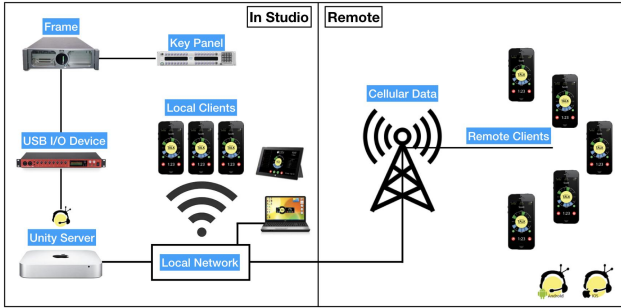


# “Vorhees Theater Communications Revamp”

By: Jordon Christopher  
Culmination Project Fall 2020  
ENT 4499



Unity Intercom is a Full Duplex intercom system connecting over WiFi or Cellular data.  
Unity Intercom has two parts, the Unity Client apps and the Unity Server software running on a Mac.

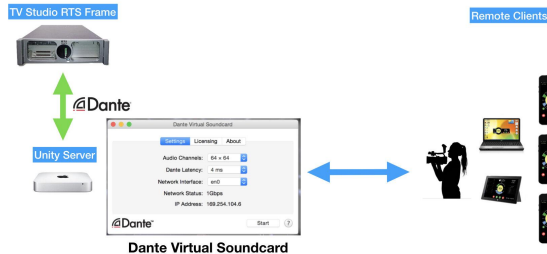


Unity Intercom is a service that is capable of taking live audio and using VoIP to allow users to communicate on channels within a remote location or from anywhere around the world with internet access utilizing smartphones



Unity

### A typical Unity System TV Station Example Using Dante



# System Requirements Document

- **Document Details the specific needs of the system and elaborates why each component would be important**
- **Contains names of all necessary items at a glance**
- **Explains what the items do**

At the current moment, the Vorhees theater has a communications system in place that is used by members of staff as well as students during the various productions that take place throughout the school year. Such events consist of the Theater Works Haunted Hotel, EIS, Live performances put on by students as well as outside talent. This communication system is being controlled by Clearcom and this project is my way of extending upon the Clearcom Tempest system that is currently aging. Integration of Unity would allow for the house manager, or video crew to stay at their station on the Clearcom headset, but allow those staff and students that are mobile such as audio, stage hands, etc.. to be on the mobile communications throughout the entire building.

- An interface to bridge the Clearcom connections into the Unity Server
- Wifi dedicated just for show control purposes
- Access points to maintain connectivity
- The Unity Server to act as the base of all communications
- End User Devices (Smartphones for each individual User)
- Headsets to connect to the Smartphones
- Rack Mounts to store all necessary devices
- Networking and Audio Cables (Ethernet via Cat 6, XLR, 3.5 mm)
- Power cables for all devices
- Network Switch To distribute signal to Wireless Points
- Having Backup power in the case of a power outage is necessary

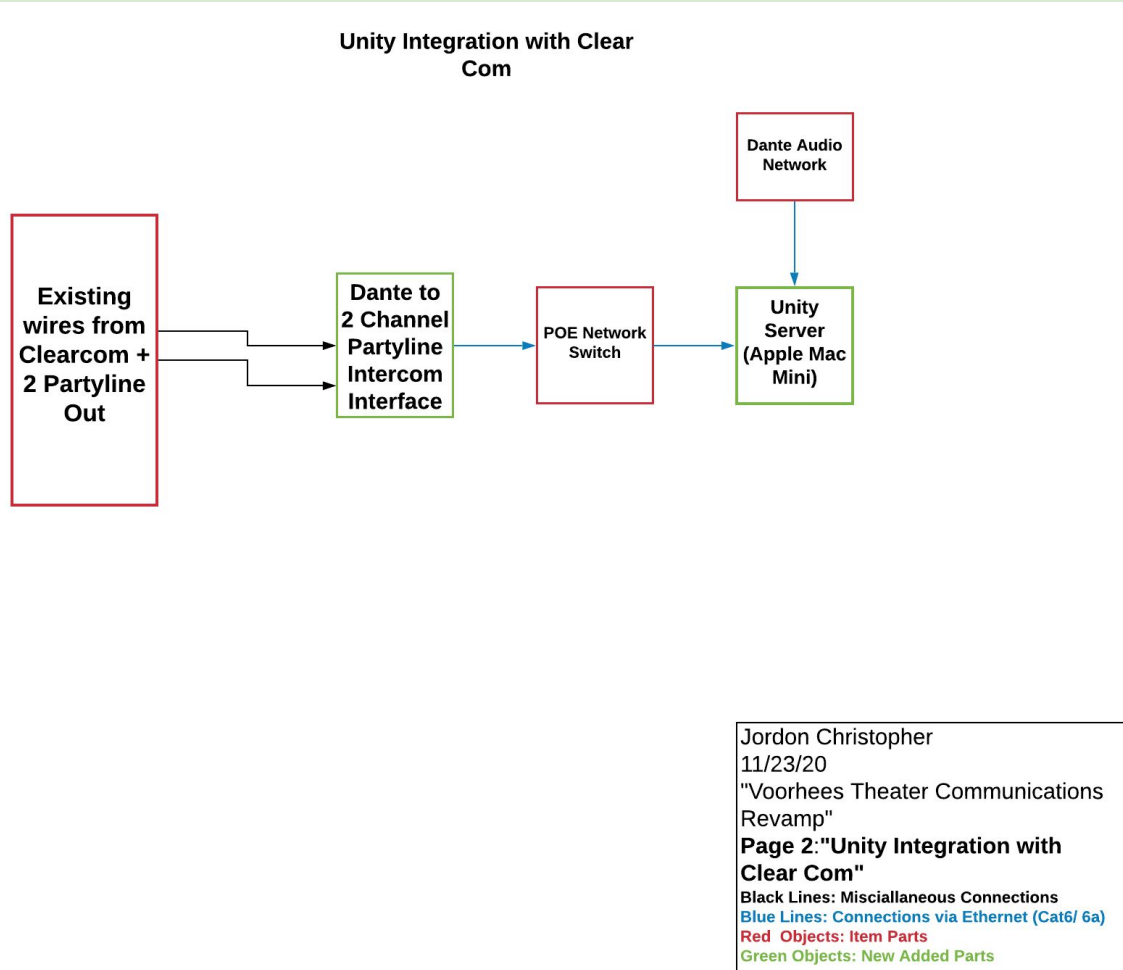
The following pages will go into detail describing the names of devices to be utilized, how they will be connected, where they will reside, and the cost for all components

