The Risks of Sharing Informatics Resources in Multi-project Environment

Rafael António Pinto Serina

Instituto Superior Técnico

rafael.serina@tagus.ist.utl.pt

Prof. Dr. Pedro Manuel Sousa

Instituto Superior Técnico

pedro.sousa@dei.ist.utl.pt

ABSTRACT

In this paper we analyze the problem of sharing informatics resources (IR) in a multi-project environment and present a solution. For analyzing the risks of sharing IR we created the process of developing software and deduct the risks of the process in the multi-project environment concerning to sharing IR. In order to solve the problem we use a known representation of IR propose a identification model and a semantic model of sharing IR. This semantic model is incorporate in the identification model. This two models were made to correctly represent the resources and to create a systematical approach to the problem of sharing IR With this model we decrease the probability of occurring problems related to sharing IR. This paper is also a contribution to the reduced number of papers related to multi-project environment.

1. Introduction

Multi-project environment is the life day of an organization. Projects create change, they grow the organization, so they are crucial to them. Project management is a complex discipline and informatics projects cannot set themselves to the normal practices in project management due to its specificities (iterative process, constant technology actualizations,...). Informatics Resources are specific to informatics projects and in the modern organizations, in order to optimize resource usage and others, sharing resource between projects and environments is the rule. Understanding what means sharing resources and what are the risks inherit to it is the focus of this paper.

2. Contextualization

In order to approach the problem we present the main concepts addressed in this work, project management and risk management.

From our research we didn't find related work with our main subject, the sharing of informatics resources in multi-project environment

2.1. Project Management

Project is a planned activity that normally produces a product, service or other result in a well define and finite time and is composed of a series of activities that are progressively and incrementally done.[1]

Project management is the discipline that applies the theories, tools and resource management to guarantee the success of the project.

As Payne [2] showed in his work, projects are mainly made in multi-project environment. This environment is as more problems than the management of single project because if the interdependencies an interconnections that the projects can have between them.

2.2. Risk Management

Risk management can be divided in two big groups, project risk management and operational risk management.

For this work the relation between this two contexts is important, since the Informatics Resources are normally shared between the two environments.

In the literature the concept of risk is not consensual, and there are several definitions of it. Most of them are similar. For our work, the most appropriated definition is presented in the PMBOK: "*An uncertain event or condition that, if it occurs, has a positive or negative affect on a project's objectives*"

The risks in multi project environment, as related to the superior complexity of managing multiple projects, is bigger.

3. Software Development Process

In order to start a systematic study about the problem of sharing informatics resources we created a business process that could represent the normal sequence of project management, and then, applying the concepts of the work of Muehlen and Roseman [3] we defined some of the risks inherited from sharing informatics resources in multiple project environment.

The normal phases that a project has are:

