# Application Technology

The augmented experience setup includes the following components AR Node, Moderator Node, OSC Node, Wi-Fi Router. These nodes are also connected to a sound processing station responsible for spatial audio rendering for specific values and receiving AR Node information.

In the following architecture, all components are visible with their possible configurations.Diagram

Description automatically generated

Figure 1 System Architecture & Components

## Augmented Reality (AR) Node

## Mobile/Tablet is running with application and connected to Wi-Fi Router. The device will be in the hand of the show observer, and the user will see the rendered character using the camera and other device built-in AR sensors. This experience has been designed as a combination of both manual and auto behavior control of a rendered character in the AR world. For auto-behavior mode, if the user reaches a defined action zone around the character, the system will calculate the distance and react to the specific situation. In this case, the character will charge on the observer, and as soon as the observer maintains the safe distance from the character, it will go back to the rest state. In manual behavior mode, the external moderator can command character using the OSC Node to perform different activities.

## Moderator Node

## This node is another mobile/tablet device running with the same version of the app but will be logged in to the channel as a moderator. From where the moderator will provide the voice-over / external voice, which will be transmitted to AR Node (using VIVOX as a communication service), the observer will hear the audio from the handheld device.

## OSC Node

## This node is also a device running with an OSC layout with different action buttons. Each one is associated with sending the command over the network specifically to the AR node for character manual control. Moderator can also enable auto or manual behavior control depending on the situation or initiate a specific sequence of actions in our case, sit, howl, stand, etc.

## Wi-Fi Router

The WI-FI router will create the local network through which all other components of the system will be connected. It will also provide the internet services for VIVOX services to transfer the moderator's voice to the observer.

## Sound Processing Station

This node is a workstation that will also be part of the network and will sense the values transmitted to the network using the OSC protocol. The values include the position of observer and position of the creature, state of the creature, start/stop signal for each sequence or set of sequences. These values will then be used to generate spatial audio to played over a speaker.

## In-App 3D Sound

3D audio has been implemented in the system, and audio intensity will be affected by the observer's distance from the character and the direction in which the user is pointing at the phone that will affect the stereo rendering of the audio.

## Application Screens

Figure 2-4 shows screenshots of the application, which show the different possibilities of this whole designed system. There are various modes in the same application for a moderator to transmit audio and a receiver to receive the audio through the device using VIVOX. Stage dimensions and floor configuration have been developed for this system, which will help the creature bound the rendered creature in that dimension. Two types of network selection have been developed Local mode with moderator and OSC node without the need of sound processing station available to the network, which is required in host-based connection.

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| Graphical user interface  Description automatically generated  Figure 2 Communication Node Selection | Graphical user interface  Description automatically generated  Figure 3 Transmitter Node (Moderator) | Graphical user interface  Description automatically generated with medium confidence  Figure 4 Receiver Endpoint |