eDoc: a documentation tool for UML based models

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ABSTRACT

The last few years have produced many improvements in software development methodologies and modeling languages. The use of Unified Software Development Process, Unified Modeling Language and Object Oriented languages has proved to be a step forward for every developer who works hard to deliver a good software. However, there is still a lot to do in terms of tools. There are already many good CASE tools as far as drawing is concerned. But it is hard to find one where drawing and documentation can be done consistently and integrated, as they should be. eDoc is a tool which can be integrated with traditional CASE tools in order to provide: visibility over the relationships among model elements, support for requirements capture, explicit linking between requirements and its correspondent use cases, use of templates for documentation, a way for the stakeholder to access the documentation, single glossary and finally consistency between diagram and document.

1. Motivation

CASE tools are often very useful when someone needs to draw diagrams but are not well suited for documentation purposes. That is a real problem since processes are always involved and should be properly documented. Most of the tools do not offer a good support for documentation so the developer faces himself using a word processor to document the processes which, along with the weakness of many CASE tools, leads to issues such as:

- Relationships among model elements are not properly nor easily described;
- Most of the tools do not have support for requirements, although requirements lead to use cases and are the starting point for the software development process. So the developer should know which use cases derive from a given requirement so that, if the requirement changes the developer knows precisely which use cases should be revised;
- It is recommended to use templates while documenting the project in order to make developer's life easier and to be sure that important questions are always answered;
- The stakeholder should have access to the project documentation as it is written so that he or she can always review it and give feedback to developers. The best way to do so is to allow the shareholder to use the same tool the developer uses to document the project. It would be even better if all the information could be accessed through a web browser, since web browsers have become a kind of universal interface that everyone can use easily;

- All the developers should access a unique document in order to guarantee its consistency;
- The developers should also have a single glossary to avoid misunderstandings among them;
- The document must be fully consistent with the diagrams drawn in the CASE tool;

2. Proposal

It was decided to create a tool that would solve some of the related problems. As said before, object oriented modeling tools offer limited support to documentation. Their concern is towards the model's graphic design.

It is important to make it clear that eDoc is not an object oriented modeling tool based on UML, as *Rational Rose* and *Fast Case* (SCHMITZ, 1999) are. It is a complementary tool. So the developer uses these modeling tools to create his model and then uses eDoc to document it.

Inside Rational Rose, some important information, as use case scripts, exceptions and preconditions are documented as one single big block of information, in the "documentation" field. They are not separated pieces, as they should be, so it is not clear to the developer what he or she should document in this field. Using eDoc, instead, the developer can use templates to document use cases as well as other model elements.

Using eDoc, the lack of integration between related information is reduced, since the developer can take advantage of its navigability and its integration with the modeling tool. With its integration, any modification in the model can be reflected in the documentation and vice-versa.

Moreover, it is possible to create requirements and to relate them with their use cases; add items to a project's glossary; add users, teams and projects; relate users and teams, teams and projects and users and projects.

3. Objectives

The main objectives of this work are listed below.

1) Develop an open architecture easy to integrate with any Object Oriented Modeling Tool based on UML. Anyone willing to integrate eDoc to any of these tools is able to do so;
2) Validate the benefits and functionalities that eDoc may offer to the developer, by developing an integration unit with Rational Rose;
3) Evaluate how hypertext may support software engineering, from the requirements elicitation to the maintenance, by using a web environment.

4. Scope

In this first version only the Use Case View and the Logical View from the UML have been considered.

A client-server application is provided to make possible the migration of a Rational Rose's model to eDoc and vice-versa. The user enters the model filename (.mdl) and path. This file is copied to the server so that the migration may be executed. In the next version, that is being developed, this task will be performed on the web, so this application will be obsolete.

eDoc converts Rose diagrams in GIF images, so that they may be accessed in the system on the web. However, one cannot change the diagrams using eDoc. It is necessary to use the modeling tool to do so. Several projects may be created in the system. Each one references a file generated in the CASE tool which represents the model itself. It is also possible to define users and teams who have access to each project. The users might input information in the system or they might have read-only access. The glossary is rather simple. It basically allows someone to enter new terms and their respective explanations.

5. Results of eDoc's Use in Real Projects

eDoc was used in three real projects since it is release on August 2000. The first one was named SIRA ("Sistema Integrado de Registro Acadêmico" or Academic Enrollment Integrated System) and has been developed at NCE/UFRJ.

The others were developed at Medidata Informática SA, a Brazilian software development company based in Rio de Janeiro. One was a virtual marketplace that connects small and medium retailers with their suppliers. The project has been born as the result of a doctorate thesis at FEA/USP. The other was a connection speed verification system, requested by a telecommunication company.

In both cases eDoc has proved to be an important tool leveraging more speed of development, better understanding of the system, consistency throughout all steps of the project and very easy to use. Despite its success relevant problems have been detected as well and will be fixed in future versions: lack of stereotypes, some model elements and some diagrams which are also part of the UML, but have not been implemented in eDoc; security has been addressed poorly, so there are important security flaws; versioning is also extremely desirable and has not been implemented yet.

6. eDoc X Other Tools

This section will compare eDoc to other tools that support documentation.

1) JavaDoc: Provides automatic Java code documentation. A Java class specially commented through JavaDoc may be submitted to an interpreter, that will generate an HTML document file.

