NetSim Simulation of IoT Networks with Real-world Sensor Data from Raspberry Pi

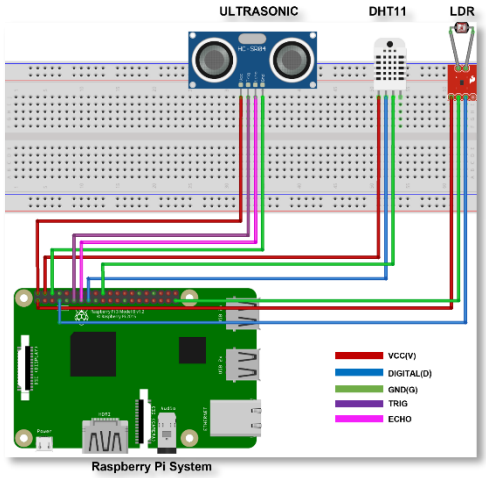
The Internet of Things (IoT) is a rapidly growing field, and the demand for IoT network simulations is increasing. IoT network simulations can be used to test the performance and reliability of IoT networks, and to identify security vulnerabilities.

One way to improve the accuracy of IoT network simulations is to integrate real-world sensor data into the simulations. This can be done by connecting sensors to the simulation environment and collecting data from the sensors. The data from the sensors can then be used to update the state of the simulation, making it more realistic.

Key Features:

- **Real-world Sensor Integration:** Connect real sensors to Raspberry Pi system- Ultrasonic, DHT11 and LDR- via GPIO pins. Transmit data to NetSim for comprehensive simulation.
- **Detailed Performance Analysis:** Evaluate IoT network performance under various scenarios and conditions. NetSim provides comprehensive performance metrics and visualization tools.

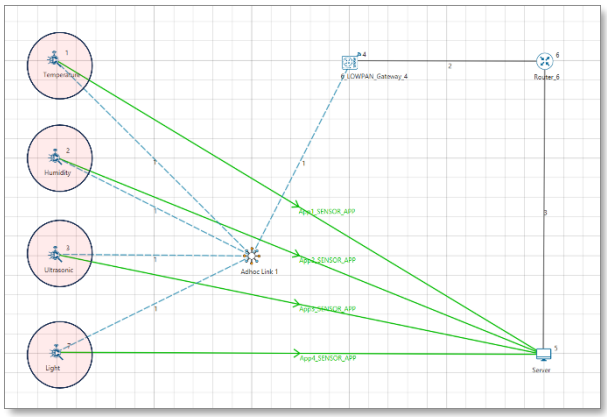
Sensor Connection with raspberry pi system



Raspberry Pi System

- The ultrasonic sensor is used to measure the distance to an object.
- The DHT11 sensor is used to measure the temperature and humidity.
- The LDR sensor is used to measure the light intensity.

Virtual Network Scenario in NetSim with Real sensor data

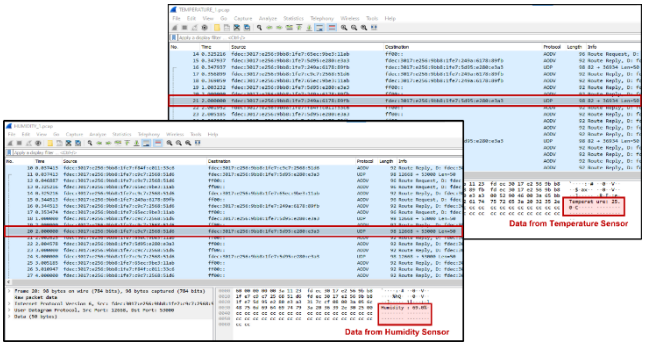


- These virtual sensors are getting real data from the Raspberry Pi system.
- The real data from the Raspberry Pi is being sent to the NetSim simulator through a socket connection.
- The data from the Raspberry Pi is being used to simulate the behavior of real sensors in the network.

Performance Analysis

In the Wireshark capture files, the payload data contains information about temperature,humidity,Ultrasonic and LDR sensor readings. These readings are the actual values acquired from the physical sensors connected to the Raspberry Pi. By examining these captured packets, we can verify the successful transmission of sensor data from the Raspberry Pi server to the NetSim simulator

Temperature and Humidity sensor data



Ultrasonic and LDR sensor data