RUTGERS
WINLAB | Wireless Information Network Laboratory

AR Mural

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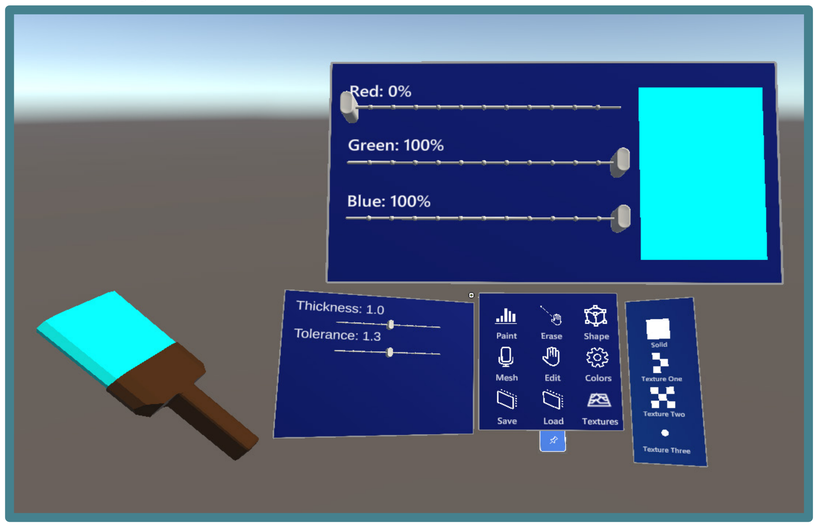
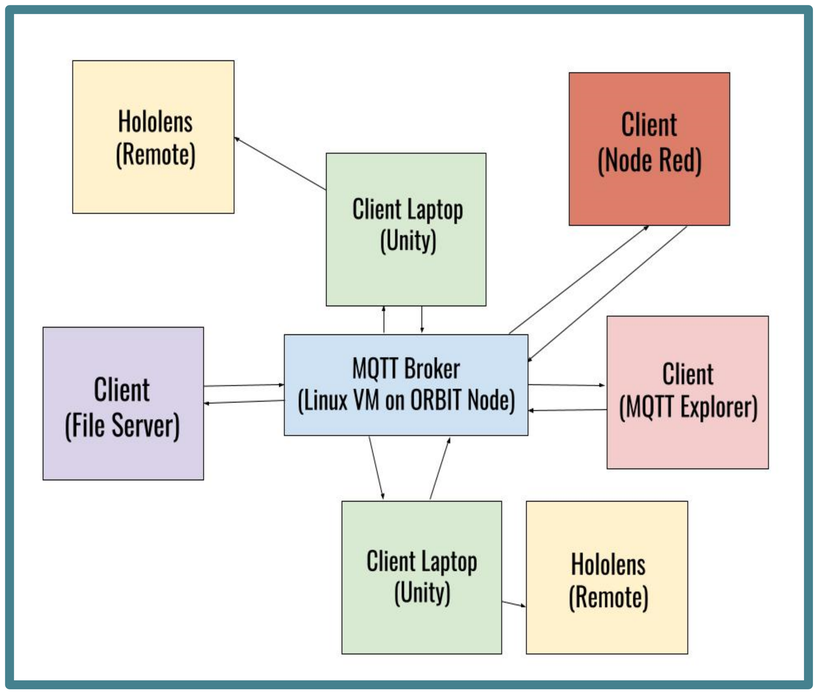
Objective

Create a collaborative augmented reality application which allows remote users to collectively create a virtual mural. In addition to creating the software that will manage the generation and rendering of the mural, another important component of this project is designing an infrastructure that will allow for very low latency collaboration.





Methodology

- Brush and mesh tools to create structures in 3D space
- Floating menus to adjust properties of structures
- Publish-subscribe architecture
- MQTT broker handles JSON object messages
- Clients drawings serialize into JSON objects (publish)
- JSON objects deserialize so clients could see drawings in environment (subscribe)
- File server stores changes of JSON object messages

Software

- **Unity** → Used to simulate 3D environment. Implemented C# scripts within software
- **Eclipse Mosquitto** → MQTT open source broker. Broker on a Linux VM hosted on ORBIT Testbed
- **Node-Red** → Used to create broker topics
- **MQTT-Explorer** → Used to monitor activity in broker topics
- **M2MQTT** → MQTT client library used to create a Unity client
- **Flask-MQTT** → Extenstion of Python Flask. Used for file server

Challenges

- Serializing and deserializing JSON data
- Confugring hololens to communicate with MQTT

Conclusion and Future Path

The foundation for all the artistic components and collaborative infrastructure allows more advanced features to be implemented. Starting with being able to effectively import and export GLB prefabs, so structures can be saved to the AR cloud. Other changes would include optimizing the data transfer between clients and possibly adding mobile support.

This work was supported in part by the NSF REU program and the donation from nVERSES CAPITAL

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