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# **SE4YH SMART ENERGY FOR YOUR HOME PROJECT PLAN DOCUMENT**

**Version 1.3**

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Project Plan Document	Date: 2015-11-27

## Revision History

<b>Date</b>	<b>Version</b>	<b>Description</b>	<b>Author</b>
2015-10-28	1.0	Initial Draft	Team
2015-11-02	1.1	All sections are added	Team
2015-11-09	1.2	Adding additional information to Section 2	Nathan Chape
2015-11-09	1.2.1	Development process section is changed, role organization picture is changed	Elena Kyorova
2015-11-17	1.2.2	Scope and intended audience is changed, definitions are added	Elena Kyorova
2015-11-18	1.2.3	Extend background and objectives, quality assurance and risk sections are changed	Elena Kyorova
2015-11-26	1.2.4	Change Gantt chart	Marko Vojić
2015-11-26	1.3	Reviewing changes	Elena Kyorova

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## 1. Introduction

### 1.1 Purpose of this document

The purpose of this document is to give an overview of the *project team*, *project vision*, *project plan* as well as the planned *development process*.

### 1.2 Document organization

The document is organized as follows:

- Section 1, *Introduction*, describes contents of this guide, used documentation during developing process etc.
- Section 2, *Background and Objectives*, describes the background (i.e. the problem of which the project will address) as well as the goals of the project.
- Section 3, *Project Schedule*, describes preliminary project schedule and the sprints that we intend to have as well as planned effort.
- Section 4, *Organization and Communication*, describes the development process and some additional characteristic as the team organization, roles, tools used for collaboration etc.
- Section 5, *Quality Assurance*, description of QA process.
- Section 6, *Risks*, a summary of the potential (developmental) risks involved with the project.

### 1.3 Intended Audience

The intended audience is:

- development team, as a tool to guide the project during development, as well as ensuring a shared project vision amongst the members of the team.
- stakeholders, as a source of information about the planning and the scope of the project

### 1.4 Scope

In this document you will find information about our product and an explanation of the actions that will be done and the development process, which will be followed.

Referring to Section 1.1, this document provides information about the background and goals of the SE4YH project. Team members, communication tools and development process are described. The next step will be creating a document regarding requirements analysis and design of the system.

### 1.5 Definitions and acronyms

#### 1.5.1 Definitions

Keyword	Definitions
SmartE	Name of the application
User	The actor which use the system
Energy usage management	Managing usage of energy for specific unit
Quality Assurance	A way to prevent mistakes and avoiding problems when a software is delivered
Sprint	Iteration (basic unit of development)
Unit test	Testing the smallest part of code that can be tested

#### 1.5.2 Acronyms and abbreviations

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<b>Acronym or abbreviation</b>	<b>Definitions</b>
SE4YH	Smart Energy for Your Home
NTR	Nothing to Report. There is no information to a specific topic available or necessary.
FER	Faculty of Electrical Engineering and Computing, University of Zagreb
MDH	Mälardalen Högskola, Sweden
UI	User Interface
GUI	Graphical User Interface
QA	Quality Assurance (It is also used for Quality assurance Engineer abbreviation)

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## 2. Background and objectives

### 2.1 Background

Over recent years, smart devices have become more and more prevalent in our homes. Smart devices, once solely the domain of media/communication devices such as TVs and smart phones, have diversified to include other household appliances. Appliances such as, washing machines and refrigerators as well as lighting and climate control. All of which can be monitored/controlled via a local wireless connection. For example, a smart washing machine can be given commands to restrict washing times to the evening or taking advantage of cheaper energy rates. Another example could be a dishwasher that you can remotely start from your phone while sitting at the office or turning off the lights that you forget before leaving to work.

### 2.2 Project Vision

SE4YH project is initiated from Matteo Rossi, located in Italy. The goal of this project is to develop a centralized system which allows a user to interact and define *rules/profiles* of their smart devices. Whilst *energy usage management* is a key concept of the *Smart Energy for Your Home*, the sponsor of the project has stressed that it is user preference that is most critical. The user should be able to manage all the devices in his/her house by mobile application. Simple and intuitive design of the application should help the user to monitor and control these devices easily.

