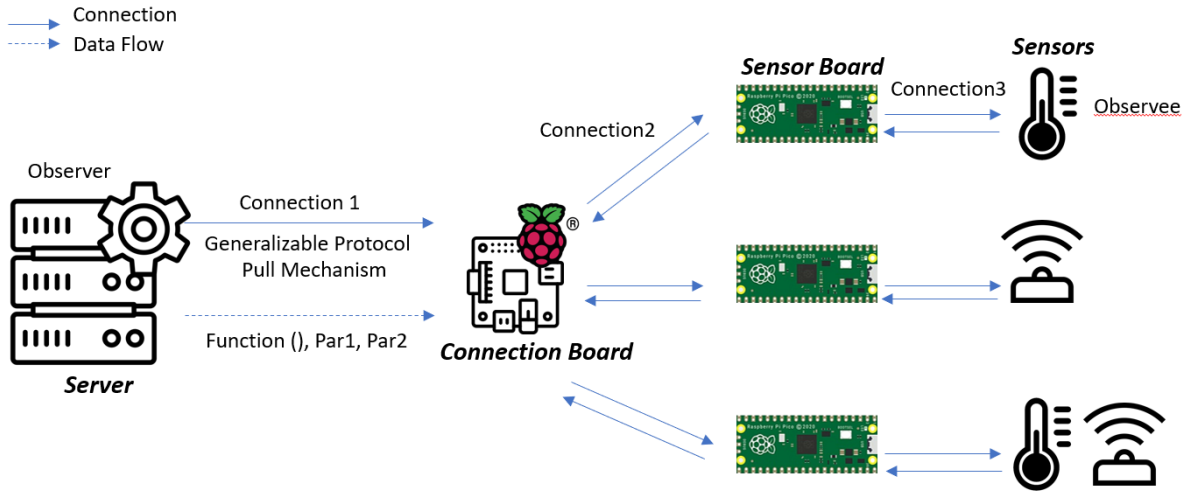
Project Title: *Sensor Data Aggregation and Visualization System*

Project Overview:

Motivation: In the context of environmental monitoring, the ability to gather, consolidate, and present sensor data is of paramount importance. This project aims to develop a comprehensive software system that collects data from a network of sensors, summarizes this information, and provides a user-friendly graphical user interface (GUI) on a server for end-users.

Project Scope: The project involves the development of a comprehensive software system with two primary data flow types: observation and configuration. The system architecture necessitates that the server be capable of configuring the attached sensors through the same I2C connection it uses for observation. This entails the server issuing "reading" requests in tandem with "edge processing" functions that are executed within the sensor board, denoted as the pico. To ensure efficient power management and battery conservation, an Observer Design Pattern is implemented, where the server pulls sensor data instead of pushing it.



Key System Components:

- **I2C Communication Protocol Development:** The project requires the creation of a customized I2C communication protocol to facilitate seamless data exchange between the server and the pico. This protocol encompasses serialized commands that the pico can decode to interact with specific sensors, enabling both read and write operations.