UNIVERSITY OF ILLINOIS, UNIVERSITY LIBRARY
3DEPOSIT PROJECT SCOPE

December 19th, 2018

OVERVIEW

1. Project Background and Description

During the Fall semester of 2018, Grainger IDEA Lab and UGL/Media Commons staff had a series of informal meetings with various campus partners on their use of and potential needs for Virtual Reality (VR). One outcome was the identification of various needs surrounding 3D and VR content preservation and discoverability. Each semester, U of I students are creating 3D/VR content for courses and projects, but there is currently no satisfactory way to present this content on the web for demonstration and instruction or retain it for institutional purposes. A project idea was developed to allow students and faculty to deposit 3D/VR content into a Library repository and create a workflow to make this content easily accessible to campus unit admins for the purposes of creating web content such as online galleries. It was decided that Grainger IDEA Lab staff would build custom tools for these purposes, with significant input and review by UGL/Media Commons. These tools and associated technologies constitute the deliverable of the project. This project is part of a wider campus initiative, *VR @ Illinois*.

2. Project Scope

Any campus member or unit will be able to deposit 3D/VR content via a web form. These deposits will become part of a Library repository. A content discoverability tool, **3deposit**, is being developed with Library unit admins in mind. Only Library unit admins will have access to this tool. They will use 3deposit to search and review deposits, as well as generate links and embeddable snippets to create publicly-accessible online content. 3deposit will be a web application, hosted on Library-managed servers. Support, maintenance, and the creation of new features will be managed by IDEA Lab staff and Grainger Library Graduate Assistants, with input and direction from Library unit admins. There will be an effort to release an updated and improved version of the project each semester.

3. High-Level Requirements

This project must include the following:

- Ability to allow any campus member or unit to easily deposit 3D/VR content in varying formats and sizes.
- Ability to communicate to campus members and units how their content will be used.
- Ability to connect to and use 3deposit from a web browser.
- Ability to restrict access to 3deposit.
- Ability to allow Library unit admins to log in to 3deposit.
- Ability to allow Library unit admins to search and review deposited content.
- Ability to allow Library unit admins to remove deposited content from repository and published endpoints.
- Ability to allow Library unit admins to generate links and embeddable snippets to use for online content, such as blogs and web pages.
- Ability to allow Library unit admins to report technical problems and suggest functional improvements.

4. Deliverables

A web application which satisfies the above requirements, including:

- Functional and technical documentation.
- Examples to demonstrate 3deposit functionality and workflow.
- Publicly-accessible codebase repository.

5. Project Details

The primary workflow will be: Deposit, Preserve, Publish, Manage.

Deposit:

- A webform, accessible to any campus member or unit, allowing input of 3D/VR content metadata and compressed file upload.
    - Initially, this will be a Webtools form with the intention to create a custom form in the future.
    - The campus member or unit will be able to indicate if they wish to associate their content with a specific course or Library unit, i.e. CS 498, Media Commons, IDEA Lab, Library Workshop, etc.
- Before content is deposited, the campus member or unit will be presented with clear language about the use and distribution of their content. They will be asked to agree to terms.
- After depositing, there will be email feedback, delivered to the campus member or unit, indicating what they can expect and where their content will be publicly accessible.

Preserve:

- There will be an automated process to ingest content, generate and apply additional metadata, and store all associated files in a highly-structured remote repository.
- Automation:
    - The process will be deployed on an instance of campus cPanel.
    - Access to this instance will be restricted to 3deposit admins.
    - The process will be written in Python, with additional technologies such as bash scripting and cron jobs.
    - The process will poll Webtools at regular intervals checking for new deposits.
    - The process will fetch deposits from the Webtools fileauth system and add them to the process queue.
    - Each deposit in the queue will be unpacked, checked for integrity, and additional custom metadata will be generated and attached to the deposit directory.
    - Deposit directories will be bundled and labeled uniformly.
    - Bundled content files will be pushed to a U of I Box repository using server-to-server JWT authentication.
    - This repository will be periodically backed up according to digital preservation best practices.
    - Process code will be committed to an online version control system, such as GitHub.
- Metadata:
    - We will be using a custom metadata schema to capture case-specific details about 3D/VR deposits.
        - See attached data dictionary.

    - More information on our metadata schema here:
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Publish:

- 3D models
    - Deposited 3D models will be published to a Library-managed Sketchfab account.
    - Sketchfab is a popular online platform for sharing 3D content.
    - Sketchfab has a robust API for uploading and managing content.
    - Once published, content can be easily embedded using the Sketchfab Viewer, which has a built-in feature to view the model in VR.
    - Content will be organized by Sketchfab "collection" – directly mapped to the unit indicated at the time of deposit.
    - Publishing content to a Library Sketchfab account provides a single endpoint to browse and view deposited content.
    - Sketchfab supports over 50 file formats.
- VR content
    - Making VR content easily available through the web is challenging.
    - Source files are not natively embeddable in web pages with current technology.
    - Part of this project will be to experiment with methods to port native VR source files to web-embeddable formats.
    - One solution may be to request that VR deposits include pre-ported builds for the purposes of sharing on the web.
    - We may also find that we can build a process to automatically port VR source files to web formats.
    - There are emerging frameworks, such as WebVR and A-Frame, which will be natively embeddable.

Manage:

- Library unit admins will be able to log in to a web application to review deposits.
- This web app will be built using the Flask web framework (Python), with additional technologies such as JSON, HTML, CSS, JavaScript, and SQL.
- The app will be deployed to the same cPanel instance as above.
- The URL for the app will be: https://threedeposit.web.illinois.edu
- Library unit admins will be able to search and filter deposits by metadata fields such as tags, course, date, size, type, etc.
- Library unit admins will be able to select content based on these filters.
- Library unit admins will be able to generate and export links and snippets in a structured format.
- These links and snippets can then be used to create web pages containing embedded views of 3D/VR content which users will be able to directly interact with and experience.

6. Implementation Plan

Basic functionality is currently in development. The core development team is:

- Robert Wallace – Project Lead – Grainger Library – IT Technical Associate
- Amanda Avery – Front End development – Grainger Library – Graduate Assistant

- Catherine Garner – Back End development – Grainger Library – Graduate Assistant
- Edward Gloor – Metadata – Grainger Library – Graduate Assistant
- Daria Orlowska – Metadata – Research Data Service – Graduate Assistant
- Garrett McComas – Metadata – Graduate Assistant
- Halle Burns – Metadata – Graduate Assistant

Project deliverables will be assigned based on these functional groupings. The team will meet periodically over the semester to determine goals and discuss development progress. Work on project deliverables will be mostly independent.

7. High-Level Timeline/Schedule

The development team is meeting on January 29th, 2019 with stakeholders from Grainger and UGL/Media Commons to demonstrate proof-of-concept, basic functionality, and to discuss the scope and deliverables of the project.

We hope to have an alpha version ready by the end of the Spring 2019 semester. We will solicit tests from select Library unit admins at this point. Work will continue over the summer. If the project makes good progress, we will have an open beta ready for Fall 2019.