A user should be able to define their own rules concerning how and when an appliance is used, for example perhaps a user would like the lights to come on automatically at a specific time of day. Or that different appliances are only allowed to be run if the total wattage does not exceed a user defined limit. Existing solutions generally only offer a fixed set of profiles. Our goal is to allow the user have complete control of their smart devices.

### 2.3 Requirements

Here we can give short description of the requirements which the project outcome should meet. More detailed requirements will be presented in separate document.

#### 2.3.1 Managing devices

The user should be able to control devices which are presented in users' home. In order to do this user should log in the system. A specific device should be able to be controlled (stop/start/pause) after it is added.

#### 2.3.2 Creating/deleting rules

The system should allow creating, editing and deleting rules, which will be assigned to a specific device. A rule contains some actions that are executed when a specified condition is fulfilled.

#### 2.3.3 Monitoring

The user should be allowed to list and review all added devices and rules.

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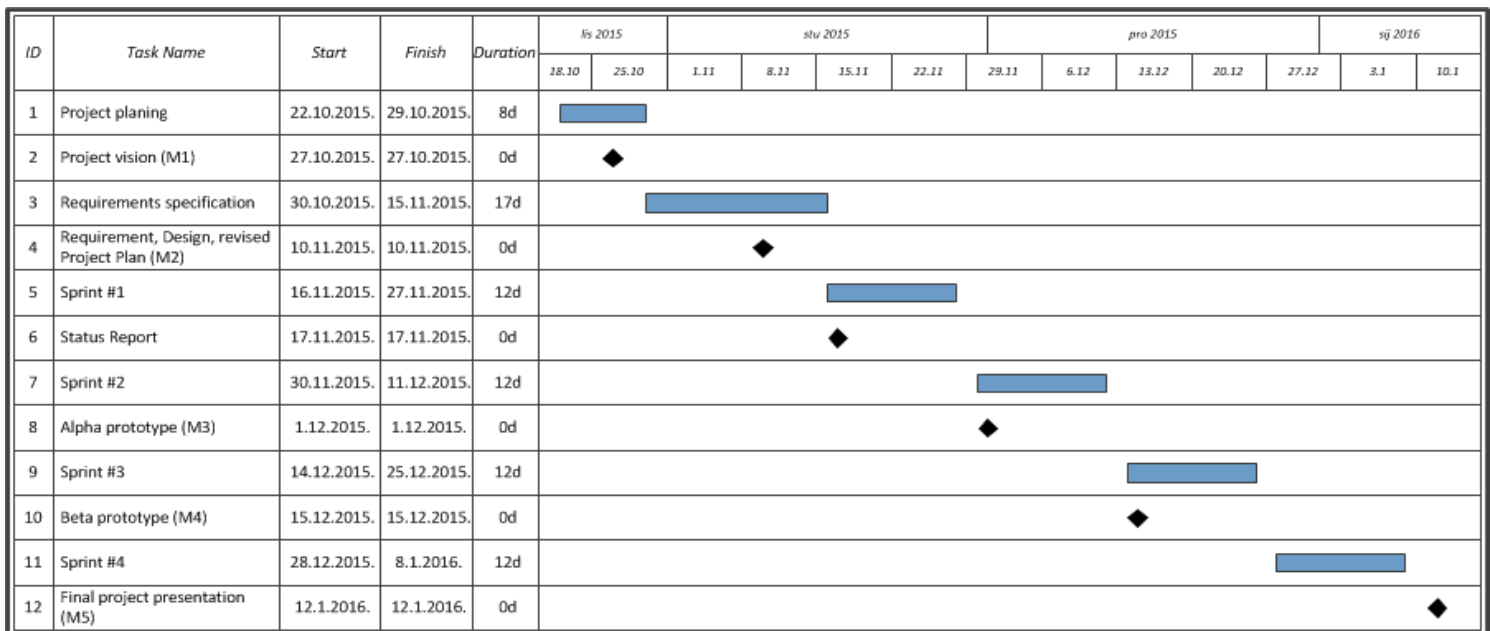
### 3. Project Schedule

