Contents

Revision History

Date	Version	Description	Author(s)
22.11.06	1.0	First version after project discussion on 22.11	Yevgeniy Ilyin
6.12.06	2.0	First draft version for requirements review	Yevgeniy Ilyin
12.12.06	2.1	More non-functional requirements added; some minor changes overall;	Yevgeniy Ilyin
15.12.06	2.2	Fig.1 and 2. added; adjustments overall	Yevgeniy Ilyin
20.01.06	2.3	Review comments applied	Yevgeniy Ilyin

1 Introduction

1.1 Purpose

This document specifies the Software Requirements Specification (SRS) for the Project Management System (PMS). It describes scope of the system, both functional and non-functional requirements for the software, design constraints and system interfaces.

1.2 Scope

The Project Management System addresses the management of software projects. It provides the framework for organizing and managing resources in such a way that these resources deliver all the work required to complete a software project within defined scope, time and cost constraints.

The system applies only to the management of software projects and is a tool that facilitates decision making; the PMS does not make decisions.

This SRS describes only required functionality of PMS, not the functionality of external systems like data storage, change management or version control systems.

This document does not divide the PMS into subsystems; it describes only requirements for the whole-system functionality which is defined in the use case model.

1.2.1 Use Case Model

To define and organize the functional requirements of the PMS, this document uses as a basis the use case model. The use case model consists of all actors of the system and all the various use cases by which the actor interact with the system and describes the total functional behaviour of the system. The use cases are defined in the 🗎3 Use Case diagrams.

1.3 Definitions, Acronyms and Abbreviations

The following table explains the terms and abbreviations used in the document.

Term / Abbreviation	Explanation
PMS	Project Management System
CMS	Change Management System (Bug tracking tool)
CVS	Concurrent Versions System
VSS	Microsoft Visual SourceSafe
PERT	Program Evaluation and Review Technique
GUI	Graphical User Interface
LAMP	A server that is running Linux, Apache, My-SQL and PHP
DBMS	Database Management System
DSS	Data Storage System
RBAC	Role Based Access Control

1.4 Glossary

The glossary defines the key terms and concepts mentioned and used in this SRS.

Word	Explanation
Project Management	The subject of this document. Represents the whole solution as aggregate

System	of all subsystems and interfaces.
Host System	The main part of the system that resides on the server and where the business logic runs. Maintains physical connections to all external systems (data storage system, version control and change management systems)
Client System	The part of the system that runs on the user PC. Provide GUI and required system functionality. Maintains physical connection to the host system.
Data Storage System	An external Data Base Management System, where the PMS stores all its data and that enables all data storage-related functionality of the PMS.
Project Team Leader	The person who has the overall responsibility for the successful planning and execution of any project. Project Team Leader leads the team of developers.
Manager	The person who has the overall responsibility for the project portfolio
Project Team Member	One of the developers who does not have responsibility for the project. The project team member has responsibility for carrying out the task assigned to him or her.
System Administrator	The person who maintains and operate a computer system or network for a company. The system administrator is charged with installing, supporting and maintaining the PMS as well as with user management.
User	Any person who uses the system and is registered within the system. It means that he or she has the user login.
User Profile	Preferences of the registered user of the system that are saved within the system.
User Role	Placeholder for the defined set of permissions.
Project Team	The organized group of developers that are working on the same project.
Project	Is a temporary endeavour undertaken to create a particular software product as a solution of some problem.
Project Portfolio	A set of projects.
Task	Is an activity that needs to be accomplished within a defined period of time. Tasks can be linked together to create dependencies and can have subtasks.
Subtask	A task that has a parent task what it belongs to.
Report	A defined view on the project that contains the specified project attributes tasks and resources and provides information about project status.
Resource	The concept is required to carry out the project tasks. It can be people, equipment, facilities, or anything else capable of definition required for the completion of a project activity.
Authorized user	The user who has logged into the system and has a right to perform some operation. The system “knows” the identity of the user and permission that are granted to this user.
Authenticated user	The user who has logged into the system. The system “knows” the identity of the user.

1.5 References

The following table defines the list of all documents referenced elsewhere in these requirements.

Reference & Document Title	**Applicable Reference and Version**
1 Project Description	case-study.pdf
2 Raw PMS Requirements	Raw requirements.doc
3 Use Case diagrams	Use Case Diagrams.doc
4 Official Guidelines for Interface Developers and Designers	http://msdn.microsoft.com/library/en-us/dnwue/html/welcome.asp
5 Review comments	PMS_Requirements_Review.pdf

1.6 Overview

Chapter 2 defines the general product functions, intended application, constraints to be respected and the assumption made in order to define requirements.

Chapter 3 specifies functional (Section 3.1) and non-functional requirements (all other sections), usability, reliability, security, performance and maintainability considerations and requirements to a level of detail sufficient to enable designers to design a system to satisfy these requirements and testers to test that the system satisfies these requirements.

Chapter 4 contains index, appendices and supporting information.

The document is structured according to the IEEE 830-1998 standard [IEEE-830].

1.7 Open issues

No.	Description of issue
~~1.~~	~~Interface to version control and change management systems has not been defined yet.~~
~~2.~~	~~Format of exported and imported projects in R1.04.16 and R1.04.17 has not been defined.~~
~~3.~~	~~The Risk attribute is not set for all requirements~~
~~4.~~	~~The Source attribute is not set for all requirements~~
~~5.~~	~~3.3.2 Defect Rate is not defined~~
~~6.~~	~~3.4 Security section is not detailed enough~~
~~7.~~	~~Deployment is not defined~~
~~8.~~	~~Maintainability is not defined~~
~~9.~~	~~Design Constraints are not defined.~~
~~10.~~	~~User Interfaces section is not detailed enough~~
~~11.~~	~~Hardware, Software and Communication Interfaces sections are not defined.~~
~~12.~~	~~Project Management standards should be defined.~~
~~13.~~	~~Index is not full.~~

2 Overall Description

2.1 Current solution

As for the moment every team leader is using a specific software product or no software at all, for maintaining the project schedule, to organize the tasks of the project and to physically store the all project data.

2.2 Product perspective

PMS it a standalone system that provides functionality described in the Product functions section. It includes all subsystems needed to fulfil these software requirements. In addition, the PMS has interfaces to the external systems, such Version Control System, Change Management and Bug Tracking System and Payroll System. These interfaces shall be implemented according to available industry standards and shall be independent from a specific external system.
Any detailed definition of an external system is out of scope of this document.
The figure 1 shows the decomposition of PMS on the functionality areas and the supported external systems.
We have to distinguish a Data Storage System (DSS) from all other external systems in that way, that Data Storage System enables normal functioning of PMS and is therefore essential. PMS stores all its data in the DSS and hence has to maintain the connection to it. PMS shall access the data storage

system through standard interface (JDBC, ODBS, ADO etc). See Data storage system section for more information.

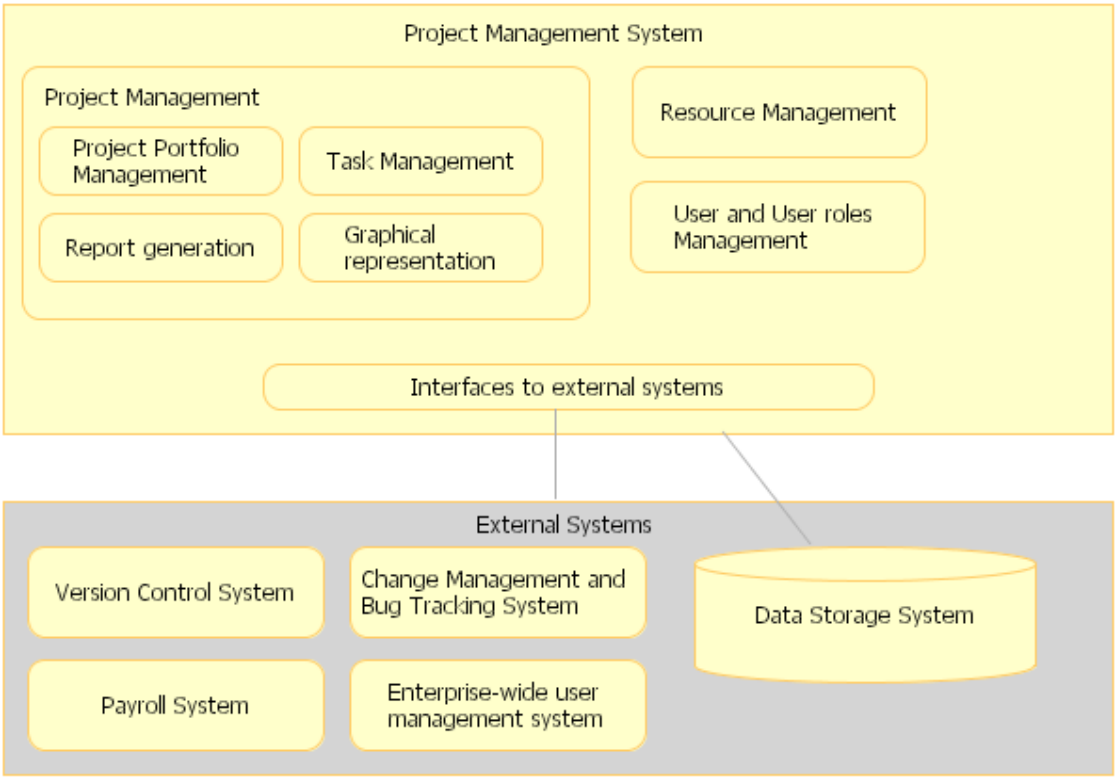

Fig. 1 Project Management System perspective

2.3 Product functions

2.3.1 Supported functions

The Project Management System:

- provides a framework for project management,
- supports multiple projects,
- supports distributed development,
- allows to define fine-grained project step like tasks and subtasks,
- allows to create complex dependencies between tasks,
- supports resource management,
- provides user and user role management,
- supports budget controlling,
- stores all system data in the centralized data storage,
- has an interface to an external version management and code storage system,
- has an interface to an external change management and bug tracking system,
- can provide data for an external payroll system,
- Can have an interface with enterprise-wide user management system.

2.3.2 Unsupported functions

The Project Management System:

- does not provide code management or code storage,
- does not provide version control,
- does not provide bug tracking and change management,
- does not provide employee management,

- does not provide work time accounting and payroll.

2.4 User Profiles

The system is intended to be used by various users. We can divide all users into four profiles, each with own responsibility and role in the PMS:

User	Functions and Responsibilities	Source
Manager	Responsible for the batch of the projects and controls overall development flow. Assigns projects to the project team leader and controls fulfilment of the project team leader's tasks.	1 Project Description
Project Team Leader	Responsible for a particular project. Leads a project team of 2 to 20 developers. Assigns tasks to project team members and controls their fulfilment. Reports to the manager.	1 Project Description
Project Team Member	Responsible for a particular task or part of a task. Reports to the Project Team Leader.	1 Project Description
System Administrator	Responsible for the installation, maintenance, security and troubleshooting of the productive system. Manage users of the PMS. Reports to the Manager	1 Project Description

Table 1. User Profiles

These roles hierarchy describes the default roles within PMS and can be adapted to the company's needs by configuring user roles (see 3.1.2.1Manage Users and User Roles)

2.5 Constraints

The document represents a study project, not a real-life SRS, and misses detailed description and requirement for many areas. It gives only directions and requirement templates for creating project management system.

2.6 Assumptions and dependencies

2.6.1 Data storage system

The PMS stores all the operational (portfolios, projects, tasks, subtasks, dependencies, resource assignments) and reference (resources, users, user roles) data in the centralized data storage. There is no requirement for a specific data storage system. We assume that the PMS shall be able to access and store data in any Data Base Management System (DBMS) through the standard interface like JDBC, OBDC, ADO etc. provided by development environment.

The description and requirements for such a DBMS is out-of-scope of this document and is not considered further.

2.6.2 Distributed project management

The PMS shall support distributed project management. Hence PMS shall run on various platforms and be able to communicate with its subsystems via Internet. We will not discuss further the communication protocols and Internet platforms.

2.6.3 Representation

We assume that the PSM represents the project management data according to the common representation standards and terminology. It also generates usual graphical representation of project tasks and their dependencies like PERT, Gantt, AON (Activity on Node) and AOA (Activity on Arrow) diagrams. The specification of such diagrams is out-of-scope of this document.

2.7 Use Cases

Use Case model defines the users of the system (actors) and specifies the activities performed by a particular type of user. The use case model is decomposed into functional areas and each functional area comprises use cases. Each use case describes how the system shall be used by the actors to achieve a specific business goal or function.

The use cases do not capture non-functional requirements of the system. In writing use cases we use only minimal level of details: a brief use case. It consists of a few sentences summarizing the use case.

It is not intended to specify the PMS requirements in term of the defined use cases. The use cases server only for decomposing the whole system into functional areas.

For detailed information see 🗎3 Use Case diagrams🗎3 Use Case diagrams document.

3 Specific Requirements

This section contains all software requirements both functional and non-functional. The functional requirements are grouped according use case model.
A requirement has the following properties:

Requirement ID	Uniquely identifies requirement within all PMS documents.
Title	Defines the functional group the requirement belongs to. Gives the requirement a symbolic name.
Description	The definition of the requirement.
Priority	Defines the order in which requirements should be implemented. Priorities are designated (highest to lowest) “1”, “2”, and “3” … Requirements of priority 1 must be implemented in the first productive system release. The requirements of priority 2 and lower are subject of special release-agreement, which is out of scope of this document.
Source	Refers to the raw requirement(s) from the 🗎2 Raw PMS Requirements document. In a real-time SRS it refers to the source, what the requirement originates from.
Risk	Specifies risk of not implementing the requirement. It shows how the particular requirement is critical to the system. There are following risk’s levels and associated impact to the system if the requirement is not implemented or implemented incorrectly: • *Critical (C)* – will break the main functionality of the system. The system can not be used if this requirement is not implemented. • *High (H)* – will impact the main functionality of the system. Some function of the system could be inaccessible, but the system can be generally used. • *Medium (M)* – will impact some system’s features, but not the main functionality. System can be used with some limitation. • *Low (L)* – the system can be used without limitation, but with some workarounds.
References	Gives link to the related use cases or requirements.

Table 2 Properties of requirements

3.1 Functionality

This section describes the main functional requirements of the Project Management System. The requirements are structured by functionality area and correspond in general the user case model, defined in 3 Use Case diagrams document. Each requirement, if applicable, has the reference to the equivalent use case.

3.1.1 Main features

3.1.1.1 Users and User Roles

Requirement ID	R1.01.01
Title	Main Functionality\Users
Description	The system shall support the concept of **user**. Every user of the system has a name and a password. The name must be unique within the installed instance of the system. In addition, every user has a set of properties: *Full Name*, *Full Business Title* (Company Name, Position), *E-Mail Address, Phone, Working Address, Alternative Phone, and Alternative Working Address*. Each user is uniquely identified by its name within the system.
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.01.02
Group	Main Functionality\Users Roles
Description	The system shall support the concept of **user role**. The role has the unique name within the installed instance of the system and a set of permissions that are assigned to this role. The permission determines explicitly what the user belonging to this role allowed to do in the system. Every user of the system must be associated with at least one of the roles. The user can belong to many roles. If the user is member of several roles, the deny permission take over the grant one[1]. Generally, the PSM shall implement the RBAC (Role Based Access Control) security model[2].
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.01.03
Group	Main Functionality\User Roles
Description	The system shall determine what of its functionality available to the authenticated user[3] according to the user role and permissions and grant or deny access correspondingly.
Priority	1
Source	
Risk	C
References	

[1] If, for example, a user a member of role A und role B. The role A grant permission P, the role B denies the same permission P. The permission will be denied for the user.

[2] Role Based Access Control decouples users and permissions by roles representing jobs or functions. Formalized by a set Roles and the relations $UA \subseteq Users \times Roles$ and $PA \subseteq Roles \times Permissions$, where $AC := PA \circ UA \Rightarrow AC := \{(u,p) \in Users \times Permissions \mid \exists r \in Roles: (u,r) \in UA \wedge (r,p) \in PA\}$

[3] Authenticated user is a user how has logged in the system (who is identified by system).

