Yes, it's possible to connect a Raspberry Pi and multiple ESP32 modules using LoRa WAN modules for long-range communication! Here's a high-level overview of how you can set this up:

Components Needed:

Raspberry Pi (any model with GPIO pins)

ESP32 modules (4 units)

LoRa WAN modules (e.g., SX1278 or SX1276) for each device

LoRa antennas for each module

Jumper wires and breadboards for connections

Power supply for the Raspberry Pi and ESP32 modules

Steps to Connect:

Connect LoRa Modules to ESP32:

Connect the LoRa module to the ESP32 using the SPI pins (MOSI, MISO, SCK, NSS) and power pins (3.3V and GND).

Connect the LoRa antenna to the LoRa module.

Connect LoRa Module to Raspberry Pi:

Connect the LoRa module to the Raspberry Pi using the SPI pins (MOSI, MISO, SCK, NSS) and power pins (3.3V and GND).

Connect the LoRa antenna to the LoRa module.

Install Required Libraries:

For ESP32, install the LoRa library in the Arduino IDE.

For Raspberry Pi, install the necessary libraries for LoRa communication (e.g., pyspark-lora).

Programming:

ESP32: Write code to send data (e.g., sensor readings) via LoRa.

Raspberry Pi: Write code to receive data from the ESP32 modules and possibly send it to a server or display it.

Example Code:

Here's a basic example of how to send data from an ESP32 to a Raspberry Pi using LoRa:

ESP32 Code:

cpp

#include <LoRa.h>

void setup() {

Serial.begin(9600);

while (!Serial); // Wait for serial port to connect

LoRa.begin(433E6);

LoRa.setTxPower(20, 0);

LoRa.beginPacket();

LoRa.print("Hello, Raspberry Pi!");

LoRa.endPacket();

}

void loop() {

delay(1000);

}

Raspberry Pi Code (Python):

python

import socket

import time

sock = socket.socket(socket.AF\_INET, socket.SOCK\_DGRAM)

sock.bind(('0.0.0.0', 8888))

while True:

data, addr = sock.recvfrom(1024)

print("Received message:", data.decode())

time.sleep(1)

This is a simplified example to get you started. You'll need to expand the code to handle multiple ESP32 modules and manage communication more robustly.

Does this help you get started with your project?