1 Related Works

Some works related with service-oriented development have presented that the impact of the service-oriented computing paradigm, the quality garantees on software development and the way in which systems can be constructed have been growing up, however there are still few approaches facilitating software development based on non functional properties, specially on web service oriented development. In spite of the variety of tools, there is not (yet) a consensus on a software process methodology for web services, spite a large amount of work already published on the subject [15, 14, 9, 12, 4, 16, 5]. In order to develop and use such a methodology, it is of paramount importance to provide adequate descriptions of its expected capabilities and competences.

Works that are directly related to this can be classified into two types: (*i*) that works that propose new approaches for non functional propoerties garantees; and (*ii*) those works proposing service-oriented development methodologies for the whole development process.

The proposal made by [6] proposes *Design by Contract* for web services, that means the specification os contracts for web services on different levels of representation contracts. It is possible to describe three levels for specifying contracts and are them: *implementation level, XML level* and *model level.* Design by Contract applied to web services allow verification services web through the use runtime checkers, before the depployment, such as *jmlrac* [7], adding behavioral information to the specification of services. These behavioral data are described by JML [7], for example.

CDL (*Contract Definition Language*) [9] is a XML-based description language, whose purpose is to describe contracts for services. The development based on CDL offers an architecture framework, design standards and methodology [11, 8, 10, 12], that can be easy understood and applied to the development of real applications. The greatest difficulty encountered in the use of CDL is that the language only represents contracts for services. Its specification is generated after several B [1] machines refinements that describe the services and their compositions.

Papazoglou *et al* [15] propose a methodologie that is based on the SOA extension. This work defines a service oriented business process development methodology with phases for business process development. The whole life-cycle is based on six phases, they are: planning, analysis and design, construction and testing, provisioning, deployment, and execution and monitoring. This proposal has as focus only the development phase and does not define specific development models, however describes the activities sequence needed to services develop.

IBM proposes a methodology for the development of SOA solutions, called SOMA [2]. SOMA defines a life-cycle with seven phases: business modelling and transformation, solution management, identification, specification, realization, implementation and deployment monitoring and management.To assist the SOMA development is necessary to use the tools proposed by IBM, which makes the process very expensive for the dependence of these tools.

Sommerville [17] describes some key points that must be followed for this type of development, these are:

1. Services-oriented software engineering should be based on the notion of programs that can be constructed by composing independent services encapsulating reusable functionality;

2. Service interfaces are defined in WSDL. The WSDL specification includes a definition of interface types and operations;

3. Services can be classified as public utilities, business services or coordination services;

4. The service engineering process involves identifying services candidates, service interface and implementation definition, testing and deployment of each service;

5. Service interfaces can be set from software systems legacies that can be reused in other applications;

6. Software development that uses services involves creating programs for composing and configuring services to create new composite services;

7. Business process models define the activities and information exchanged in a business processes. Activities in business process can be performed by services so that the model of business process represents a composition of services.

Based on [17], service-oriented projects, in the context of Service-Oriented Architecture (SOA), are more complex than the software projects in general because they require, in most cases, component reuse, a larger team and, a more complex and logistical process for distributed development. Allied to this, SOA projects are not well defined, and often, the system vision is not clear in its design/specification level.

Unlike the works presented, the main contribution of our proposal is the methodology description together with model representations in three levels (CIM, PIM and PSM) for the design and development of distributed applications that can be reused and that are safe. Allied to this there exists a specification language for service composition and contracts, called PEWS-CT [13]. This work is an extension of SOD-M [3] with the definition of non functional properties models for the service composition oriented modeling.

2 Statements

The research questions that guide our research are intimately related with the spirit of classic software engineering, specifically the definition of a method for non functional properties-based distributed applications development. We also have in mind the application of the concept related with model driven development. There is a need to develop a proper model for these emerging technologies to reduce developing costs and to produce flexible and adaptable services based on quality properties. Therefore, we must ask the following:

1. What the elements that make the development of web service applications different from traditional software development?
2. Is it possible to define a methodology for web service application development that is based on non functional properties requirements?
3. Is it possible to define a language to specify composition constraints and contract restriction for web service?
4. How to verify web services contract restrictions at runtime?
5. It is possible to summarize all the development through models?

Therefore, we will defend the following concepts:

"*Developing applications that use compositions of services from a methodology for this purpose and which is based on non functional properties assurance requirements, can provide a better development and outcome. Allied to this, a method based on MDD / MDA can provide a better reuse of applications and models. Finally, a specification language that expresses web service composition and its constraints can help further the development.*"

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