Requirement ID	R1.01.04
Group	Main Functionality\User Roles\Predefined Roles
Description	The default installation of the system shall provide at least the following preconfigured user roles: "*Manager*", "*Team Leader*", "*Team Member*", "*Administrator*". The Table 3 lists the default rights of each role. The system administrator (user with the right to edit user roles) can configure permissions of the roles.
Priority	2
Source	
Risk	M
References	

User Role	**Is allowed to**
Manager	Browse project list, Create/Delete/View/Update/Export/Import project, Assign/Re-assign a resource to the project.
Team Leader	Create/Delete/View/Update task, View/Import project, Assign/Re-assign a resource to the task
Team Member	View task, View project
Administrator	Create/Delete/View/Edit user (manage user), Configure system, Create/Delete/View/Edit user role (manage user role)

Table 3. User Roles

Requirement ID	R1.01.05
Group	Main Functionality\User Roles\Storage
Description	The system shall store the list of all users (with all their properties) allowed to work within the system, the list of all user roles, and all the relations between users and user roles in the permanent storage. The system shall be able to store at least 200 users and at least 5 user roles.
Priority	1
Source	
Risk	C
References	Security Requirements, performance Requirements – number of users

Requirement ID	R1.01.06
Group	Main Functionality\User Roles\Manage
Description	The system shall provide the user with the permission "Manage User Roles" the ability to manage users, their properties and user roles.
Priority	1
Source	
Risk	C
References	Requirement Manage Users and User Roles

Requirement ID	R1.01.07
Group	Main Functionality\User Roles\Change password
Description	The system shall provide the authenticated user the ability to change his or her password and to store the change.
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.01.08
Group	Main Functionality\User Roles\Permissions

Description	The system shall provide the following list of the permissions, that can be assigned to user roles: Manage users, manage roles, manage system, create/delete/view/edit task|project|project portfolio, export/import project, assign a resource to a task[4].
Priority	1
Source	
Risk	C
References	

3.1.1.2 User Profile

Requirement ID	R1.02.01
Group	Main Functionality\User Profile
Description	The system shall provide the concept of **User Profile**. The user profile contains the user-specific configurable parameters of the system. The user profile is associated with one and only one user that is registered in the system (has a user name and a password).
Priority	1
Source	
Risk	C
References	UC1.02

Requirement ID	R1.02.02
Group	Main Functionality\User Profile\Storage
Description	The system shall store the list of all user profiles in the permanent storage. The system shall be able to store as much user profiles as the number of users.
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.02.03
Group	Main Functionality\User Profile\Edit
Description	The user must be able to change his or her profile and save the changes.
Priority	1
Source	
Risk	C
References	

3.1.1.3 System Login

Requirement ID	R1.03.01
Group	Main Functionality\System Login
Description	The user must login to the system by specifying his or her name and password before he or she can work with the system. If the password is invalid or the user name does not exist in the system, the user is not allowed to login and must enter the name and password again. There is no limit of the login tries. After successful login the system shall associate the user with the user roles and configure appearance of GUI according the user profile. After the login the main functionality of the system according the user's permissions is available. After the login the user becomes the authenticated and authorized user.
Priority	1

[4] The exact definition of the permission list is an integral part of the requirements. For the sake of simplicity, however, we refused to enumerate the whole list.

Source	
Risk	C
References	UC1.01

3.1.1.4 Manage Portfolio List

Requirement ID	R1.04.01
Group	Main Functionality\Project Portfolios
Description	The system shall organize the projects to the project portfolios. The project portfolio is a container for zero or more projects. There can be zero or more project portfolios in the installed instance of the system. The project portfolio has properties: *Name, Description, Owner, and Creation Date*. Every project portfolio is associated through the property *Owner* with one and only one user. The user with permission “manage project portfolio” can assign and re-assign any user to the property *Owner*.
Priority	1
Source	
Risk	C
References	R1.05.01

Requirement ID	R1.04.02
Group	Main Functionality\Project Portfolios\Storage
Description	The system shall store the list of project portfolios in the permanent storage.
Priority	1
Source	
Risk	
References	

Requirement ID	R1.04.03
Group	Main Functionality\Project Portfolios\View
Description	The system shall provide the authorized user with permission “view project portfolio list” the ability to view and browse the list of the all project portfolios available in the system.
Priority	1
Source	
Risk	C
References	UC4.01

Requirement ID	R1.04.04
Group	Main Functionality\Project Portfolios\Filter
Description	The authorized user with permission “view project portfolio list” must be able to define a subset of project portfolios, that he or she wants to view on the basis of a user-defined filter. As a criterion for the filter the user must be able to select any property of the project portfolio and any combination of this properties connected with the logical operators OR, AND and NOT.
Priority	2
Source	
Risk	M
References	

Requirement ID	R1.04.05
Group	Main Functionality\Project Portfolios\Create
Description	The system shall provide the authorized user with permission “create project portfolio” the ability to create a new project portfolio and to specify all properties of the project portfolio. The project portfolio name must be unique within the installed

	instance of the system. Otherwise, the project portfolio cannot be created and error message must be shown to user. The project portfolio must be empty (contains no project) after creation. The user is identified as the owner of this portfolio.
Priority	1
Source	
Risk	C
References	UC4.03

Requirement ID	R1.04.06
Group	Main Functionality\Project Portfolios\Select
Description	The authorized user with permissions “view project portfolio list” and “view project list” must be able to select any project portfolio from the list provided as the result of the Req.1.04.3 or Req. 1.04.04 and view the all properties of the selected portfolio and the list of projects contained in this portfolio. The selected portfolio becomes “current” for this user.
Priority	1
Source	
Risk	C
References	UC4.02

Requirement ID	R1.04.07
Group	Main Functionality\Project Portfolios\Edit
Description	Under the condition that the user has permission “edit project portfolio”, the user must be able to edit the properties of the portfolio and save the changes. The project portfolio’s properties are defined in R1.04.01
Priority	1
Source	
Risk	C
References	UC4.05; R1.04.01

Requirement ID	R1.04.08
Group	Main Functionality\Project Portfolios\Delete
Description	Under the condition that the user has permission “edit project portfolio”, the user must be able to delete the portfolio from the system. The system shall delete this portfolio and all its projects. All tasks and relations, associated with projects will be deleted. This operation shall be undoable.
Priority	1
Source	
Risk	C
References	UC4.04

Requirement ID	R1.04.19
Group	Main Functionality\Project Portfolios\Permanent Delete
Description	The system shall provide the possibility to delete a portfolio, its projects, tasks and relations permanently. This command shall be accessible only from outside the system (i.e. command line) and the deleting user must have special permission[5].
Priority	1
Source	
Risk	M
References	

3.1.1.4.1 Manage Project List

[5] This permission is not defined in this SRS

Requirement ID	R1.04.09
Group	Main Functionality\Project List\Current project portfolio
Description	The system shall perform the all operations on project list and projects in the context of the “current” project portfolio defined in R1.04.06
Priority	1
Source	
Risk	C
References	R1.04.06

Requirement ID	R1.04.10
Group	Main Functionality\Project List\View
Description	The system shall provide the authorized user with permission “view project list” the ability to view and browse the list of all projects of the current project portfolio.
Priority	1
Source	
Risk	C
References	UC12.01

Requirement ID	R1.04.11
Group	Main Functionality\Project List\Filter
Description	The authorized user with permission “view project list” must be able to define a subset of projects he or she wants to view on the basis of a user-defined filter. As a criterion for the filter the user must be able to select any property of the project and any combination of the properties connected with the logical operators OR, AND and NOT.
Priority	2
Source	
Risk	M
References	R1.05.02

Requirement ID	R1.04.12
Group	Main Functionality\Project List\Create
Description	Under the condition that the user has permissions “create project” and “edit project portfolio”, the system shall provide this user the ability to create a new project within the current project portfolio and to specify all properties of the project. The user must provide at least the name of the project. The project name must be unique within the given portfolio. Otherwise, the project cannot be created and error message must be shown to user. The project must be empty (contains no tasks) after creation. The user is identified as the owner of this project. The system shall add the project to the current portfolio.
Priority	1
Source	
Risk	C
References	UC12.03, R1.05.02

Requirement ID	R1.04.13
Group	Main Functionality\Project List\Select
Description	The authorized user with permission “view project” must be able to select any project from the list provided as the result of the Req.1.04.10 and Req. 1.04.11 and to view the all properties of the selected project as well as to perform all project-specific actions on this project according to his or her access rights. The selected project becomes “current” for this user.
Priority	1
Source	

Risk	C
References	UC12.02
Requirement ID	R1.04.14
Group	Main Functionality\Project List\Edit
Description	Under the condition that the user has permission “edit project”, this user must be able to edit all the properties of this project and save the changes. The properties of the project are defined in the R1.05.02
Priority	1
Source	
Risk	C
References	UC12.07; R1.05.02
Requirement ID	R1.04.15
Group	Main Functionality\Project List\Delete
Description	Under the condition that the user has permissions “edit project” and “edit project portfolio”, this user must be able to delete the project from this portfolio The system shall delete this project, all its tasks and relations. The operation must be undoable. The system shall provide the possibility to delete a project, its tasks and relations permanently. This command shall be accessible only from outside the system (i.e. command line) and the deleting user must have special permission[6].
Priority	1
Source	
Risk	C
References	UC12.06
Requirement ID	R1.04.16
Group	Main Functionality\Project List\Import
Description	Under the condition that the user has permission “import project” and “edit portfolio list”, this user must be able to create a new project by importing an external file in well-defined format. If the system encounters problems during the import operation or unable to import the project, the error message shall be shown to the user and the import operation shall be terminated.
Priority	2
Source	
Risk	M
References	UC12.04
Requirement ID	R1.04.17
Group	Main Functionality\Project List\Export
Description	The authorized user with permission “export project” must be able to export the given project to the external file in well-defined format. If the system encounters problems during the export operation or unable to export the project, the error message shall be shown to the user and the export operation shall be terminated.
Priority	2
Source	
Risk	M
References	UC12.05
Requirement ID	R1.04.xx
Group	Main Functionality\Project List

[6] The permission is not defined in this SRS.