- Parts List:
- Studio Technologies Model 45DC Partyline Interface
- Ubiquiti UAP Pro Wireless Access Points to distribute wifi signal across the theater
- Unity Server (Apple Mac Mini provided by City Tech)
- (15) TCL A1 Android Smartphones As User devices for communication
- (15) Unity JB 30 Headsets to plug into the Android devices for personal listening
- (2) Rack mounts for Clearcom Interface and Mac Mini
- Cables (Provided by City Tech)
- Network Switch to take signal and carry across Network
- Yamaha CL5 (or other Dante integrated mixer provided by City Tech) to transfer sound over Unity for means of communication
- APC Smart Connect 2200 va UPS (Backup Power)

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"Overview and Parts list Document"  
11/22/20

# Clearcom to Unity Block Diagram

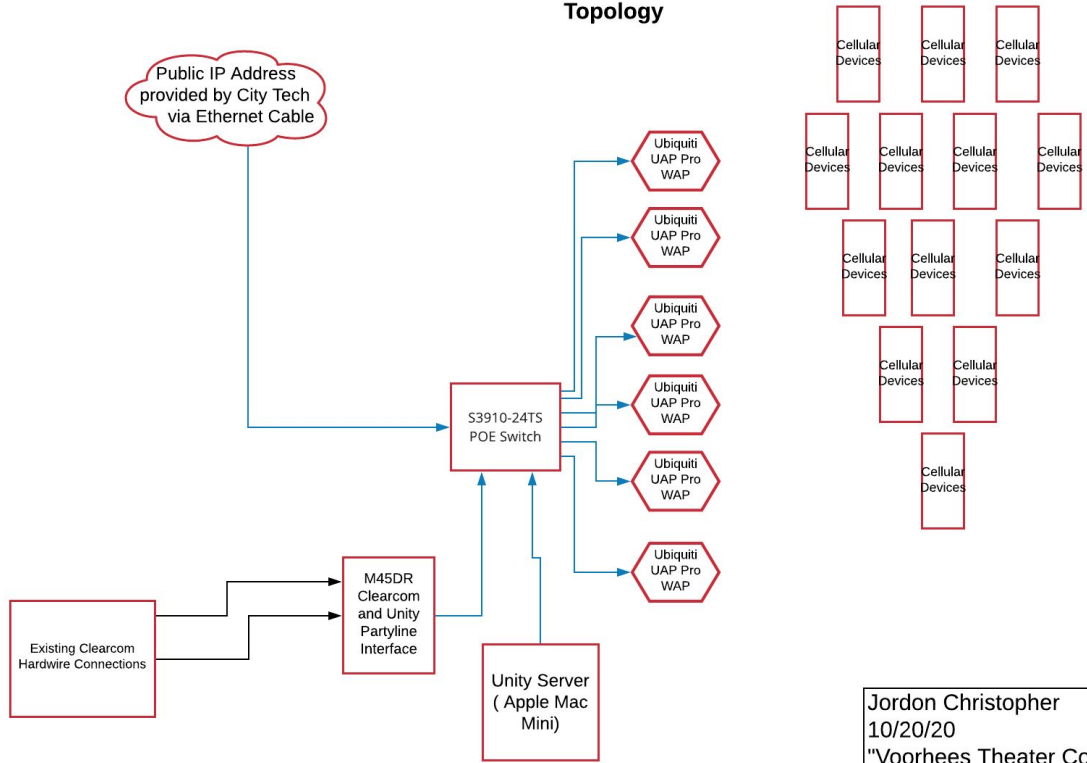
- Elaborates how the current Clearcom system would be integrated with Unity
- Dante Virtual Soundcard to manage all audio using the I/O license by Unity



