Research plan for projects[1]

Title of the project	UbiBazaar: App Store for the Internet of Things
Responsible people	Simon Stastny
Time period for the project	18. August 2014 to 10. June 2015
Amount of resources in PM planned	
Web address for the project[2]	https://github.com/ubibazaar/

A project work should keep a plan consisting of the following sections. The plan needs to be kept updated and constitute the basis for any discussion with supervisor.

Change log for the plan

When you update the plan please record what you changed and what the reason for the change.

Version	Date of change	What is changed?	The reason for the change
0.1	20. August 2014	First version.	Because we needed a first version
0.2	31. August 2014	First take on purpose and products	Establishing the scope of the project
0.3	4. October 2014	Project aims and research questions refined. Process decided and Products and Participants changed accordingly.	Direction of research defined to be IoT.
0.4	22. November 2014	Purpose updated	To fit current focus on user innovators
0.5	6. December 2014	Research questions reworded	To fit focus on innovators

[1] This plan is based on the 6Ps of research as described in Oates, Dr Briony J (2005). Researching Information Systems and Computing. SAGE Publications.

[2] Most probably a github repository. Talk to Babak to agree where and how to share stuff.

Purpose

Until recently, development in the Internet of Things (IoT) space was dominated by large commercial players[3]. This is now changing as small affordable open source electronic platforms (such as Arduino, Raspberry Pi or BeagleBoard) facilitate development of smart things and IoT systems also by user innovators, such as hobbyists, makers and researchers.

These platforms were were designed with both hardware and software development in mind and new things can be developed using very low resources and expertise as the hardware devices themselves are inexpensive, software development tools for them are free (both as in free beer and free speech) and the communities surrounding those platforms are providing many free tutorials, manuals, examples or even whole e-books[4].

Even though many IoT systems are being built upon those platforms and many of those innovators, in the spirit of open source, might be keen to share the ready-to-deploy software artifacts with other innovators, researchers,, hobbyists, makers and the general public, we feel the world still lacks channels for easy distribution and deployment of IoT software.

We believe that introducing a tool such an app store with IoT software could drive user innovation and user adoption in IoT, the same way app stores have driven them the area of mobile applications just recently.

This project aims to identify challenges in IoT software deployment and distribution and propose a technical solution addressing those challenges and making the most of successful ideas from mobile app stores.

The research question to be addressed is:

1. How can introduction of app stores improve IoT software deployment and distribution for user innovators?
    a. How do use innovators deploy and distribute IoT software currently?
    b. What challenges user innovators face when deploying IoT software?
    c. How can be those challenges addressed using ideas from app stores?

Products

As this project is done in several iterations (as described in Process part below), each iteration has its own products.

1. State of the art literature review will be delivered.
2. As a result of the first iteration, a survey will be delivered identifying challenges in IoT software deployment.
3. In the second iteration, a prototype will be created and evaluated.

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[3] Kortuem, G.; Kawsar, F., "Market-based user innovation in the Internet of Things," Internet of Things (IOT), 2010, URL: http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5678434&isnumber=5677827

[4] http://playground.arduino.cc/Main/ManualsAndCurriculum

4. The output of the fourth iteration is a specification for the product and its reference implementation.

Process

The research project will be done in 4 iterations.

1. The strategy for the first iteration is a survey to identify challenges in IoT deployment. The survey will be done in two steps. In the first one, several interviews will be performed to collect data and understand the topic in order to prepare for the second step of the survey. People involved with development and deployment of IoT applications will be interviewed about challenges they faced. In the second step, an online questionnaire will be prepared and distributed to some hobbyist and makers communities to collect more data.
2. For the second iteration, design and creation strategy will be used to create a paper prototype of an application will be created, that solves challenges and addresses requirements identified in the survey. As an input for this iteration, documents from the survey will be used.
3. In the third iteration, a survey will be performed with a group of researchers to evaluate the created prototype. For the survey, data will be collected by using focus group technique.
4. As a last, fourth iteration, Design and creation strategy will be used to carry out specification and create reference implementation of the system. Last iteration will be using documents from previous iterations as an input.

Participants

A group of IoT software developers will be interviewed for the survey, and members of selected innovator or maker communities will be asked to answer an online questionnaire.

A group of researchers in SINTEF will be participating in testing of the paper prototype of the tool.

Paradigm (optional)

Positivism?

Presentation

The project will be documented in a written report delivered to the project supervisor.

Reference implementation, specifications of system architecture, features and message formats and all other information necessary for implementing and extending the system will be made publicly available to enable and encourage open-source community to take part in the project.