Description
Priority 1
Source
Risk
References

3.1.1.4.2 Manage Project Leader

Requirement ID R1.04.18
Group Main Functionality\Mange Project Leader
Description Under the condition that the user has permission “edit project”, the user must be able to assign or re-assign any of available users to the *Project Leader* property of the project. The user can be associated with any number of projects, but project can be associated only with one user.
Priority 1
Source
Risk C
References UC7.01; R1.05.02

Requirement ID R1.04.xx
Group Main Functionality\Mange Project Leader
Description
Priority 1
Source
Risk
References

3.1.1.5 Manage Project

Requirement ID R1.05.01
Group Main Functionality\Project\Current Project
Description The system shall perform the all operations on tasks in the context of the “current” project defined in R1.04.13
Priority 1
Source
Risk C
References R1.04.13

Requirement ID R1.05.02
Group Main Functionality\Project
Description The system shall provide the concept of **project**. The project has properties and contains zero or more tasks. The project must belong to one and only one project portfolio. The properties of the project are: *Name, Description, Status, Creation Date, Start Date, Finish Date, Owner, and Project Leader*.
Priority 1
Source
Risk C
References

Requirement ID R1.05.03
Group Main Functionality\Project\Derived Properties
Description The system shall provide a set of additional project properties that are calculated or derived from the other project’s attributes. The system shall perform this calculation every time the underlying properties have been changed. The derived

	properties are: *Project Duration*: the length of the critical path. The critical path is the path that takes the longest to complete. To determine the path times, add the task durations for all available path. *Project Cost*: the sum of costs of all tasks, containing in the project. *Project Progress*: the percentage of completion, derived from the percentage of completion of project's tasks.
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.05.04
Group	Main Functionality\Project\View
Description	The system shall provide the authorized user with permission "view project" the ability to view (but not edit) the properties of the current project, view and browse the tasks belonging to the project.
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.05.05
Group	Main Functionality\Project\Reporting
Description	The system shall provide the authorized user with permission "create report" the ability to create a various reports on the project[7].
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.05.06
Group	Main Functionality\Project\Change portfolio
Description	The system shall provide the authorized user with permissions "edit project" and "edit portfolio" the ability to change the portfolio, which the project belongs to.
Priority	1
Source	
Risk	C
References	

3.1.1.5.1 Manage Task

Requirement ID	R1.05.10
Group	Main Functionality\Manage Task\Task
Description	The system shall provide the concept of a **task**. The task consumes time and it requires resources. The task has properties and zero or more other tasks. These other tasks are called **subtasks**. The subtask must belong to one and only one task and can have zero or more subtasks. The circular references are not allowed. Hence the task cannot belong to its subtask. The task must belong to one and only one project. The task and subtask is associated with zero or more resources.
Priority	1
Source	

[7] As mentioned before, the definition of reports is out of scope of this document.

Risk	C
References	

Requirement ID	R1.05.10.1
Group	Main Functionality\Manage Task\Task\Properties
Description	The properties of the task are: *Name, Description, Start Date*, *Optimistic Time* (the minimum possible time required to accomplish a task, assuming everything proceeds better than normally expected), *Pessimistic Time* (the maximum possible time required to accomplish a task, assuming everything goes wrong, but excluding major catastrophes), *Most Likely Time* (the best estimate of the time required to accomplish a task, assuming everything proceeds as normal), *Risk*
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.05.10.2
Group	Main Functionality\Manage Task\Subtask
Description	Subtask has the same properties as a task.
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.05.10.3
Group	Main Functionality\Manage Task\Task\Derived Properties
Description	The system shall provide a set of additional task properties that are calculated or derived from the other task's attributes. The system shall perform this calculation every time the underlying properties have been changed. The derived properties are: *Expected Time*: the best estimate of the time required to accomplish a task. Formula for calculating ET=(Optimistic Time + 4*Most Likely Time + Pessimistic Time) div 6[8] *Early Start Time; Early Finish Time; Late Start Time; Late Finish Time; Slack*[9]. *Task Cost*: the sum of the costs of all resources associated with the task and all its subtasks. *Task Progress*: the percentage of completion. If the task has subtasks, the *Task Progress* is the weighted (according to the task's duration) sum of *Task Progress* properties of all subtasks divided by number of subtasks.
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.05.11
Group	Main Functionality\Manage Task\Dependencies
Description	The system shall support dependencies between tasks. The dependence is a directed link between two tasks. The link goes out from the one task and ends at the other one. The former is called the predecessor of the latter and the latter is called the successor of the former. The task can have zero or more predecessor

[8] If Most Likely Time or Pessimistic Time is not set or defined, the divisor must be changed accordingly.
[9] The definition of the project management concepts is out of scope of this document.

	(ingoing links) and zero or more successor (outgoing links). The task cannot start and thus cannot be completed until its immediately predecessors are completed. The system shall support only finish-to-start dependencies. Circular dependencies are not allowed. Hence the predecessor of a task cannot be the successor of this task at the same time. The dependency can be defined only between tasks, but not subtasks.
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.05.11.1
Group	Main Functionality\Manage Task\Create Dependencies
Description	The system shall provide the authorized user with permission “edit task” the ability to create dependencies between tasks ensuring the rules defined in R1.05.11. The system shall not allow the user to create dependencies violating the rules and show the error message in the case of violation.
Priority	1
Source	
Risk	C
References	UC9.08

Requirement ID	R1.05.11.2
Group	Main Functionality\Manage Task\Edit Dependencies
Description	The system shall provide the authorized user with permission “edit task” the ability to edit existing dependencies between tasks ensuring the rules defined in R1.05.11 and to save the changes. The system shall not allow the user to make changes that lead to the rule violation and show the error message in the case of violation.
Priority	1
Source	
Risk	C
References	UC9.08

Requirement ID	R1.05.11.3
Group	Main Functionality\Manage Task\Delete Dependency
Description	The system shall provide the authorized user with permission “edit task” he ability to delete any existing dependency between tasks. This operation must be undoable.
Priority	1
Source	
Risk	C
References	UC9.08

Requirement ID	R1.05.12
Group	Main Functionality\Manage Task\Create
Description	The authorized user with permission “edit project” must be able to create a new task within the current project and to specify all properties of the task. The user must provide at least a name of the task, *Start Date* and *Most Likely Time*. The task name must be unique within the given project. Otherwise, the task cannot be created and the system shall show the error message the user. The system shall associate the task with the current project.
Priority	1
Source	
Risk	C

References	UC9.01
Requirement ID	R1.05.13
Group	Main Functionality\Manage Task\Browse
Description	The system shall represent the tasks, their dependencies and subtasks of the project in a graphical form as a Gantt chart, a PERT diagram and an indented list of all task and subtasks. The representations are called “views” of the project. The user must be able to browse a particular view, select any task, subtask and dependencies between them as well as to edit their properties (see R1.05.14).
Priority	1
Source	
Risk	C
References	UC6.03; UC9.03; R1.05.14
Requirement ID	R1.05.14
Group	Main Functionality\Manage Task\Edit
Description	The authorized user with permission “edit task” must be able to edit all properties of the task, particular the time estimates of the task: *Optimistic Time, Pessimistic Time and Most Likely Time* and save the changes. The system shall re-calculate the dependent properties of this task and other associated tasks.
Priority	1
Source	
Risk	C
References	UC9.03; UC9.03.01; UC9.03.02;
Requirement ID	R1.05.15
Group	Main Functionality\Manage Task\Delete
Description	The authorized user with permission “edit project” must be able to delete any existing task. The system shall also delete all subtasks of this task and all its outgoing and ingoing dependencies as well as the associations with resources. The system shall delete the task from the current project. This operation must be undoable.
Priority	1
Source	
Risk	C
References	UC9.02
Requirement ID	R1.05.16
Group	Main Functionality\Manage Task\Report progress
Description	The authorized user with permission “edit task” must be able to enter the percentage of task or subtask completion as a value of the property *Task Progress*. If the task contains any subtask(s), than the Task Progress cannot be enter manually by the user und is calculated as described in R1.05.10.3. The system shall estimate the completion time of task, subtask or project as a result of changing the value of *Task Progress* of the given task.
Priority	1
Source	
Risk	C
References	UC9.05; R1.05.10.3
Requirement ID	R1.05.17
Group	Main Functionality\Manage Task\Estimate
Description	The system shall estimate the completion time of task on the basis of timing estimates for subtasks, dependencies between tasks, resource assignment and availability, task progress.
Priority	1

