Design and Implementation of a Framework for Remote Automated Environmental Monitoring and Control

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User Interface
Features:
• Add, edit, and remove peripheral devices and services
• Upload peripheral descriptors
• View notifications from services

Web Server
The web server is responsible for delivering information from the service engine and the peripheral interface to the user interface. It accommodates HTTP communication, and implements encryption and user authentication.

Service Engine
Functions:
• Makes use of logical relationships to connect triggers and actions
• Allows services to be created, edited, and removed
• Manages peripherals connected to services

Peripheral Interface
Functions:
• Generalizes communication with peripherals of different types
• Provides a means for developers to build custom peripherals

Peripheral Software
The peripheral software implements the custom-built wireless network which exists between the base station and the peripherals. Additionally, peripherals are hardcoded with basic sensing and actuating functions which are called upon by the peripheral interface.

Potential Applications
1. Home automation
2. Monitoring the state of a sandbag dam
3. Geospatial temperature monitoring to detect when pipes might burst

Base Station

Designer Workflow
A core component of the peripheral interface, the developer workflow is what permits software to be customized. Through the creation plugins called "peripheral descriptors", developers can define how their peripherals should behave.

Hardware
Subsystems:
1. Base station hardware (computer and transceiver)
2. Peripheral core
3. Demonstration system (lights, sensors, etc.)

Peripheral Descriptors

ArudIMU v4