Throughout the last decade, the research area of wirelessly networked sensors has been one of the most popular among computer engineers and scientists. With recent initiatives such as Cyber-Physical Systems, Internet of Things, and Planetary Skin, sensor-based applications have gained new momentum in the research community and industry beyond the realm of computer engineers and scientists. There are many scenarios in which engineers and scientists may need to acquire data from a system or environment using a network of sensors. Using and configuring these sensor networks should not require any special knowledge from the user, it should be a simple tool.

There are many scenarios in which engineers and scientists may need to acquire data from a system or environment using a network of sensors. These sensors are tools and a means to the end of acquiring relevant data. A minimum of time and effort should be dedicated to configuring and maintaining them. Using and configuring these sensor networks should not require any special knowledge from the user, it should be a simple tool.

Current options require either software development expertise or incur large costs for specialized proprietary systems.

A unique development framework → PROVIZ

Drivers: Popular Among Scientists/Engineers

PROVIZ Driver Model

- Node Code
- Hub Code
- I/O Conversions
- Libraries

PROVIZ Device Driver

- All devices (boards, sensors, radios, etc.) are backed by a driver that contains:
  - E/O capabilities/requirements of the device
  - Code behavior within a node
  - Code behavior within a hub
  - Any libraries required by the device

PROVIZ Node/Hub

- Each node/hub is defined by the same basic model.
- Each has:
  - A single “platform device”. This is the device to which the sensors and links are connected. E.g., Raspberry Pi, Arduino.
  - Multiple sensor devices, limited only by the I/O capabilities of the platform device.
  - Multiple link devices, devices such as radios (e.g., Zigbee, WiFi) and modems that allow the node or hub to transmit data. Limited by the I/O capabilities of the platform device.
- A hub is defined as a node that contains multiple links, at least one of which is connected to a TCP/IP network.

The model also has a wiring map that contains information about how the links and sensors should be wired to the platform device, as well as the node/hub’s ID and the ID of the hub to which it should upload its data.

PROVIZ Visual Topology Creation

- The user creates the nodes and hubs for their network and specifies how they should connect to each other.
- Each node/hub has a context menu from which the user can flash the device, as well as view its wiring diagram and source code.

PROVIZ Live Data Acquisition

Network data can be viewed in real time by simply discovering the hubs and polling them for current data. Simple clients can be written for any platform including mobile.

Acknowledgements

References