Source	
Risk	C
References	UC9.04

Requirement ID	R1.05.18
Group	Main Functionality\Manage Task\Generate Task Schedule
Description	The system shall be able to generate the task schedule, including timing information of the task, its subtasks, start and finish dates of the task and subtasks, resource assignment of the task and its subtasks. The system shall provide the user the ability to view, store and print this schedule.
Priority	1
Source	
Risk	C
References	UC9.06

Requirement ID	R1.05.19
Group	Main Functionality\Manage Task\Assign resource
Description	The authorized user with permission “edit task” must be able to associate a resource with a task. Zero or more resources can be associated with zero o more tasks. Each association between a resource and a task has own *Availability* attribute, which shows what percentage of the whole resource availability allocated for the associated task. The sum of availability attributes of all resource-task associations for given resource cannot be higher than 100%.
Priority	1
Source	
Risk	C
References	UC10.05

Requirement ID	R1.05.19a
Group	Main Functionality\Manage Task\Edit task-resource association
Description	The authorized user with permission “edit task” must be able to edit the association between a task and a resource. The association can be deleted, or moved to another task or resource.
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.05.xx
Group	Main Functionality\Manage Task
Description	
Priority	1
Source	
Risk	
References	

3.1.1.5.2 Manage Resources

Requirement ID	R1.05.20
Group	Main Functionality\Manage Resources\Resource
Description	The system shall provide the concept of a **resource**. The resource is required to carry out the project tasks. The system shall support the following types of resources: *Person, equipment, material*. The resource has properties and associated with zero or more tasks. In addition, the resource of the type “person” can be associated with one and only one user. The resource is associated neither

	with a project, nor with a project profile
Priority	1
Source	
Risk	C
References	R1.05.25

Requirement ID	R1.05.20.1
Group	Main Functionality\Manage Resources\Resource\Properties
Description	The properties of the resource are: *Name, Description, Cost, Availability, and Type*
Priority	1
Source	
Risk	C
References	

Requirement ID	R1.05.21
Group	Main Functionality\Manage Resources\Create
Description	The authorized user with permission “edit resource” must be able to create a new resource with the system and to specify all properties of the resource. The user must provide at least a name of the resource. The name must be unique within the installed instance of the system. Otherwise, the resource cannot be created and the system shall show the error message to the user.
Priority	1
Source	
Risk	C
References	UC10.01

Requirement ID	R1.05.22
Group	Main Functionality\Manage Resources\Browse
Description	The system shall organize all available resources in the list and provide the authorized user with permission “view resource” the ability to browse, select, view and edit resources in the list.
Priority	1
Source	
Risk	C
References	UC10.07

Requirement ID	R1.05.23
Group	Main Functionality\Manage Resources\Edit
Description	The authorized user with permission “edit resource” must be able to edit all properties of the resource and save the changes. The system shall re-calculate dependent properties of the tasks (namely *Task Cost*)
Priority	1
Source	
Risk	C
References	UC10.02

Requirement ID	R1.05.24
Group	Main Functionality\Manage Resources\Delete
Description	The authorized user with permission “edit resource” must be able to delete any existing resource from the system. The system shall also delete all associations between the resource and tasks and users. This operation shall be undoable.
Priority	1
Source	
Risk	C
References	UC10.04

Requirement ID	R1.05.25
Group	Main Functionality\Manage Resources\Assign user
Description	The system shall provide the authorized user with permission “edit resource” the ability to associate a resource of the type “person” with one and only one user[10]. The user can be associated with one and only one resource.
Priority	1
Source	
Risk	C
References	UC10.06

Requirement ID	R1.05.26
Group	Main Functionality\Manage Resources\Assign availability
Description	The authorized user with permission “edit resource” must be able to assign a percentage of the availability to the *Availability* attribute of the resource and the *Availability* attribute of the association between the resource and the task.
Priority	1
Source	
Risk	C
References	UC10.03; R1.05.19; R1.05.20.1

Requirement ID	R1.05.27
Group	Main Functionality\Manage Resources\Assign task
Description	The authorized user with permissions “edit resource” and “edit task” must be able to associate and to re-associate a resource with one or more tasks. The association between the resource and the task has an attribute *Availability*, that how much resource’s effort is available for doing the associated task.
Priority	1
Source	
Risk	C
References	

3.1.1.5.3 Team Member Functionality

Requirement ID	R1.05.30
Group	Main Functionality\Team-Member Functionality\Get Tasks
Description	The authorized user with permission “view task” must be able to generate a list of the tasks and their subtasks fulfilling the following conditions: • Tasks and subtasks are assigned to this user • Tasks and subtasks have not been completed yet • Tasks and subtasks have the *Start Date* less or equal the current Date.
Priority	1
Source	
Risk	H
References	UC11.01

Requirement ID	R1.05.xx
Group	Main Functionality\Team-Member Functionality
Description	
Priority	1
Source	
Risk	
References	

[10] User in terms of R1.01.01

Requirement ID	R1.05.xx
Group	Main Functionality\Team-Member Functionality
Description	
Priority	1
Source	
Risk	
References	

3.1.1.5.4 Working off-site

Requirement ID	R1.05.40
Group	Main Functionality\Working off-site\Check out
Description	The system shall provide the authorized user with permission “edit project” the ability to get (check-out) a project for off-line work (without on-line connection to the system data storage or network). The user must be able to edit project, edit tasks and their dependencies and assign or re-assign resources to tasks. The all project data must be stored local on the user’s computer.
Priority	3
Source	
Risk	M
References	UC8.01

Requirement ID	R1.05.41
Group	Main Functionality\Team-Member Functionality\Synchronize
Description	The system shall provide the authorized user with permission “edit project” the ability to synchronize the project, which was edited off-line, with the project’s data in the system main data storage, after the user is on-line again (has connection to the system data storage or network). The user must be able to view and to resolve the possible conflicts between off-line and on-line versions of the project.
Priority	3
Source	
Risk	M
References	UC8.02

Requirement ID	R1.05.xx
Group	Main Functionality\Team-Member Functionality
Description	
Priority	1
Source	
Risk	
References	

3.1.1.6 Do Reporting

Requirement ID	R1.06.01
Group	Main Functionality\Reporting\Generate Report for Project
Description	The system shall provide the authorized user with permission “generate report” the ability to generate a report for the selected project. The report must include: • Project’s properties and derived properties, particularly *Project Cost* • Project’s timing information (start date, estimated finish date) • Project’s tasks and their subtasks with timing information • Resource assignment

- Project's progress

The user must be able to set the level of report's details. Unlike the R1.06.04 the project report concentrates mostly on project and tasks progress and costs.

Priority 1
Source
Risk H
References UC6.02; R1.06.04

Requirement ID R1.06.02
Group Main Functionality\Reporting\Generate Report for Subset of Projects
Description The user must be able to generate reports defined in R1.06.01 for any subset of projects from one or different project portfolios.
Priority 1
Source
Risk H
References UC6.01

Requirement ID R1.06.03
Group Main Functionality\Reporting\Generate Team Member Schedule
Description The system shall provide the authorized user with permission "generate report" the ability to generate a list of all tasks and subtasks assigned to a particular user including timing information of all tasks and subtasks; start and finish dates and progress information. The system shall provide the user ability to store and to print this schedule.
Priority 1
Source
Risk H
References UC6.05

Requirement ID R1.06.04
Group Main Functionality\Reporting\Generate Project Schedule
Description The user with permission "generate report" must be able to generate a schedule for a particular project including the following information:

- Project's properties
- Project's tasks and their subtasks with timing information (start date, estimated finish date)
- Resource assignment for tasks and subtasks

The system shall be able to group the project information according to the various criteria: resources, tasks. Unlike the R1.06.01 the project schedule concentrates mostly on timing information, task dependencies and resource assignment.
Priority 1
Source
Risk H
References UC6.04; R1.06.01

Requirement ID R1.06.05
Group Main Functionality\Reporting\Generate project view
Description The system shall provide the authorized user with permission "generate report" the ability to generate various graphical views of the project: PERT, Gantt or network diagrams like activity on arrow (AOA) and activity on node (AON). The views must represent tasks, subtasks, dependencies between tasks, task progress and timing information (start date, estimated finish date, early start,

	duration, early finish, late start, slack, late finish)[11]
Priority	1
Source	
Risk	C
References	UC6.03

Requirement ID	R1.06.06
Group	Main Functionality\Reporting\Generate Report for task
Description	The system shall provide the authorized user with permission “generate report” the ability to generate a report for the selected task. The report must include: • Task properties and derived properties, particularly *Task Cost* • Task timing information (start date, duration, estimated finish date) • Subtasks with timing information • Resource assignment • Task progress The user must be able to set the level of report’s details.
Priority	1
Source	
Risk	H
References	

Requirement ID	R1.06.xx
Group	Main Functionality\Reporting\
Description	
Priority	1
Source	
Risk	
References	

3.1.1.7 Entity Diagram

The following diagram shows all defined entities from the above requirements and their relations.

