PROVISIONING AND CONFIGURATION

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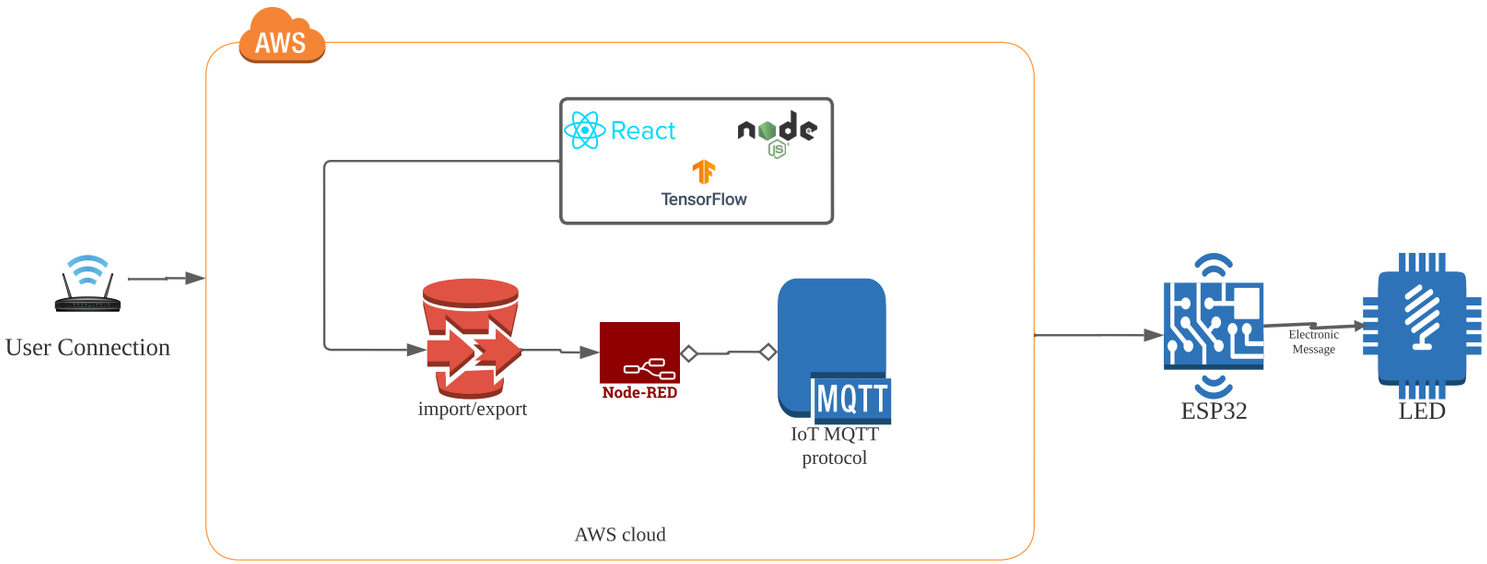
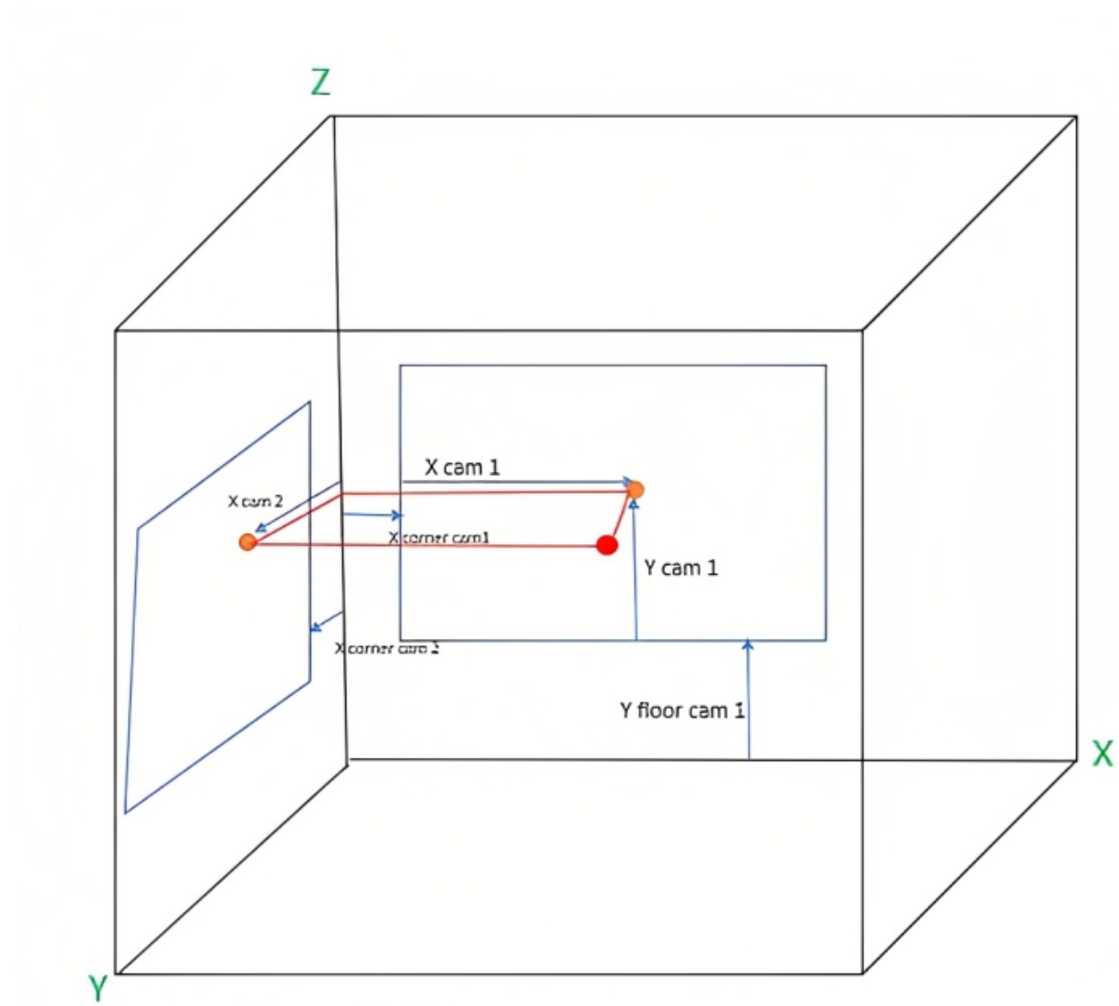


Representation of two-dimesnional projection to three dimensions



- X value → X cam 1 + X corner cam 1
- Y value → X cam 2 + X corner cam 2
- Z value → Y cam 1 + Y floor cam 1

Provisioning

LED positioning is determined by measuring its real-life distance to reference corner (this can be any corner in a room). For example, by measuring (in centimeters) the length from the LED to the leftmost wall then measuring the distance from the LED to the front wall of the room and its height from the floor; we can determine its respective X, Y and Z coordinates for later reference.

To project two-dimensional coordinate data from cameras: height and distance to reference corner of each camera must be considered. The projected Z value is calculated by adding camera 1's Y point value and its height from floor. For the projected X value, camera 1's X point value and its distance to reference corner is summed. Finally, for the projected Y value camera 2's X point value and its distance to reference corner is summed as well. Pose determination is handled by calculating the distance from the elbow to wrist and wrist to target LED. If the sum of these distances is equal to the distance from elbow to LED, the user is pointing in the direction of target light. Otherwise if the sum of these distances is less than the distance from elbow to LED, the user is not pointing in the direction of target light.

After determining which target light the user is pointing to, if any, target light identity will be sent through MQTT messaging to ESP32. Finally, ESP32 will turn on respective pin, turning on target light.