- Initiation of project
- Planning
- Execution
- Monitoring and Controlling
- Closing Project
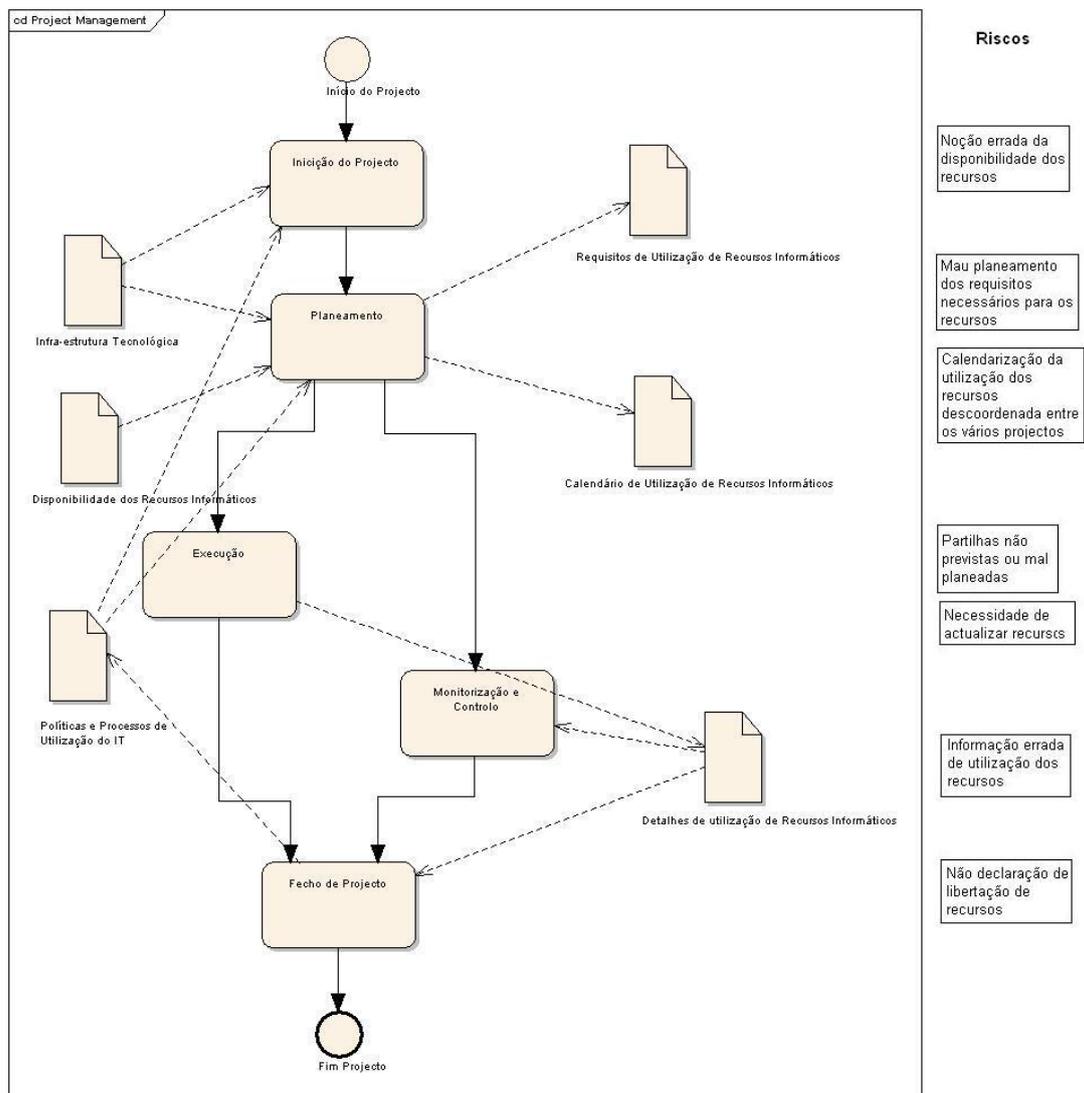
1 Project Management Business Process with associated risks

In all of this phases the informatics resources and the information about them are used in many different ways.

To considered the beginning of a project is very important to know the availability of the resources, and if there isn't a effective control of resources this can produce problems.

When planning the project and executing the project the risk factors of sharing some informatics resource that wasn't meant to be shared can kill a project

In the first illustration we show the business process that we've design and the some of the related risks associated to sharing informatics resources .

4. Informatics Resource Management in Multi-Project Environment

Our work as been showing the need of having a systematic approach to manage informatics resources when we are facing multi-project environment.

There is the need of having a unique language referring to informatics resources for better management.

In order to create that language we need to know how to define an informatic resource.

We've create a model, base on the configuration management discipline, to give a unique entity to each resource.

Our Identification Model has the following attributes:

- Unique Identifier
- State
- Resource Type
- Specific Attributes

The unique identifier it's essential to dissipation of errors related to identification.

The state refers to the state of the resource for the resource to be auditable. An example of a state is operational, tested...

To the resource type we used the work of André Vasconcelos [4] where he defines inside the technological architecture (illustration 2) a specification of informatics resources types:

- Tipo de Recursos:
  - IT Infrastructure Block
    - Network
    - Peripheral

- Specific Device
- Mobile Device
- Personal Computer
- Server
  - IT Platform Block
  - IT Application Block
    - IT Module Block
    - IT System Block
    - IT Component Block
      - IT Presentation Block
      - IT Logic Block
      - IT Data Block
      - IT Coordination Block
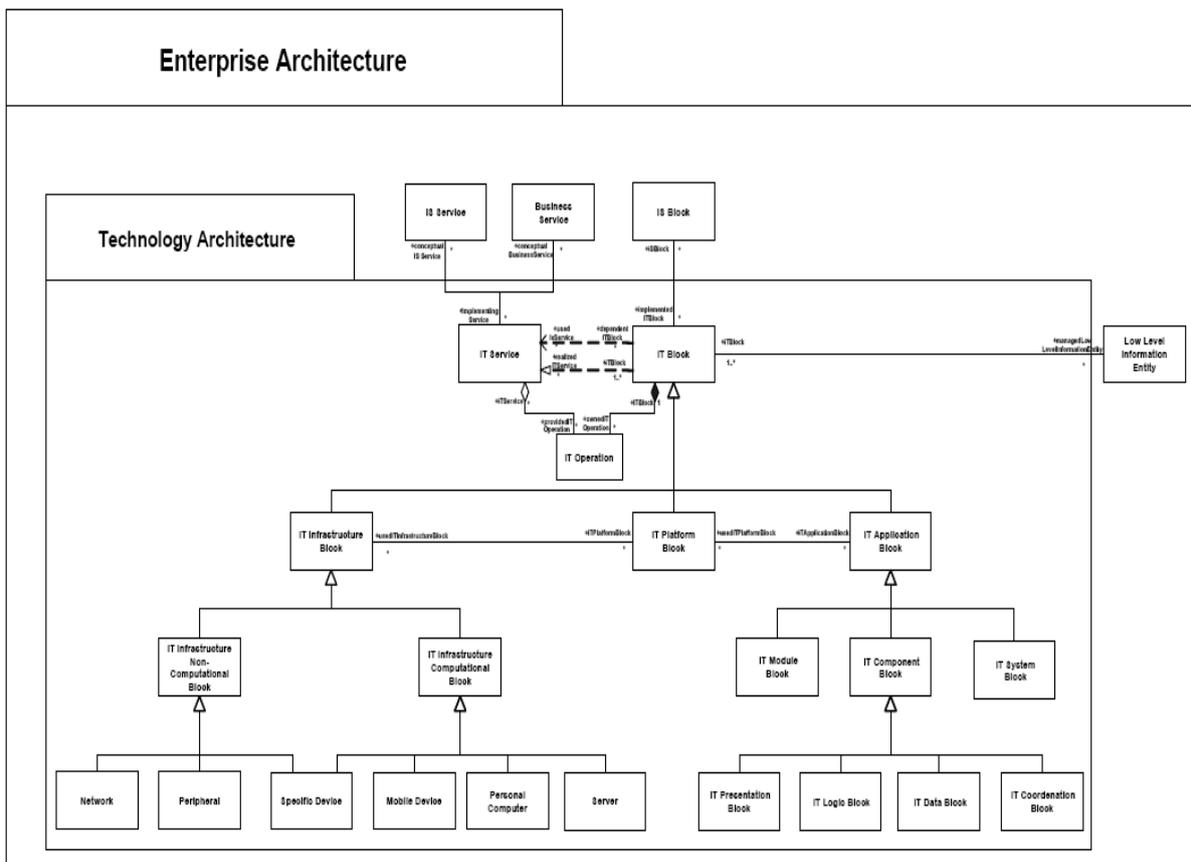
2 Technological Architecture

4.1. Sharing Semantic Model

After designing the identification model we studied the model that could prevent errors in the act of sharing informatics resources.

The base of the model (Illustration 3) was the division from physical and non physical resources.

Depending on this division there can exist different ways to solve the problems created by sharing resources.

Physical resources, in terms of sharing, have the physical limitation. There can't be two persons using the same computer, physically speaking, at the same time without knowing it.

So the problems of sharing physical can be considered analog to human resources.

Today's tools resolve this problem by using an utilization rate of the resource. One problem that can occur too is the need of the resource to be update, so in terms of sharing physical resources we have to consider if the resource is going to be update or not.

The non physical informatics resources have more complex problems. They can virtually be shared by everyone, because they don't have physical limitation. As an example, we can see the usage of a database.

So, in terms of sharing, we empirically found 3 states that can solve a big part of problems related to share.

The first is Share, this is the normal state of a resource, he can be shared by everyone without problem, like accessing a database in mode read-only.

The second is Actualization. This state signalizes that a resource is going to suffer an actualization and if other projects that use that resource has to understand the implication of that actualization in their projects.

The third one is Exclusive. This concept was taken from database concept isolation, where when you need to write data, you have to access the database exclusively to don't became with dirty data.

This model don't solve all problems in sharing resources but can make some projects not to delay or fail.