[11] The generation and presentation of different project’s view is a very important functionality of the PMS. Nevertheless, we omit the exact definition of these views, and assume that the PMS shall produce views in terms of MS Project.

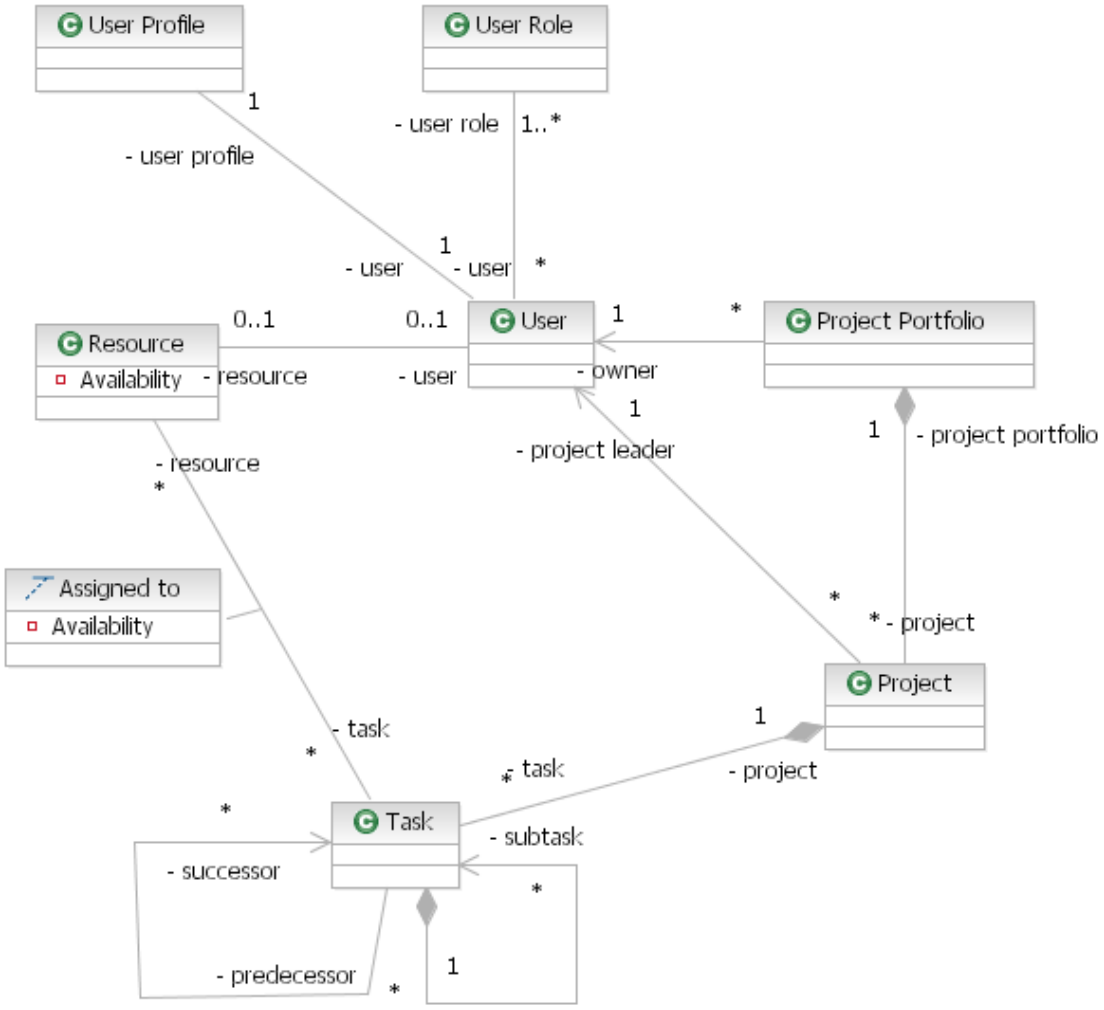

Fig. 2 PMS entities and relations

This diagram does not define PMS classes that must be implemented in software, but just the common entities.

3.1.2 Maintenance functionality

Requirement ID	R1.07.01
Group	Maintenance\Update
Description	The system shall provide the user with the permission “edit system configuration” the ability to update the system to a new version. The update must be well-defined and well-documented procedure and must be done by experienced administrator within 4 hours. The existing system data storage, existing users and user roles must be available after the update. The all users of the system must be able to work on their project portfolios, projects and tasks immediately after the update.
Priority	1
Source	
Risk	C
References	UC2.03

Requirement ID	R1.07.02
Group	Maintenance\Patch
Description	The system shall provide the user with permission “edit system configuration” the ability to install a patch in the system. The patch must update limited part or parts of the system and must be done within 2 hour. The existing system data storage, existing users and user roles must be available after the patch. The all users of the system must be able to work on their project portfolios, projects and tasks immediately after the patch
Priority	1
Source	
Risk	C
References	UC2.04

3.1.2.1 Manage Users and User Roles

Requirement ID	R1.07.10
Group	Maintenance\Manage Users and Roles
Description	The system shall provide the authorized with permissions “edit users” and “edit user roles” the ability to manage system users and user roles.
Priority	1
Source	
Risk	C
References	UC2.06; R1.01.01; R1.01.02; R1.01.04; R1.07.11; R1.07.12

Requirement ID	R1.07.11
Group	Maintenance\Manage Users and Roles\Manage Users
Description	The system shall provide the authorized user with permission “edit users” the ability to perform the following operations on users ensuring constraints from the R1.01.01: • Browse the list of existing users and view properties of any user. • Create a new user. • Edit an existing user. • Delete a user. • Assign and re-assign a user to a user role.
Priority	1
Source	
Risk	C
References	R1.01.01; R1.01.02

Requirement ID	R1.07.12
Group	Maintenance\Manage Users and Roles\Manage User Roles
Description	The system shall provide the authorized user with permission “edit user roles” the ability to perform the following operations on user roles ensuring constraints from the R1.01.02: • Browse the list of existing user roles and view properties of any user role. • Create a new user role. • Edit an existing user role. Particularly assign or remove permissions. • Delete a user role. Only the user role containing no users can be deleted.
Priority	1
Source	
Risk	C
References	R1.01.01; R1.01.02

3.1.2.2 Configuration

Requirement ID	R1.07.20
Group	Maintenance\Configuration
Description	The user with permission “edit system configuration” must be able to configure the specific parameters of the system: • Connection parameters for system data storage. • Location of log files and detail level of logging. • Maximal allowed number of concurrent users of the system and simultaneous logins. • Parameters of monitoring and auditing subsystem.
Priority	1
Source	
Risk	H
References	UC2.05

3.1.2.3 Monitoring and Troubleshooting

Requirement ID	R1.07.25
Group	Maintenance\Troubleshooting\Log files
Description	The system shall provide the user with permission “edit system configuration” the ability to view, browse and evaluate the log file or files. The log file must contain the continuous time- and origin-stamped sequence of events occurred in the system, diagnostic information, transaction information, exceptions happened in the system and other information depending on the configured logging level[12].
Priority	2
Source	
Risk	M
References	UC2.08; R4.04.01

Requirement ID	R1.07.26
Group	Maintenance\Troubleshooting\Monitoring
Description	The system shall provide a set of tool or a subsystem to monitor the status of the system. The monitor subsystem shall show the following: • List of activities carrying out in the system. • Number of logged users. • Memory and CPU consumption of the main system services. • List of active transactions in the system. The user with permission “edit system configuration” must be able to start and stop monitoring and to save the information from the monitor subsystem.
Priority	3
Source	
Risk	L
References	UC2.09

Requirement ID	R1.07.27
Group	Maintenance\Troubleshooting\Performance counters
Description	The system shall provide a set of performance counters to monitor the status of the system services in a production environment. The user with permission “edit system configuration” must be able to start and stop performance counters and to save the performance information.
Priority	3

[12] The exact definition of event’s properties and log information is out of scope of this document.

