

# Realistic 3D and Virtual Reality-Based Modeling of Digital Networks and the Internet Project Portfolio

VRCraft

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## Document History

<b>Rev Number</b>	<b>Date</b>	<b>Modified By</b>	<b>Reason</b>
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# 1 Meeting Minutes

## 1.1 Weekly action items

- Summary of progress
- Meeting review: Helpful/Not
- Attendance and participation
- Team member contributions

### 1.1.1 Team Meeting #1 – Wed. September 11, 2019

#### Overview

- Team Name: VRCraft
- Team meetings will be held as needed. Both of our schedules align pretty well already.

#### To-do

- Finish contract - BH & SA
- Transfer logbook to OneNote and share it - BH & SA
- Make a minutes document - BH
- Make a repository on GitHub for future work - BH
- Email out agenda - SA

### 1.1.2 Client Meeting #1 – Thur. October 3, 2019

#### Goals

- Create computer network with switches
- Wire cables
- Computers talk to each other
- Build layers 1, 2, and 3
- Build a network virtually
- Show MAC address
- Implement in VR (Look into)

#### Moving Forward

- GitHub repo with Wiki
- Private for now. Possibly public later
- Schedule up to us
- Start with networks and move onto VR later
- Experiment with formspec for GUI

#### Create Objects

- “Computer” Device - Name and MAC address
- Wire - Receives on one end and sends on the other using ABM (4 method calls)
- Switch

## 2 Project Learning

### ***2.1 What off-the-shelf technologies you can use to solve the problem?***

Pre-existing mods and software for Minecraft give us an idea platform to build from.

### ***2.2 Why did you think the design would work?***

Minetest is a free and open source 3D voxel game that enables the creation of complex virtual worlds. Mods enable modifying Minetest. There are 100s of free of mods, i.e.: Animals, Armor, Mechanics. There are step-by-step open source tutorials on how to create mods. However, current mods do not model computer networks and their control in a way that is realistic enough to enable quality research and education in TCP/IP-based networks and cybersecurity using 3D virtual worlds. Because of the capability to create mods, we believe that we will be able to create this new setup.

### ***2.3 Why the design did not work.***

TBD

### ***2.4 What needed to be changed?***

TBD

## 3 Design Goals

### ***3.1 Client need and project goal (with timeline).***

“Enable the creation and usage of realistic and accurate 3D and virtual reality models of modern computer networks for research and instruction.”

<b>Task Description</b>
<b>Completed Team Contract - Sept. 12, 2019</b>
<b>Budget Estimates - Sept. 19, 2019</b>
<b>Approval of Requirements - Sept. 26, 2019</b>
<b>Initial Mod Creation - Oct. 3, 2019</b>
<b>Client Meeting #1 - Oct. 3, 2019</b>
<b>Logbook and Portfolio Initial - Oct. 10, 2019</b>
<b>Workflow Layout + Further Mod Development - Oct. 14, 2019</b>
<b>Snapshot Day #1 - Oct. 15, 2019</b>
<b>Design Validation Plan - Oct. 24, 2019</b>
<b>Project Value Proposition - Oct. 31, 2019</b>
<b>Logbook and Portfolio Update - Nov. 14, 2019</b>
<b>Concept Design Review - Nov. 22, 2019</b>
<b>Snapshot Day #2 - Dec. 6, 2019</b>
<b>Project Portfolio, Wikipage, Logbook First Semester Finalized - Dec. 13,</b>
<b>Project roughly 50% completed - Dec. 31, 2019</b>
<b>Design Expo Registration - Jan. 28, 2020</b>
<b>Engineering Release Review and Logbook draft - Feb. 21, 2020</b>
<b>Complete Prototype build - Apr. 5, 2020</b>
<b>Logbook - Apr. 17, 2020</b>
<b>UI Design EXPO - May 1, 2020</b>
<b>Final Report / Drawings - May 5, 2020</b>