# Sprint	Start Date	End Date
1	Nov 16th, 2015	Nov 27th, 2015
2	Nov 30th, 2015	Dec 11th, 2015
3	Dec 14th, 2015	Dec 25th, 2015
4	Dec 28th, 2015	Jan 8th, 2016

#### 3.1 Milestones

Item	Plan	Actual	#Sprint
M1 - Project Vision	2015-10-27	2015-10-27	-
M2 - Requirements and Design	2015-11-10	2015-11-10	-
M4 - Alpha prototype	2015-12-01		2
M5 - Beta prototype	2015-12-15		3
M5 - Final Product	2016-01-12		4

#### 3.2 Gantt chart



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## 4. Organization

This project is distributed, we have one team in Croatia at FER and other in Sweden at MDH and the customer is located in Italy.

The development methodology which will guide the realization of the project will be Scrum.

### 4.1 Team members

Name	Email	Faculty
Marius Schlinke	marius.schlinke@yahoo.de	MDH
Elena Kyorova	elenakyorova@gmail.com	MDH
Diego Limones	diego.l.b20@gmail.com	MDH
Nathan Chape	nathan.chape@gmail.com	MDH
Marko Vojić	marko.vojic@fer.hr	FER
Ondrej Kollar	ondro.kollar@gmail.com	FER
Eugen Družin	eugen.druzin@fer.hr	FER

### 4.2 Supervisors

Name	Email	Faculty
Abhilash Thekkilakattil	abhilash.thekkilakattil@mdh.se	MDH
Igor Čavrak	igor.cavrak@fer.hr	FER

### 4.3 Customer

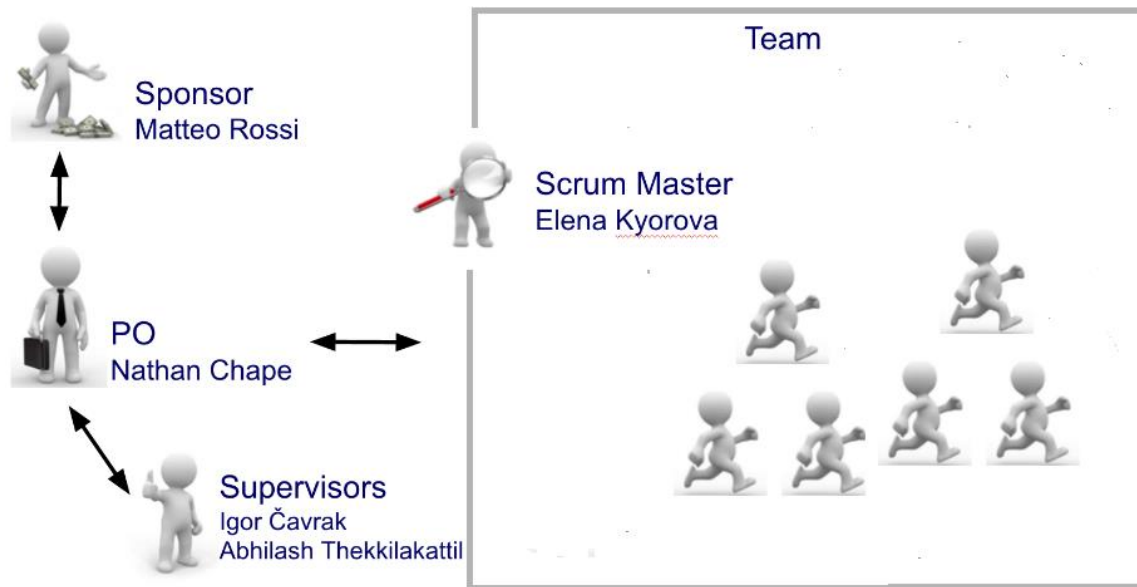
Name	Email
Matteo Rossi	rossi@elet.polimi.it

### 4.4 Team Roles

For the current Scrum implementation we will use three main roles: Product Owner, Scrum Master and Development Team.



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### Product Owner

The Product Owner should be a person with vision, authority and availability. The Product Owner is responsible for continuously communicating the vision and priorities to the development team. Communication is a main function of the Product Owner. The ability to convey priorities and empathize with team members and stakeholders is vital to steer the project in the right direction. Product owners bridge the communication gap between the team and its stakeholders.

