



University  
of Idaho

# REALISTIC NETWORK MODELING USING MINETEST

By Team NetworkCraft

Sean Anderson, Benjamin Hallman

# OVERVIEW

- I Value Proposition
- I Goals & Capstone Objectives
- I Usage Requirements
- I Conceptual Development
- I Implementation
- I Demonstration
- I Future Work
- I Recap
- I Q&A



# VALUE PROPOSITION

## **Virtual Reality for networking education.**

Currently, there are no virtual reality models of modern computer networks for research and education. As educational methods progress further into immersive technological learning, it is crucial that technology options are made available at the same rate. Products must be developed to meet this increasing need. Our goal is to create a realistic and accurate 3D model of modern computer networks for research and instruction that can be coupled with virtual reality to be used as a basis for further development or instruction. Our solution to this problem will be easy to use and allow potential students whose learning method caters to that of a visual learner to flourish in the academic subject of basic networking.

# GOALS

- I Increase interest and knowledge in STEM and Cyber disciplines.
- I Create a game-based, VR-enabled environment to teach networking concepts

# CAPSTONE OBJECTIVES

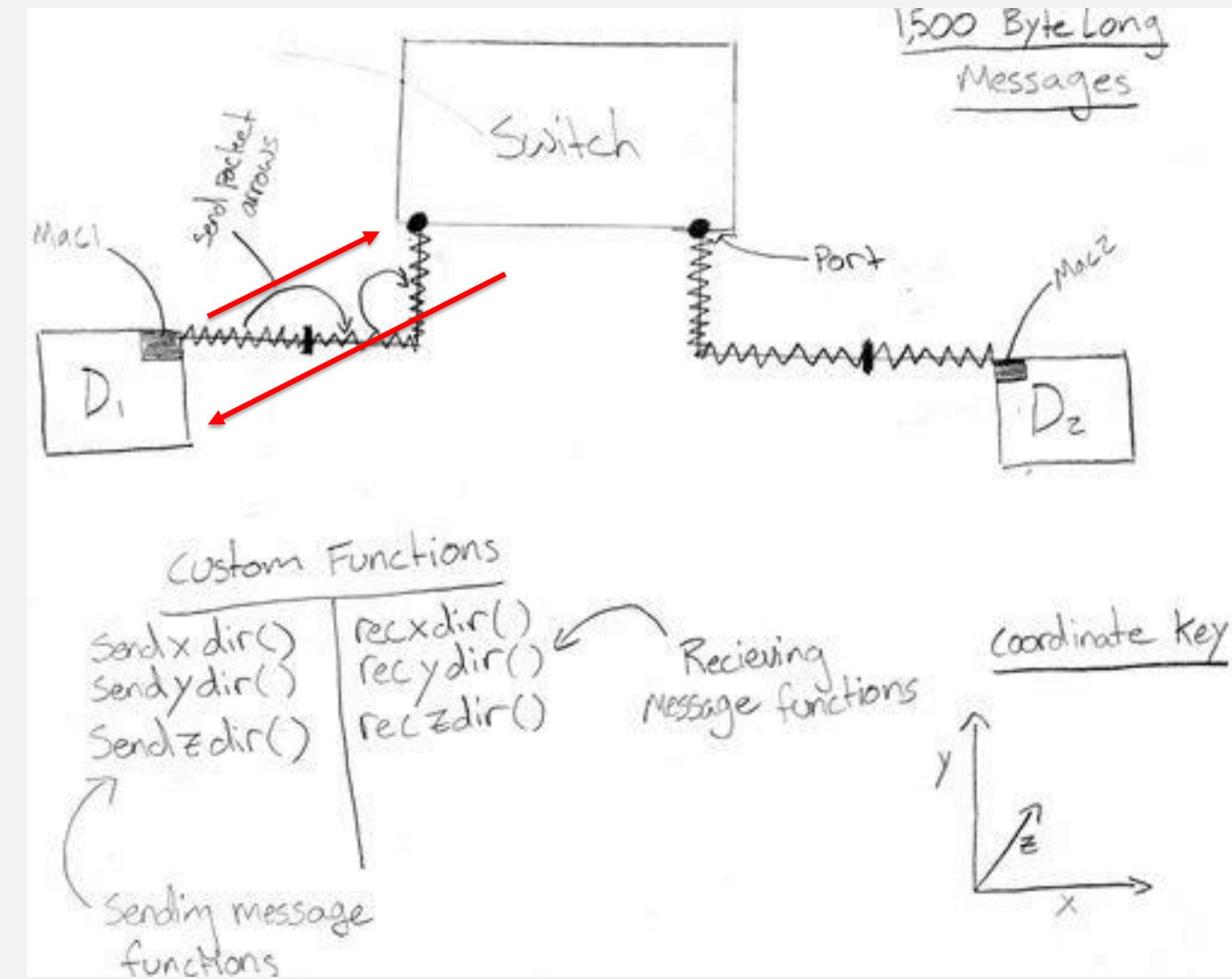
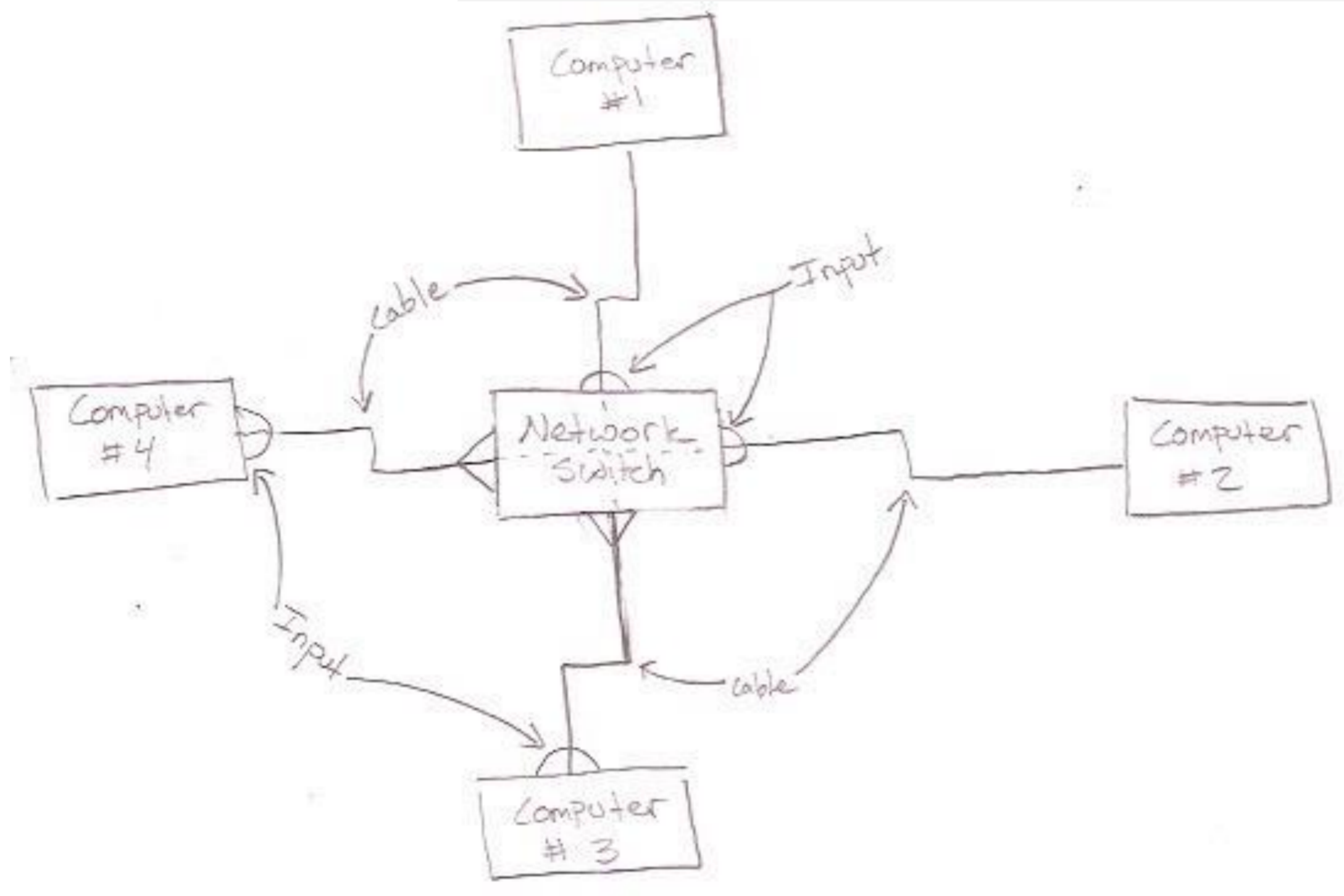
- I Create the first prototype of the game-based environment using Minetest
- I Allow computers to communicate with one another if configured properly
- I Add corresponding instructional content to assist learner
- I Nicely commented code, allow for future improvements



# USAGE REQUIREMENTS

- I A computer, mouse, keyboard
- I The game “Minetest”
  - Free, open-source
  - Available at [www.minetest.net](http://www.minetest.net)
- I Our modification for the game
  