### **3.2 Revision of goal. Why the revision was necessary?**

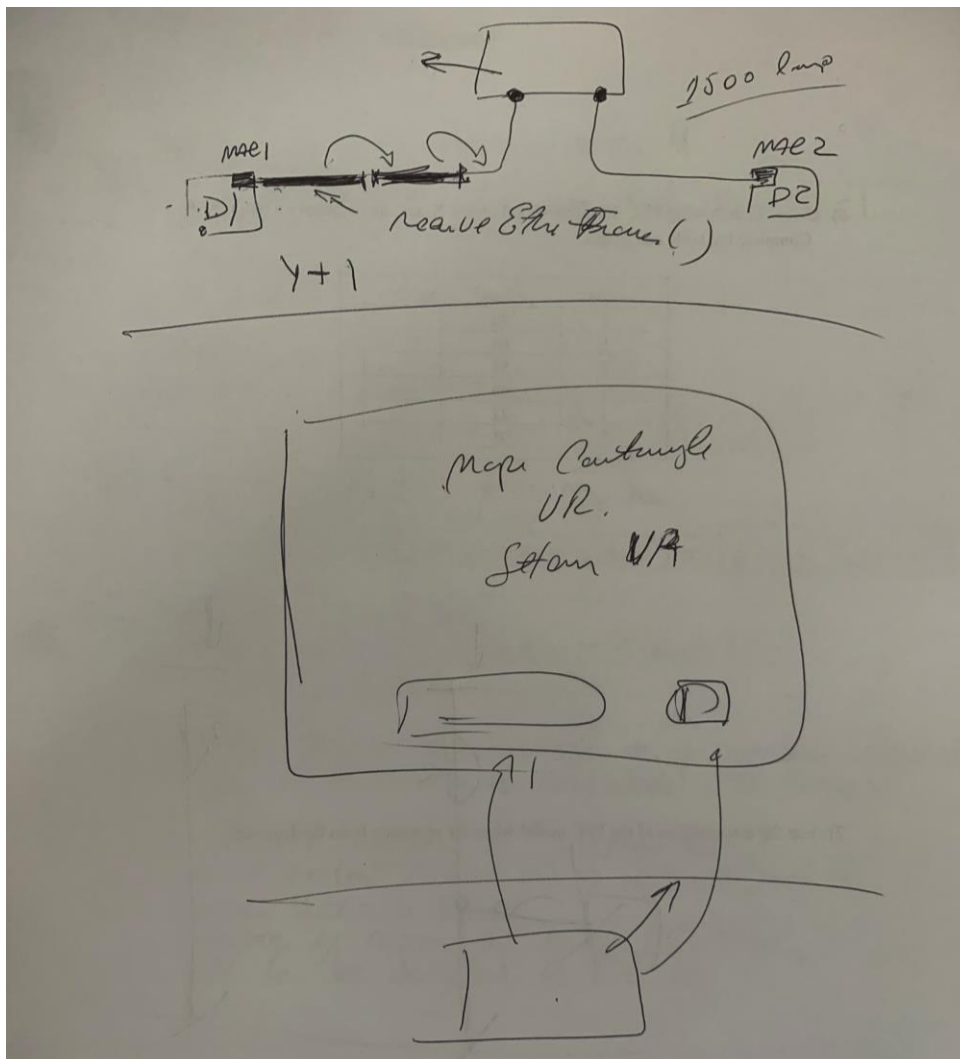
TBD

### **3.3 New goal**

TBD

## 4 Specifications and Constraints

### 4.1 Picture Specification from Client Meeting #1



### 4.2 Design specifications and constraints.

The VR component may be difficult to implement per Dr. Conte de Leon's advice. As of now, our current focus will be on implementing a working network simulation, as opposed to being able view it all in VR. This may change in the future. Since Minetest does not have any sort of native built-in VR compatibilities, it may require a tremendous amount of work to implement.

An initial list of things that we would like to have include:

- Device - Name and MAC address
- Wire - Receives on one end and sends on the other using ABM (4 method calls)
- Switch

## **5 Analysis of Alternatives**

### ***5.1 Possible Alternatives***

The game that Minetest is based upon, Minecraft, is a much further developed game. Networking structures can also be implemented in Minecraft, and Minecraft is already supported with VR. However, due to potential licensing constraints, Minecraft is not a current possibility for the University to work with.

## **6 Implementation Plan**

### **6.1 Repository**

A private repository will be created on GitHub by our client. This repository will be kept private for now. Later, thought will be given on whether to make this repository public.

### **6.2 Illustration of network creation**

An illustration will be made to allow us to visualize the creation of a network in the game and allow us to generate a concise order of steps to take in order to implement these networks.

### **6.3 Implementation**

Time will be taken to understand LUA, the language Minetest is scripted in, and implement the designed illustrations of our networks through the use of the modifications (mods).

### **6.4 Testing/ Experimental Design**

A well allotted amount of time will be taken to test our product before release to ensure that our product is fully functional by release and that no bugs will be present during client testing.

## **7 Analysis**

### **7.1 Write about the confidence in your results.**

TBD

### **7.2 What conclusions can be made?**

TBD

## **8 Budget**

### ***8.1 Initial Budget***

Our initial budget is \$0.

Minetest is free, open-source software.

The VR component of the project will not need to be purchased by the University as it is already readily available and setup.

## **9 Appendices**

TBD