As the face of the team to the stakeholders, the following are some of the communication tasks of the product owner to the stakeholders:

- Demonstrates the solution to key stakeholders who were not present at a sprint review
- Defines and announces releases
- Communicates team status
- Organizes milestone reviews
- Educates stakeholders in the development process
- Negotiates priorities, scope, funding, and schedule
- Ensures that the product backlog is visible, transparent, and clear

Empathy is a key attribute for a product owner to have—the ability to put yourself in someone else’s shoes. A product owner converses with different stakeholders in the project, who have a variety of backgrounds, job roles, and objectives. A product owner must be able to see from these different points of view. To be effective, it is wise for a product owner to know the level of detail the audience needs. The development team needs thorough feedback and specifications so they can build a product up to expectation. Providing more information than necessary may lose stakeholder interest and waste time.

A product owner’s ability to communicate effectively is also enhanced by being skilled in techniques that identify stakeholder needs, negotiate priorities between stakeholder interests, and collaborate with developers to ensure effective implementation of requirements.

### Scrum Master

Scrum is facilitated by a Scrum master, who is accountable for removing impediments to the ability of the team to deliver the product goals and deliverables. The Scrum master is not a traditional team lead or project manager, but acts as a buffer between the team and any distracting influences. The Scrum master ensures that the Scrum process is used as intended. The Scrum master helps ensure the team follows the agreed Scrum processes, often facilitates key sessions, and encourages the

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team to improve. The role has also been referred to as a team facilitator to reinforce these dual perspectives.

The core responsibilities of a Scrum master:

- Helping the product owner maintain the product backlog in a way that ensures the needed work is well understood so the team can continually make forward progress
- Helping the team to determine the definition of done for the product, with input from key stakeholders
- Coaching the team, within the Scrum principles, in order to deliver high-quality features for its product
- Promoting self-organization within the team
- Helping the team to avoid or remove impediments to its progress, whether internal or external to the team
- Facilitating team events to ensure regular progress
- Educating key stakeholders in the product on scrum principles

One of the ways the Scrum master role differs from a project manager is that the latter may have people management responsibilities and the Scrum master does not. Scrum does not formally recognize the role of project manager, as traditional command and control tendencies would cause difficulties.

### **Development Team**

According to Scrum's founder, "the team is utterly self-managing." The development team is responsible for self-organizing to complete work. A Scrum development team contains about seven fully dedicated members (officially 3-9), ideally in one team room protected from outside distractions. For software projects, a typical team includes a mix of software engineers, architects, programmers, analysts, QA experts, testers, and UI designers. Each sprint, the team is responsible for determining how it will accomplish the work to be completed. The team has autonomy and responsibility to meet the goals of the sprint.

### **4.5 Communication roles**

As the selected development process is Scrum there is a certain person responsible for communication with the customer. Communication tools are described in next chapter. All questions that need to be directed to the client will be discussed among the team members and presented to the product owner.

As the role of the Scrum master is to take care of the following of the process, any problems and questions related to Scrum process will be directed to him.

### **4.6 Development process**

Scrum was chosen by the members of the team as an agile software development methodology. The team will benefit from the following characteristics of Scrum methodology: suitability for small projects with not clearly defined requirements, need of regular meetings between the members. The methodology brings relaxed environment in which roles can be changed quickly, without strictly defined hierarchy in the team.

The product will be developed within iterations called Sprints that will be fourteen days each.

The project will start with initialization phase in which requirements will be gathered. User stories will be created by communicating with the sponsor and brainstorming. They will be used to define separate tasks. These stories will be described and prioritized and will be added to the sprint backlog. Initial architecture of the product will be created.

Next phases will be dedicated to implementation of the product that is previously designed by architecture and the requirements. The tasks will be divided after implementation the assignees should test the tasks. After the end of each sprint the developed components will be integrated and a working version of the product should be available.

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#### 4.6.1 Scrum Roles

Detailed description of roles is presented in Section 4.4: Product Owner, Scrum Master and Development Team.

The Scrum Master role can rotate amongst the team member depending on each member responsibilities during development stage of the project.