- I For final goal: a virtual reality setup
  - E.g. HTC Vive

# CONCEPTUAL DEVELOPMENT

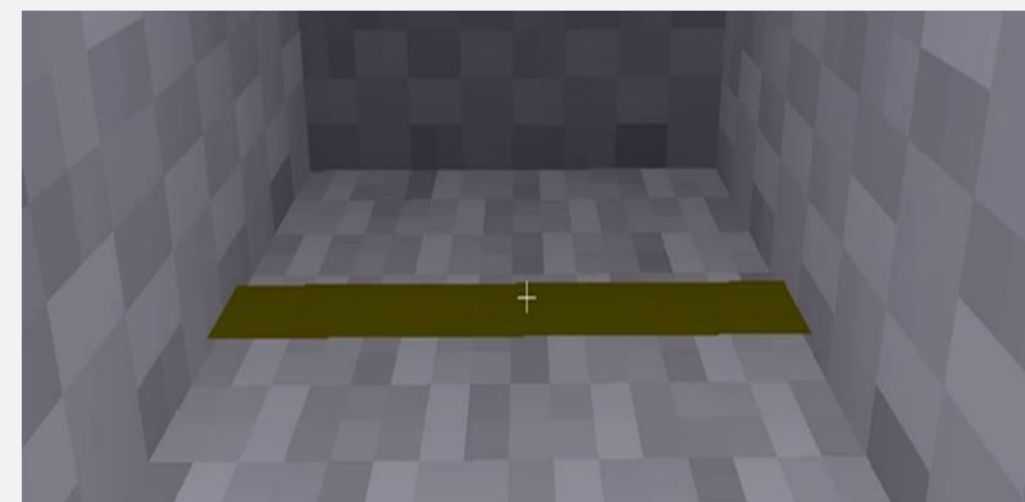


**I** Recognition of direction-specific functions/coding

# IMPLEMENTATION

I Implemented and coded 4 different Minetest "blocks" (a new object)

- Computer
- Switch
- Cable
- Tutorial Book



# IMPLEMENTATION CONTINUED



- I Computer opens a graphical user-interface (GUI) when right-clicked
- I In-game tutorial book allows for students to be guided through the process

Computer Name  
Computer 1

Default Message

Send Message

Target's Mac  
00:0a:95:9d:68:17

Current Mac Address  
00:0a:95:9d:68:16

Save Refresh Restore to Default

Title:  
Help Guide

Contents:  
Welcome to the NetworkCraft Minetest mod! This game mod serves as supplemental education of a basic network through interactive learning in Minetest! Please allow this help guide serve as your step-by-step tutorial for interacting with the NetworkCraft mod. Before building, creating, and interacting with your own network using NetworkCraft you must first have a basic understanding of what a network is. Networks are everywhere. In a large sense, nobody can do anything with data that does not involve a network. Much like the human networks that you are apart of, computer networks let us share information and resources. In the NetworkCraft mod networks currently consist of three things: computers, switches, and wires. Computers, represented by a monitor and keyboard in NetworkCraft, allow the user to send and receive messages. Switches, represented by a small blinking box have six ports and serve as a bridge, allowing multiple continuous computer connections. Wires, represented by a thin yellow line, are what connects computers and switches together. Let us start by

Save



# Minetest

An open source voxel game engine. Play one of our many games, mod a game to your liking, make your own game, or play on a multiplayer server.

Available for Windows, macOS, GNU/Linux, FreeBSD, OpenBSD, DragonFly BSD, and Android.

Tell me more

Download

News: 5.2.0 released. (April 5<sup>th</sup> 2020)

## Features

### Players

#### Choose from Multiple Games

There are many games to choose from. You could survive in a harsh environment, build creatively, or fight other players. Just [download a game](#) or connect to a server.

#### Enormous Maps

With 62,000 x 62,000 x 62,000 blocks, there's no running

### Developers

#### Make a Game

Create your own voxel game using our [Lua API](#). No need to worry about tricky voxel rendering or networking; instead, write scripts to add items and control game play.

#### Modding API

Use the game Lua API to make mods for any Minetest-based

# FUTURE WORK

## I Implement virtual reality

- Create the mod for Minetest, then compatibility with our mod

## I Improve Computer/Switch GUIs

- Restore to Default, Computer Name (+ Functionality)

## I Improve tutorial content

## I Allow for multiple connections

## I More Network Layers (not only 1 and 2)

# REVIEW

- I Value Proposition – VR for networking education
- I Goals & Capstone Objectives – Creating a basis
- I Usage Requirements - Minetest
- I Conceptual Development - Drawings
- I Implementation – Computer, switch, wire, book, GUIs
- I Demonstration
- I Future Work – Expansion, VR



**THANK YOU!**  
**QUESTIONS?**