The model is resumed in illustration 3.
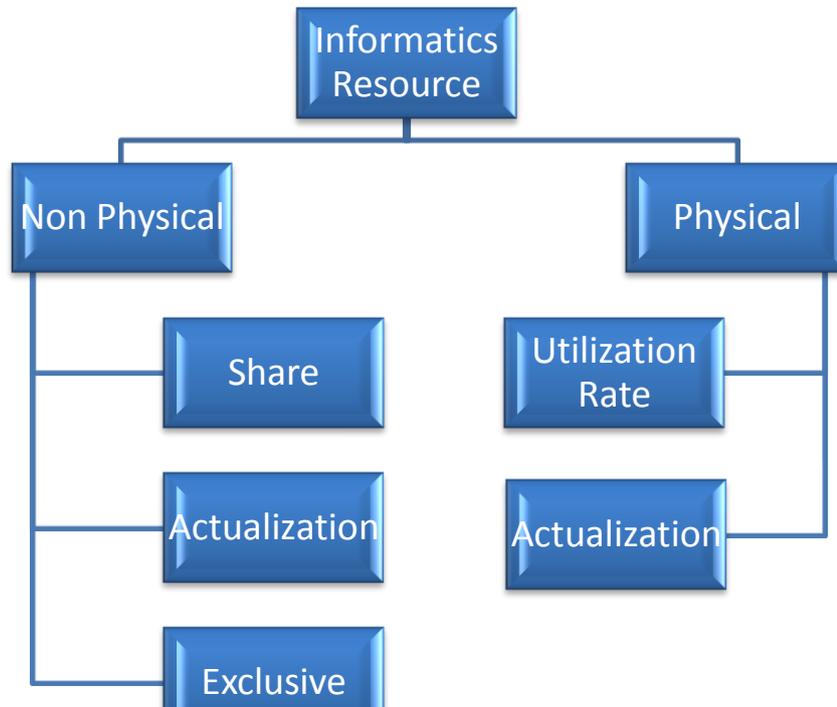
3 Informatics Resource Sharing Semantic Model

Having this model and the identification model it's only missing the temporal problem. We now can define how the resource is going to be shared but we don't know when. To solve this problem we apply the normal concepts that exist in all project management tools used to manage human resources.

So we can make a unique general model as:

- Unique Identifier
- State
- Resource Type
- Specific Attributes
- Temporal Usage Description
  - Time
  - Owner
  - Type of Sharing

Owner is a task of some project and the type of sharing is taken from the semantic sharing model.

5. Validation

To validate our work we used the work of Suh and Han[5], where they use the mathematical expression (1), to calculate the risk associated to informatics resources.

$$ALE_{ij} = (RC_{ij} + IL_{ij}) \times P_j \quad (1)$$

ALE_{ij} is the extra expense expected to resource i if risk j happens.

RC_{ij} is the cost of replacing the resource i due to j.

IL_{ij} is the lost of money related to the having problems with resource i due to j.

P_j is the probability of risk j to happening.

From our work we didn't find any systematic model to address the problem sharing multiple resources in multi-project environment. Suh and Han[5] say that the probability of some risk to became real grows if there is no effective control system of that risk.

So the probability of the risk of sharing models is lower when our model is put in practice, so we can reduce the values of ALE_{ij}.

6. Conclusion

With this work we studied the implications of sharing informatics resources un multi-project environment and presented a model to solve the problems related to that.

In order to do that, and because we didn't find any work related to this subject we had to prove that the risk was a reality by analyzing the process of managing a project and seeing where the resources were used and what kind of risks existed associated to them.

After defining the risk we showed the models that can identify and solve a big part of the problems related to sharing of informatics resources and show how validation.

The model doesn't resolve all the problems of sharing but it's a first study in this subject, and one more study in multi-project environment that still has few studies comparing to single project management.

7. References

1. PMBOK – Project Management Body of Knowledge 3.0, PMI Project Management Institute. http://www.pmi.org

2. J. H. Payne, *Management of Multiple Simultaneous Projects: A State-of-the-Art Review*, ELSEVIER, 1995

3. Michael Muehlen & Michael Rosemann, *Integrating Risks in Business Process Models*, Stevens Institute of Technology & Queensland University of Tecnhology, 2005

4. André Vasconcelos, *Arquitecturas dos Sistemas de Informação: Representação e Avaliação,* Tese de Doutoramento - Instituto Superior Técnico, 2007

5. Bomil Suh & Ingoo Han, *The IS risk analysis based on a business model,* ELSIVIER, 2002

6. http://www.egroupware.org/