Network Technologies Used to Aggregate Environmental Data

Paul Stasiuk  
*Loyola University Chicago*

Konstantin Läufer  
*Loyola University Chicago*, klaeufer@gmail.com

George K. Thiruvathukal  
*Loyola University Chicago*, gkt@cs.luc.edu

Follow this and additional works at: [https://ecommons.luc.edu/cs_facpubs](https://ecommons.luc.edu/cs_facpubs)

🔗 Part of the *Environmental Monitoring Commons, OS and Networks Commons, Programming Languages and Compilers Commons, Software Engineering Commons*, and the *Systems Architecture Commons*

**Recommended Citation**

P. Stasiuk, K. Läufer, and G. K. Thiruvathukal. Network Technologies used to Aggregate Environmental Data: Research Poster. 2nd Greater Chicago Area System Research Workshop (GCASR), May 3, 2013, Evanston, IL, USA.

This Presentation is brought to you for free and open access by the Faculty Publications and Other Works by Department at Loyola eCommons. It has been accepted for inclusion in Computer Science: Faculty Publications and Other Works by an authorized administrator of Loyola eCommons. For more information, please contact ecommons@luc.edu.

This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 License](http://creativecommons.org/licenses/by-nc-nd/3.0/).
Introduction

NOSWCEM or Loyola Weather Service(lws) project is a continuation of previous research conducted by Dr. George K. Thiruvathukal and Dr. Konstantin Läufer.

The goal of lws is to design and build a system of functioning environmental monitoring widgets that can intelligently and autonomously control the environment around them based on set thresholds and triggers. Ideally, the widgets will also have the ability to aggregate their data and easily display this data in various ways; through a user interface in the room that the widget is placed or via a web interface.

Methods

Agile software development

Building software based on iterative and incremental approaches with a focus on developing a working model as quickly as possible.

Communication Protocol Investigation

Investigating and benchmarking protocols that can be used to transport sensor data over networks.

Data Modeling

Developing a data model and queries that scale to growing databases.

Scalable Architecture

Developing and deploying an architecture that grows as sensors are added and is extendable through other interfaces.

Application Program Interface(API)

Developing a web based protocol that allows for others to build services around the data that is being collected.

Hardware

Raspberry Pi

The Raspberry Pi is a micro-computer that fetches sensor data and pushes the data to the aggregation node (see architecture).

Phidget I/O Kit

In place of developing new sensor interfaces directly on the Pi, we opted to use a simple I/O board that allows for sensors to be accessed programmatically.

Software

Python

While not the fastest language, prototyping is fast, simple and flexible.

Fast

A Python Micro framework that allows for RESTful development of python web applications.

ZeroMQ

A message queuing protocol implementation.

MongoDB

A documents-based database that is being used to store persistent data.

Acknowledgements

Special thanks go to my mentors Dr. Thiruvathukal and Dr. Läufer. Additionally, I would like to thank the Computer Science department for supporting my research in many ways. Finally, I would like to thank the communities at www.phidgets.com and www.raspberrypi.org for leaving a massive knowledge-base for me.

References

A detailed list of references can be found at: http://goo.gl/zt1BV

Architect...