# Network & Setup Topology

- Inputs and outputs for all devices
- Includes AC Power, POE Switch, WAPs, UPS
- Colors denote what type of wire and connectivity
- End User devices would be Android Smartphones

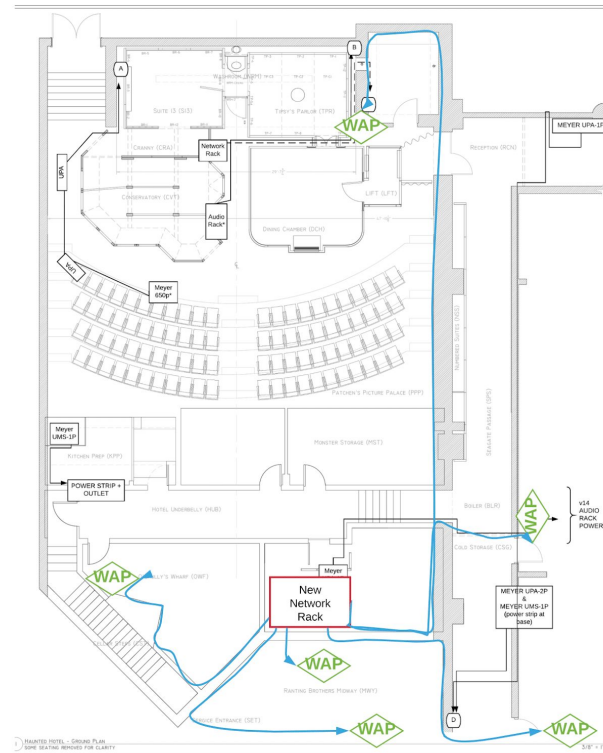
Vorhees Theater Wireless Network Topology



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**Page 1: "Vorhees Theater Wireless Network Topology"**  
Black Lines: Miscellaneous Connections  
Blue Lines: Connections via Ethernet (Cat6/ 6a)  
Red Objects: Item Parts

# Map of Voorhees Theater

- Ground plan points out where network racks would reside
- Certain plots reside off the map for where WAPs would be installed
- Wiring color denotes Ethernet Connectivity



\*\*New Network rack would contain POE Network Switch, Unity Server (Mac Mini which also carries Dante) Model 45DC Partyline Interface, and Ethernet line coming from school ISP

\*NOTE  
 There are 6 locations for the Wireless Access Points to be placed.  
 - Theater catwalk  
 - Light Booth next to entryway of theater - SL stage closet  
 - Room V014 next to rear hallway  
 - Animatronic room next to hallway  
 - Above ceiling of cafeteria next to lobby stairs  
 Some of these locations cannot be portrayed due to discrepancy in levels and rooms provided on map

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**Page 3: "Network Switch and Access Point locations"**  
 Green Lines: Wireless Access Points  
 Blue Lines: Connections via Ethernet (Cat6/ 6a)  
 Red Objects: Item Parts

# Budget and Parts List

Company	Item	Quantity	Price	Total
Unity	Base 3 User License	1	\$599.99	\$599.99
Unity	Add 10 User License	1	\$959.99	\$959.99
Unity	Add 2 User License	1	\$239.99	\$239.99
Unity	I/O License	1	\$239.99	\$239.99
FS	S3910-24TS POE Network Switch	1	\$540.00	\$540.00
Studio Technologies	45DC Partyline Interface	1	\$1,356.08	\$1,356.08
APC	Smart Connect 2200	3	\$899.99	\$2,699.97
Ubiquiti	UAC AP Pro Wireless Access Point	6	\$136.99	\$821.94
TCL	A1 Android Smartphone	15	\$24.99	\$374.85
Studio Technologies	M45DCRM-1 Rack Mount	1	\$86.00	\$86.00
Sonnet	RackMac Mini Mount	1	\$199.99	\$199.99
Unity	JB 30 Dual Earphones	15	\$79.00	\$1,185.00
		<b>TOTAL:</b>		<b>\$9,303.79</b>

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 Page 5:"Parts List and Budget"