#### 4.6.2 Communication tools

Here we present a list with communication tools that will be used:

- Skype - It will be used for video conferences between the team members and communication with the sponsor.
- Slack - It will be used for instant messaging, pushing notifications, discussions on a specific subject between the members of the project and also connection with the supervisors.

#### 4.6.3 Meetings

Each sprint starts with sprint planning meeting in which team members define the sprint *backlog*, the task that should be finished and estimate the time each task would take. Tasks are chosen by the members of the team, every team member is supposed to finish the task in estimated time. After each sprint team will have sprint review in which accomplished tasks will be presented to the product owner/supervisor. Backlog refinement meetings will be held near the end of every sprint.

Right after the review meeting, sprint retrospective meeting is held in order to evaluate the past sprint and determine what can be improved. The Scrum master should review the changes to backlog that are made during review meetings and document them using excel sheets.

Regular meetings with the sponsor will be held in order to check if any changes in requirements, architecture or analysis should be made. Skype will be used as a communication channel with the sponsor. The responsible team member for the communication will be the Project Owner.

The whole team will have regular weekly meetings (once or twice a week). They will be held Wednesday (between 14:00 and 14:30) and/or Friday (between 11:00 and 11:30). These meetings will contain status reports, common issues, upcoming activities, and so on. During these meetings a "minutes of meeting" document will be written. After each meeting, the document will be published on the DSD SE4YH project web page.

#### 4.6.4 Other Tools

- Google Drive Pack (Google Docs, Google Sheets, Google Slides) - Document pack will be used for making documentation, presentations and reports.
- Doodle - It will be used in order to arrange meetings between the team members
- Git - It will be used for version control system, Bitbucket repository will be used as our git repository.
- Gitflow - This tool allows easier branching for git.
- Code Sniffer - PHP static code analyzer, allows creating your own code standart
- Android Lint Tool - It provides static code analysis for Android project
- Crashlytics - Monitoring Android Client application crashing
- JIRA - Development suite that will be used for :
  - Task management (task allocation and reallocation), issue tracking, remaining time visualization
  - Tracing commits (every commit is connected with a specific JIRA task)
  - Visualization of Sprint backlog items

## 5. Quality Assurance

We will have weekly meetings to keep everyone on same track during the whole process. Every meeting will be well documented. Documents will be revised before they are delivered in order to assure the documentation quality.

In order to test the back end development, unit tests will be created and executed.

A front end version will be delivered in the end of every sprint and possible changes will be discussed with the sponsor.

In order to ensure the high quality of the code, code review will be performed.

The following review procedure will be applied to every task/bug:

- Team member A implements task from the backlog and marks the task with status "In progress"
- Team member A finishes the task and mark the task as "QA"
- Team member B reviews the Team member A's task.
- Team member which perform the QA role resolve the task - makes it as done.

If any problem with task implementation appears, team members can use the communications channel to ask for help.

Bug (defect) will be created in case the person that perform the QA role meets mismatch between the requirements and the implementation or in case some error appears. The bug description will follow the following template:

- Test environment: device, software version, device configuration
- Frequency
- Steps to reproduce
- Expected/Actual result
- Additional information (Is the bug reproducible?)

The adequate standard code conventions will be applied for the selected programming languages which will be used for developing the system.

Static analysis tools will help developers apply coding standards, avoid writing confusing and unmaintainable code and detect common errors. The tools that we will use are described in 4.6.4 Section.

## 6. Risks

Risk	Likelihood	Impact	Mitigation
R1 -High workload	High	Medium	Parallelize activities. Define independent components.
R2- Lack of Communication	Low	High	Use instant messaging for fast communication. Use Skype for meetings.
R3 - Difficult to understand the potential user needs	Medium	High	Create a poll. Talk to experts in the field. Talk to sponsor.
R4 - Availability of sponsor	High	Medium	Perform Skype meetings if there any questions. Show working progress to the sponsor.
R5 - Availability of team members	High	Medium	The team will try to plan all events and deadline in order to avoid unavailability

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R6 - Integration problems	High	High	The team will spend more time with simulating devices
R7 - Lack of knowledge for the used technologies	Medium	Medium	Technologies with detailed documentation will be chosen, knowledge will be transfer among team members, estimation time will be exceeded for non-experienced members