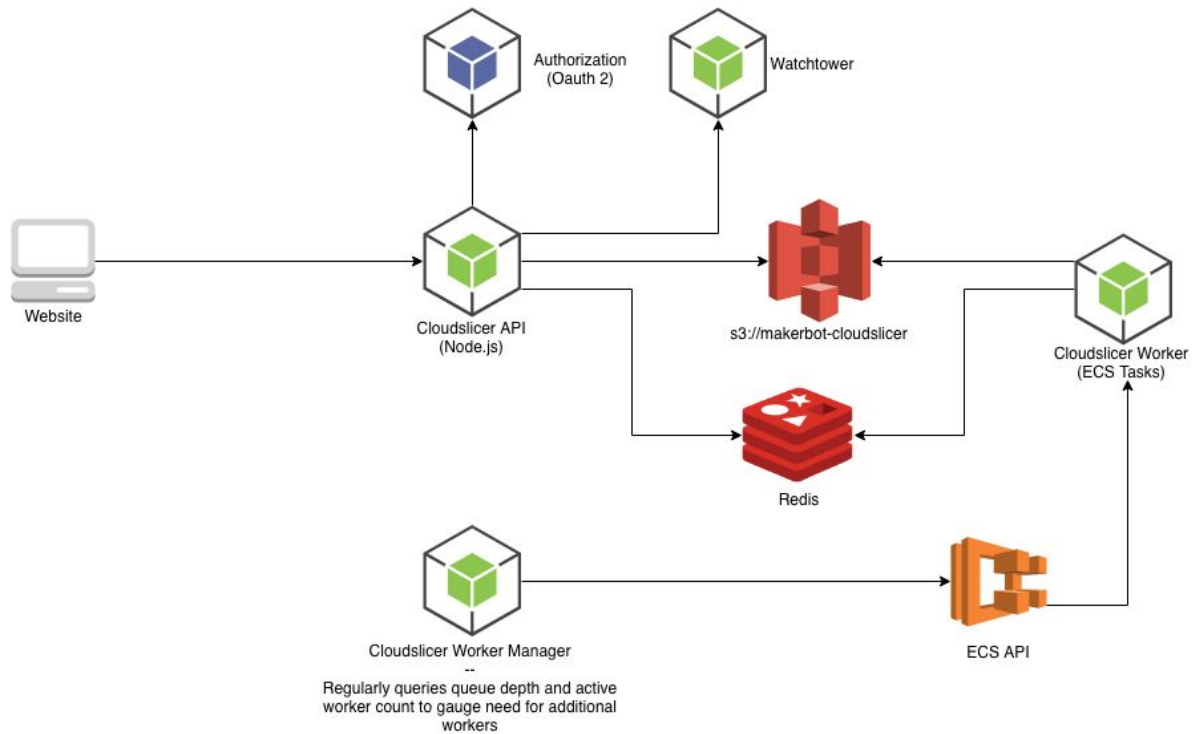
Software architecture for digital collaborative experiences

The software architecture of the integrated solution will be reviewed together with the main design considerations. Building flexible, scalable and reliable service infrastructure which will allow many future integrations is a main objective.

Building workflows using Autodesk Fusion 360 and MakerBot APIs

The specific Fusion 360 APIs used in the integration will be reviewed and the experience of publishing to the Fusion Store will be shared with the audience. Overview of the MakerBot and Thingiverse APIs will provide insights into how to build and deploy applications in the MakerBot ecosystem.

MakerBot Cloud Slicer's auto-scaling, high-availability infrastructure

The infrastructure of MakerBot's Cloud Slicer service allows developers to scale print processing jobs and bring the output data back into CAD tools.

It is critical that Cloud Slicer functions with high reliability & low latency to provide the most seamless workflow possible for users. We will go through a high level overview of how Cloud Slicer achieves these goals via a modern web service architecture that scales with demand.

Furthermore, we will review how CI/CD tools are used at MakerBot to automate our deployments to continuously improve our product for developers and how partners can best leverage the infrastructure.

Explore the ease of use in implementing Cloud Slicer's RESTful API

We will examine Cloud Slicer's API in production and review it's conformance with RESTful API guidelines. A sample application will be demonstrated that exemplifies how easy and quick it is to implement in a developer environment.

Real-time demo of Cloud Slicer workflows

Finally, we will demonstrate a sample application of a complete data-flow between Fusion 360 and Cloud Slicer.

A discussion will be opened on other possible data and/or workflows between CAD applications and 3D printing cloud services.