Source	
Risk	L
References	UC2.10

3.1.2.4 Maintain Data Storage

The detailed description of the data storage maintenance is out-of-scope of this specification, because the data storage subsystem is not defined in this document. However, the system data storage shall ensure the minimum set of maintenance requirements:

Requirement ID	R1.07.30
Group	Maintenance\Data Storage\Backup
Description	The system data storage shall provide the authorized user the ability to perform an automatic periodic backup of the system data and to restore the system data from the backup in case of system failure.
Priority	1
Source	
Risk	C
References	UC2.07.01

Requirement ID	R1.07.31
Group	Maintenance\Data Storage\Housekeeping
Description	The system data storage shall provide the authorized user the ability to perform common housekeeping activities on the data storage: • Add/update/remove data in the data storage. • Perform periodic clean-up and update of data.
Priority	1
Source	
Risk	H
References	UC2.07.02

3.1.3 Graphical User Interface

UI of the PMS is out of scope of this document. We assume that PMS provides a UI for all operations with the system and represents graphically all project management relevant information. The UI could look like MS Project.

3.1.4 Interfaces to external Systems

These requirements define points of connection to external systems only. The exact description of the interfaces is out of scope of this document.

Requirement ID	R1.08.01
Group	Interface\Version Control
Description	The system shall provide the open interface[13] to the version control and source code management systems like CVS and VSS.
Priority	3
Source	
Risk	M
References	

Requirement ID	R1.08.02
Group	Interface\Change Management
Description	The system shall provide the open interface to the change management control

[13] Open interface means that it is well defined, documented and open for any external system.

	systems like Bugzilla and Serena ChangeMan Dimensions.
Priority	3
Source	
Risk	M
References	

Requirement ID	R1.08.03
Group	Interface\Payroll
Description	The system shall provide the open interface to the payroll system.
Priority	4
Source	
Risk	L
References	

Requirement ID	R1.08.04
Group	Interface\External User management
Description	The system shall provide the open interface to an external user management system (like who is who)
Priority	4
Source	
Risk	L
References	

3.2 Usability

This section includes all requirements that affect usability.

3.2.1 Graphical User Interface

Requirement ID	R2.01.01
Group	Usability\GUI
Description	The system shall conform to the Microsoft GUI standard defined in the 4 Official Guidelines for Interface Developers and Designers document. The further specification of the GUI like windows layout, view definitions, navigation, reachability of functionality, accessibility is out of scope of this document and must be defined in a separate specification.
Priority	1
Source	
Risk	H
References	

3.2.2 Training

Requirement ID	R2.02.01
Group	Usability\User Training
Description	The experienced computer user must be able to use the system productively[14]: • In the role “Manager” – after 1 day of training[15] • In the role “Project Leader” – after 2 days of training • In the role “Project Member” – after 0.5 day of training • In the role “Administrator” – after 2 days of training

[14] Productively means, that user uses the system for everyday work for real-life projects.
[15] Training means reading of documentation, understanding examples, and instructor-based courses.

Priority 1
Source
References

Requirement ID R2.02.02
Group Usability\Documentation
Description The system documentation shall be sufficient to start using the basic functionality of the system immediately. The documentation shall describe all implemented system functionality. The user in the user roles “Manager” and “Project Leader” must be able to start using all functionality of the system after 4 hours instructor-based training. The user in the user role “Project member” must not require instructor-based training. The user in the user role “Administrator” must be able to install, maintain and troubleshooting system after 8 hours instructor-based training.
Priority 1
Source
References

3.2.3 Task Times

Requirement ID R2.03.01
Group Usability\Task times
Description The following tasks must be done within the specified time by the particular users under the condition that user has completed training in the system functionality.

Create a project portfolio	Manager	5 min
Create project	Manager	5 min
Create task/subtask	Project Leader	5 min
Create resource	Project Leader	10 min
Find project	Project Leader	5 min
Assign resource/user	Project Leader	5 min
Generate project schedule	Project Leader/Manager/Project Member	10 min
Generate task schedule	Project Member	5 min

Priority 1
Source
References

3.2.4 Language

Requirement ID R2.04.01
Group Usability\Language
Description All system messages, texts, log entries and help documentation must be in English.
Priority 1
Source
References

Requirement ID R2.04.02
Group Usability\Localization

Description The system shall be designed in that way, that the localization (translation of UI, all system messages, documentation and help into other languages) can be done within 1 week by 2 persons under condition that all text strings are translated into the goal language.
Priority 2
Source
References

3.3 Reliability

3.3.1 Availability

Requirement ID R3.01.01
Group Reliability\Availability
Description The system shall be available for use at 24 hours a day, 7 days a week. The data storage shall be available for use 24 hours a day, 7 days a week. The maintenance weekends are allowed but must be announced 2 month in advance. The maintenance weekends mean that the system is off-line during 48 hours for maintenance activities. The system must require not more that 6 maintenance weekends per year.
It makes the distributed developing in all time zones possible.
Priority 1
Source
References

Requirement ID R3.01.02
Group Reliability\MTBF
Description The Mean Time Between Failures (MTBF) must be at least 300 hours.
Priority 1
Source
References

Requirement ID R3.01.03
Group Reliability\MDT
Description The average time between failure and being returned to service (MDT) must not exceed 2 hours within the operational hours and 8 hours outside operational hours (maintenance weekends).
Priority 1
Source
References

Requirement ID R3.01.04
Group Reliability\Failure
Description The system shall not have any single point of failure. All critical services of the system (data storage, communication subsystem) must be replicated. The system architecture shall allow the using of cluster hardware and support multi-processor systems.
Priority 1
Source
References

3.3.2 Error rate

Requirement ID R3.02.01
Group Reliability\Error rate

Description The system shall have sufficient quality. The quality is sufficient if:
for the first release of the PMS:
- There is no more than 1 showstopper[16] error per two weeks
- There are no more than 2 patch severity errors per week
- There are no more than 5 high severity errors per week
- The number of medium and low severity errors are not defined

For the second release:
- There is no more than 1 showstopper error per month
- There are no more than 5 patch severity errors per month
- There are no more than 10 high severity errors per month
- The number of medium and low severity errors are not defined

For subsequent releases:
- No more than 1 showstopper per six month
- No more than 2 patch severity errors per month
- No more than 5 high severity errors per month
- The number of medium and low severity errors are not defined

Priority 1
Source
References

3.3.3 Error handling

Requirement ID R3.03.01
Group Reliability\Error handling
Description The system shall provide log information about its state, running processes and encountered errors.
The system shall be able to detect failed services and connections and restart them automatically.
The system shall provide full information about failures and errors. The information shall include: time of failure, origin (subsystem or component) where a failure occurred, severity and description of error or failure. Diagnostic information shall be logged and saved in independent data storage (disk file or database).
Priority 1
Source
References R1.07.25; R1.07.26

3.4 Security

Requirement ID R4.01.01
Group Security\General
Description The system shall protect the data and services from unauthorized access. The system shall also provide authentication and secure transaction.
Priority 1
Source
References

3.4.1 Authorization

Requirement ID R4.02.01

[16] The severity of the errors: showstopper, patch, high, medium, and low. The definition of the severity is out of scope of this document.

Group	Security\Authorization
Description	The system shall implement Role based access control model.
Priority	1
Source	
Risk	C
References	

3.4.2 Authentication

Requirement ID	R4.03.01
Group	Security\Authentication
Description	The system shall provide a mechanism of user authentication to unambiguously identify a user.
Priority	1
Source	
Risk	C
References	

3.4.3 Auditing

Requirement ID	R4.04.01
Group	Security\Auditing
Description	The system shall audit some business activities performed by user. The audit entries must be tamperproof or at least tamper evident and be stored in a secured storage. All audit entries must at least contain: • User name that has performed an action • Time stamp • Action description Activities that are audited: • global events such as logon, logoff, password changes • creation/editing/deletion of user or user role • assigning and reassigning permissions to roles • all security exceptions
Priority	1
Source	
Risk	C
References	R1.07.25

3.4.4 Data transfer

Requirement ID	R4.05.01
Group	Security\Data Transfer
Description	The system shall ensure secure and tamperproofed data exchange between parts of the system and the user. All data send over network (LAN or WAN) must be encrypted[17].
Priority	1
Source	
Risk	C
References	

[17] In real-life project, the encryption mechanism must be defined as well, but this document does not describe it further.

3.5 Hardware

This section defines hardware requirements for the PMS. Hardware requirements represent the minimum physical system configuration on which the PMS runs and fulfils performance requirements. The hardware requirements for mobile devices (handhelds, mobile phones) are omitted in this document, but must be present in a real-time SRS.

