Project Portfolio Management Prototype Application Design

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The management of project portfolio in a company requires the use of specific software, especially when the number of projects is significant. This paper is based on the Methodology for the development of IT projects portfolio management applications research project. This paper presents some of the results of a project portfolio application design.

Keywords: project management, project portfolio management, applications development.

Introduction

Project portfolio management has a high level of importance in project oriented companies in order to achieve the business goals. The project portfolio management has to be supported by software tools that cover various needs of the managers.

Many IT-oriented companies and research institutes from Romania are developing software systems through the projects. The number of projects running at a given time is significant, which leads to difficulties in ascertaining the development stage of certain or several projects and the amount of resources involved in these projects. By organizing the projects in a portfolio, their management becomes a much easier task for the persons in charge, but this should be done only by using specialized software applications.

The objective of the Methodology for the development of IT projects portfolio management applications project is to develop a methodology for building software applications for project management portfolios based on research of the running IT projects inside various organizations. During this research, were analyzed by comparison how the projects portfolio management is done in some companies and organizations from Romania and abroad in order to identify the main characteristics that shall represent the basis of the software system development. The methodology allows the development of classical, distributed and mobile applications for PPM. One of the deliverable of the Methodology for the development of IT projects portfolio management applications project is an application prototype for IT project portfolio management.

This methodology will help in building applications for PM and PPM, applications that could be customized based on the managers and clients’ needs.

The design process

The design phase had the following levels: conceptual design, logical design and physical design (figure 1). The physical design was used for the prototype.

Fig. 1 Design levels and the resulting models

The conceptual model presents the problem from the users and business view, and the problem are define using scenarios. This model identifies the business specifics, user’s activities and requirements. The generated scenarios have to show the requirements
completely and exactly. The clients, users
and other stakeholders are involved in sce-
narios’ development.
The logical model results from the design
team’s view over the problem. The scenarios
defined at a conceptual model are used and
an abstract model of the solution is built. The
abstract model is composed by object and
services, user interface and a logical database
design.
The physical model presents the problem
from a developer point of view. The output
from the logical level is used as input for the
components and user interface specifications
and for the database physical design.
The main objects identified are Proiect, Porto-
foliu and Resursa. Figures 2, 3 and 4 depict
the identified classes’ members.

![Fig. 2 Proiect class](image)

The members of Proiect class are:
- **IDProiect** – the unique id of the project
- **Denumire** – project name
- **Versiune** – project version
- **Buget** – project initial budget
- **Tip** – project type; the type is associated
to IT domain of which the project be-
longs to: software development, mainte-
nance, hardware configuration etc.
- **DataDeInceput** – project start date
- **DataDeIncheiere** – project finish date
  (fixed or estimated)

![Fig. 3 Portofoliu class](image)

**Portofoliu** class has the following members:
- **IDPortofoliu** – portfolio unique id
- **Denumire** – portfolio name
- **TipPortofoliu** – portfolio type; possible
  values for this field are: SW (IT project
  portfolios focused on software develop-
  ment) and HW (IT projects portfolios
  focused on hardware development and
  implementation); portfolio type is used
depending on the organization specific
- **AdaugaProiect()** – methods for adding a
  new project to the portfolio
- **StergeProiect()** – method for the re-
  moval of a project from a portfolio
- **CalculeazaValoare()** – method that re-
  turns the value of a portfolio at a given
date
- **NumarProiecte()** – returns the number of
  projects within the portfolio

![Fig. 4 Resursa class](image)

**Resursa** class includes the following
members:
- **IDResursa** – resource unique id
- **Denumire** – resource name
- **Categorie** – resource type
- **UnitateMasura** – unit of measure
- **PretUnitar** – resource medium price
Figure 6 depicts a sequence diagram that shows how a project is evaluated based on provided criteria. If the criteria are fulfilled, the project is accepted to be included in the portfolio, otherwise the project is rejected. In the same manner where developed the other diagrams.

**Fig. 5** A sequence from class diagram

**Fig. 6** Sequence diagram

**Database structure**

Databases object were designed according to the classes and object identified during the analysis and design phases. All the information about projects and programs has to be stored in database. About every project or program, at least the following information needs to be stored:

- Project name
- Project owner information
- Project managers data
- Company information
- Project type
- Start and finish date
- Investment costs
- Expected profit
- Risks involved
- Current relationships.

Tables 1, 2 and 3 describe the structure of

**Table 1 Resurse table structure**

<table>
<thead>
<tr>
<th>Field name</th>
<th>Type</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>CodResursa</td>
<td>Text</td>
<td>10</td>
</tr>
<tr>
<td>Denumire</td>
<td>Text</td>
<td>50</td>
</tr>
<tr>
<td>IDCategorie</td>
<td>Long Integer</td>
<td>4</td>
</tr>
<tr>
<td>Unitate</td>
<td>Text</td>
<td>5</td>
</tr>
<tr>
<td>Pret Unitate</td>
<td>Single</td>
<td>4</td>
</tr>
</tbody>
</table>

The primary key of Resurse table is CodResursa.

**Table 2 Portofoliu table structure**

<table>
<thead>
<tr>
<th>Field name</th>
<th>Type</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPortofoliu</td>
<td>Long Integer</td>
<td>4</td>
</tr>
<tr>
<td>Denumire</td>
<td>Text</td>
<td>50</td>
</tr>
<tr>
<td>TipPortofoliu</td>
<td>Byte</td>
<td>1</td>
</tr>
</tbody>
</table>

The primary key of Portofoliu table is IDPortofoliu.

**Table 3 Proiecte table structure**

<table>
<thead>
<tr>
<th>Nume câmp</th>
<th>Tip</th>
<th>Lungime</th>
</tr>
</thead>
<tbody>
<tr>
<td>CodProiect</td>
<td>Text</td>
<td>6</td>
</tr>
<tr>
<td>DenumireProiect</td>
<td>Text</td>
<td>50</td>
</tr>
<tr>
<td>Buget</td>
<td>Single</td>
<td>4</td>
</tr>
<tr>
<td>DataStart</td>
<td>Date/Time</td>
<td>8</td>
</tr>
<tr>
<td>DataIncheiere</td>
<td>Date/Time</td>
<td>8</td>
</tr>
<tr>
<td>TipProiect</td>
<td>Byte</td>
<td>1</td>
</tr>
</tbody>
</table>

The primary key of Proiecte table is CodProiect.

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**Fig. 7 Database structure**
Figure 7 shows the database structure and relationships for the prototype application. The database prototype is developed in Microsoft Access and can be exported in other RDBMS.

Conclusions
It is recommended that project portfolio management software to be integrated within the company information system and also with the project management software, in order to transfer data automatically.

The design is based on the following steps:
- project oriented company analysis
- project management processes analysis
- multilevel design.

The methodology uses an object oriented approach having in mind the software development techniques performances that exists today.

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