

LULEÅ UNIVERSITY OF TECHNOLOGY

THIRD YEAR PROJECT

Sensor data aggregation through CoAP

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Project Description

Background

Luleå University of Technology conducts research on lowpower wireless microprocessors called "Mulle". These microprocessors can be used for various things depending on which type of sensors you connect to it, everything from measuring temperature or vibrations in a car to analyzing the quality of the road that you drive on.

Every year northern parts of Sweden are used for testing cars during winter conditions. To test a car you first decide what you want to test, then you test with local sensors logging within the car. When enough data is collected you return back home. At the testing facility the data is now available for analysis. Depending on the results from the previous runs you might want to test some parts in more detail so you re-configure all sensors and go out for another test run.

This process is time consuming when you need to return to testing facility to be able to analyze and re-configure all sensors. In todays society most computers are connected to internet and/or other private networks, most of these computers have the ability to be remotely configured and maintained. The goal with this project is to be able to analyze data from sensors in realtime and re-configure them on the fly while testing is in progress.

Project Targets

1. Be able to send live sensor data from multiple "Mulle" to an online logging server/service.
2. Be able to read sensor data on the web with both a PC (web browser) and through an Android mobile device.
3. Be able to re-configure the sensors through a web interface and through an Android mobile device.

Technical dilimiations

TODO: Vad har explicit uteslutits från arbetet?

Execution of the project

SCRUM and how we have used it

We started off in november with deciding how many sprints we will have and between which dates. The entire project of 17 weeks half time, was divided into three sprints. Before our first sprint planning meeting we sat down with our client to get a feeling on what we were supposed to do. During our first sprint planning meeting we divided the sprint goal into smaller sprint stories, due to all of us being new to Scrum and not having a clear picture on how much coding that was needed we ended up with 8 sprint stories. Due to the small number of sprint stories in relation to the big sprint goal we ended up not finishing any sprint story. Lesson learnt before the second sprint were that we tried to divide the sprint goal into even smaller stories. During the second sprint we finished our first 69 story points.

To decide upon size for each sprint story(scope) for the second and third sprint we used "planning poker" [1, p. 42]. With pen and paper we wrote down our estimate on how "big" we expected each story to be. Some stories we had completely different picture of how big its scope was which led to a short discussion about it. In the end we had the same mental picture of each sprint story, a lesson learnt is that the sprint stories still was to big.

One project, three sprint goals

Individual time monitoring and our "speed"

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1. First sprint story
2. Second sprint story
3. Third sprint story
4. Fourth sprint story
5. Fifth sprint story

Sensor data aggregation through CoAP
Work in progress

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Reflection and discussion about SCRUM for our project

Results

Deliverables

TODO: Vad levererar vi med respekt till ursprungliga krav?

Testing

Lessons learnt

Improvements to our work

Conclusions

References

- [1] Henrik Kniberg, *Scrum and XP from the Trenches*. C4Media Inc, Publisher of InfoQ.com, 978-1-4303-2264-1, <http://infoq.com/minibooks/scrum-xp-from-the-trenches>, 2007.

Appendix A - How to build upon our codebase

This appendix include information on how to build upon our codebase for the Mülle (C), server code (Python, PHP/HTML5 and C) and Android Mobile phone (Java).

Mülle

Server

Coapy server

TODO: Python parts such as the python coapy server and how we use EXIP c-code parts.

Webpages and database

Android Mobile Phone application