Requirement ID	R13.01.01
Group	Hardware\Host system[18]
Description	The server part of the PMS shall be able to run and fulfill the performance requirements on: Dual Pentium 2.8 GHz, 2 GB RAM, 5 GB disk space. LAN bandwidth: 1Gbps[19]; WAN bandwidth: 2 Mbps[20].
Priority	1
Source	
References	3.6 Performance

Requirement ID	R13.01.02
Group	Hardware\Client system
Description	The client part of the PMS shall be able to run and fulfill the performance requirements on: Single Pentium 1.8 GHz, 1 GB RAM, 1 GB disk space. LAN bandwidth: 1 Gbps; WAN bandwidth: 2 Mbps; minumum screen resolution 1024x768
Priority	1
Source	
References	3.6 Performance

Requirement ID	R13.01.03
Group	Hardware\Data storage system
Description	The hardware requirements for the data storage system are out of scope of this document. It is assumed, that the data storage system provides sufficient performance to fulfill the performance requirements of PMS.
Priority	1
Source	
References	3.6 Performance

3.6 Performance

Requirement ID	R5.01.01
Group	Performance\Number of concurrent users
Description	Under the condition that the host system fulfils the hardware requirement R13.01.01, the system shall support concurrent work[21] of at least 200 users that are logged the system. The response time must not exceed the times defined in R5.01.02
Priority	1
Source	
Risk	M
References	R5.01.02; R13.01.01

[18] The breakdown of the PMS into host, client and data storage subsystem is out of scope of this document.
[19] Gigabit per second
[20] Megabit per second
[21] Real-life requirements shall exactly specify a (average) load generated by one user. The document, however, omits this definition.

Requirement ID	R5.01.02
Group	Performance\Response times
Description	Under the condition that the host system and client system hardware fulfill the minimal hardware requirements R13.01.01 and R13.01.02 (particularly bandwidth), the system shall have the following average response time: If the user accesses the system from the local network: • 80% of executions of any function shall be within 3 seconds • 95% of executions shall be within 5 seconds • 100% of executions shall be within 7 seconds If the user accesses the system from the WAN: • 80% of executions of any function shall be within 7 seconds • 95% of executions shall be within 10 seconds • 100% of executions: no requirement The maximal response time must not exceed the average response time by more than 50%.
Priority	1
Source	
Risk	H
References	R13.01.01

Requirement ID	R5.01.03
Group	Performance\Start-up time
Description	Under the condition that the host system fulfils the hardware requirement R13.01.01, the time between initiation of the system startup and availability of full system functionality must be not longer 10 minutes.
Priority	1
Source	
References	R13.01.01

Requirement ID	R5.01.04
Group	Performance\Number of objects
Description	The system shall not have the limitation on the number of projects portfolios, projects, tasks, subtasks, users, user roles, dependencies, resources and other PMS objects. The data storage, however, can limit the size of the PMS database and hence the number of objects. Hence, the number of objects is the matter of database configuration. The data storage limitation is out-of-scope of this requirement.
Priority	1
Source	
References	

Requirement ID	R5.01.05
Group	Performance\Memory consumption
Description	The host part of the system shall consume not more than 800 Mbytes of RAM at any point of time. The average[22] memory consumption must be not higher than 500 Mbytes. The client part of the system shall consume not more than 200 Mbytes of RAM at any point of time. The average[23] memory consumption must be not higher than 100 Mbytes.
Priority	1

[22] Calculated on the basis of 7 days.
[23] Calculated on the basis of 1 day.

Source	R13.01.01; R13.01.02
References	R13.01.01

Requirement ID	R5.01.06
Group	Performance\Disk space consumption
Description	The client part of the system shall consume not more than 1 GB of disk space. The host part of the system shall consume not more than 5 GB of disk space[24].
Priority	1
Source	
References	R13.01.01; R13.01.02

Requirement ID	R5.01.07
Group	Performance\Re-calculation time
Description	Under the condition that the host part and the client part of the system fulfill the hardware requirement R13.01.01, the system shall perform all specified functionality on a project containing up to 1000 tasks within 3 seconds.
Priority	1
Source	
References	R13.01.01; R13.01.02

3.7 Scalability

Requirement ID	R14.01.01
Group	Scalability\
Description	The overall performance (in the terms of 3.6) of the system must grow if more powerful hardware used for host part of the system. It must be possible to run different parts of the system on distributed hardware.
Priority	1
Source	
References	

3.8 Deployment

3.8.1 Installation

Requirement ID	R6.01.01
Group	Deployment\Installation
Description	The installation of the system must be well-defined and well-documented procedure. The experienced system administrator shall be able to install the system within 1 day. The installation must be atomic – either the whole system will be installed successfully or it will not be installed at all. The system shall provide the possibility of unattended installation that can be run automatically. Every step of the installation must be logged into the disk log file. The log file must contain the following information: time stamp, event[25], event description.
Priority	1
Source	
Risk	H

[24] The disk consumption of the data storage subsystem is not meant here.
[25] Event is either installation step or installation progress or warning or error.

References

3.8.2 Upgrade

Requirement ID	R6.02.01
Group	Deployment\Upgrade
Description	The upgrade of the system must be a particular case of the installation and fulfill the same requirements. The upgrade shall preserve all user data: projects, tasks, resources, project portfolios.
Priority	1
Source	
References	R6.01.01

3.9 Maintainability

3.9.1 Warranty period

Requirement ID	R9.01.02
Group	Maintainability\Warranty
Description	The first 6 month of system's usage are covered with warranty.
Priority	1

3.9.2 Bug fixing

Requirement ID	R9.01.01
Group	Maintainability\Bug fixing
Description	"Critical bugs" are defined as errors with severity showstopper and patch. "Non-critical bugs" are defined as errors with severity high, medium and low. The time period from finding a critical bug until it is fixed should on average take no longer than 2 weeks. There has to be a monthly hot fix package release that fixes major critical bugs. Non-critical bugs must be fixed within 2 month after they were found.
Priority	1
Source	
References	

3.10 System

3.10.1 Supported Operating Systems

Requirement ID	R9.01.03
Group	System\Supported OS
Description	The client part of the system shall run on MS Windows 2000, Windows XP, Windows Vista, Linux System with kernel version 2.4 or higher, and Mac OS 9 or higher. There is not requirement for the host part of the system.
Priority	1
Source	
References	

3.11 Design Constraints

R3.01.04

3.12 On-line User Documentation and Help System Requirements

Requirement ID	R10.01.01
Group	Documentation
Description	The system shall provide the on-line user documentation and the help subsystem. The on-line user documentation provides context-dependent help for all user interface functionality. The help subsystem includes the description of all PMS entities and functionality. The documentation shall contain table of contents and index. The user must be able to perform search in both on-line user documentation and help subsystem.
Priority	1
Source	
Risk	H
References	

3.13 Purchased Components

Requirement ID	R11.01.01
Group	Purchased Components\Database
Description	The DBMS for the PMS data storage must be available and provide enough user licensees to ensure full functionality of the PMS.
Priority	1
Source	
Risk	C
References	R1.07.30; R1.07.31

3.14 Interfaces

3.14.1 System interfaces

3.14.2 User Interfaces

Requirement ID	R12.01.01
Group	User Interface\
Description	Under the condition, that the device supports HTML 4.01 standard of W3C.org, the system shall support user interfaces and layouts for: • Common PC • PDA • Mobile phone The system shall be accessible from these devices.
Priority	1
Source	
Risk	M
References	

3.14.3 Software Interfaces

Software interfaces are defined in 3.1.4 Interfaces to external Systems.

3.14.4 Communications Interfaces

Requirement ID	R14.01.01
Group	Interfaces\Communication
Description	The system shall use as communication protocol: • Between host part and client part on common PC[26]: HTTPS protocol • Between host part and client part on mobile device: WAP protocol • Between host subsystems – transport level protocol must be TCP/IP The system shall provide Web service interface for accessing its main functionality[27] from an external system.
Priority	1
Source	
Risk	H
References	

3.15 Licensing Requirements

Out-of-scope

3.16 Legal, Copyright, and Other Notices

Out-of-scope

3.17 Applicable Standards

Requirement ID	R17.01.01
Group	Standards
Description	The system shall use terminology, writing notation, calculation methods and provide any project-management-related functionality according to the standards from Project Management Institute (PIM). Other standards, that can be used (if there are no applicable standard from PIM): • International Project Management Association (IPMA) • ISO 10006:1997 • CPM • CMMI The usage of these standards must be explicitly declared in PMS user interface and documentation.
Priority	1
Source	
Risk	H
References	

[26] Personal computer, that fulfills the requirement R13.01.02

[27] In a real-life SRS, here must be exact definition, what functionality can be accessed through web service interface.

4 Supporting Information

4.1 Index

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