   It is poor because it only documents the code.
2) Rational Rose: Provides a simple documentation, in a textual field, for its model elements. It may generate two document formats: .doc or static HTML (through its Web Publisher Tool).

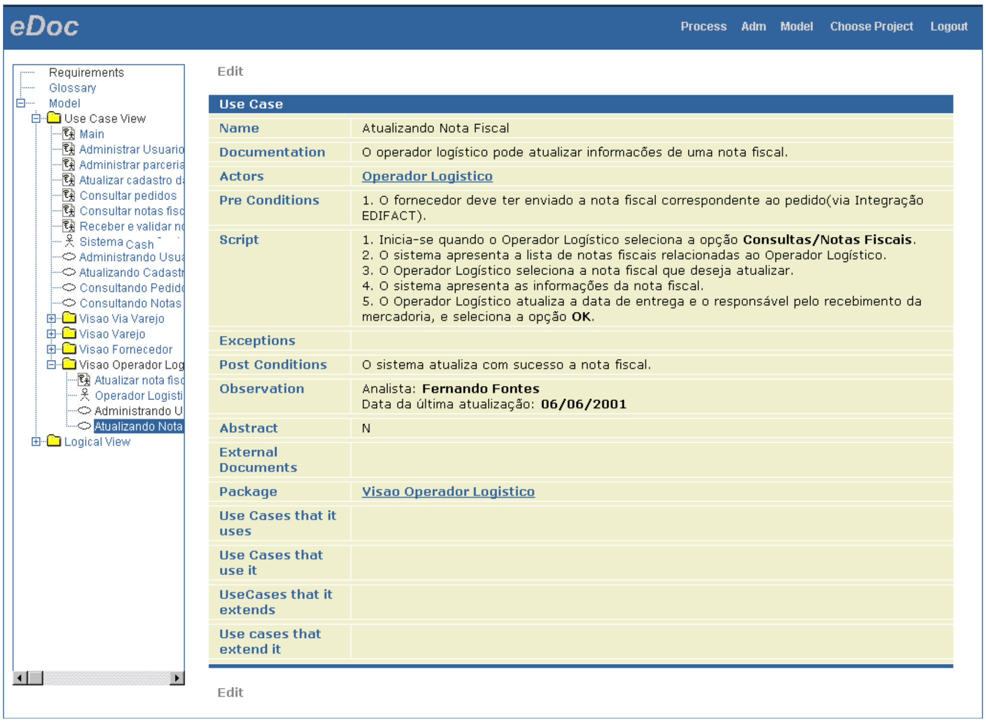
   Once Rose does not support requirements, it cannot support its documentation, or relate it to their derived use cases.
3) Fast Case: Its documentation is similar to Rose's, although it only generates HTML files.

As seen above, existing tools' documentation is restricted. JavaDoc documents Java code and Rose and Fast Case document the model. On the other hand, eDoc has a wider scope:

supports requirements documentation and use cases scripts, for instance; emphasizes navigability, once one can easily navigate through model elements associations; etc.

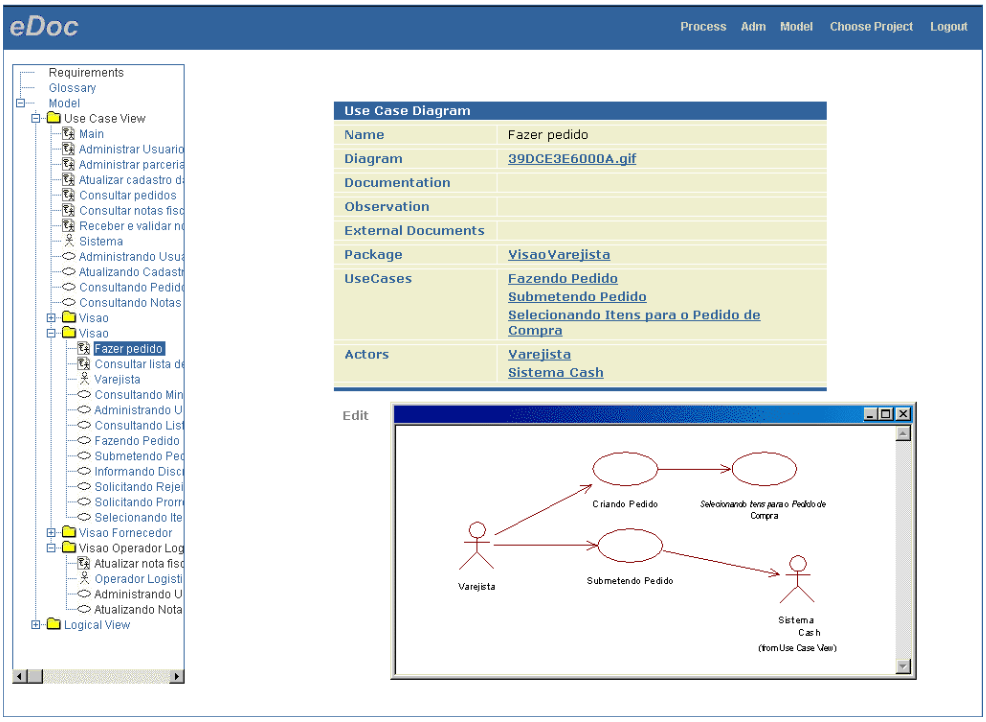
The conclusion we come up with is that we cannot compare eDoc to the existing tools, because they have different proposals and scopes.

7. Screen Snapshot



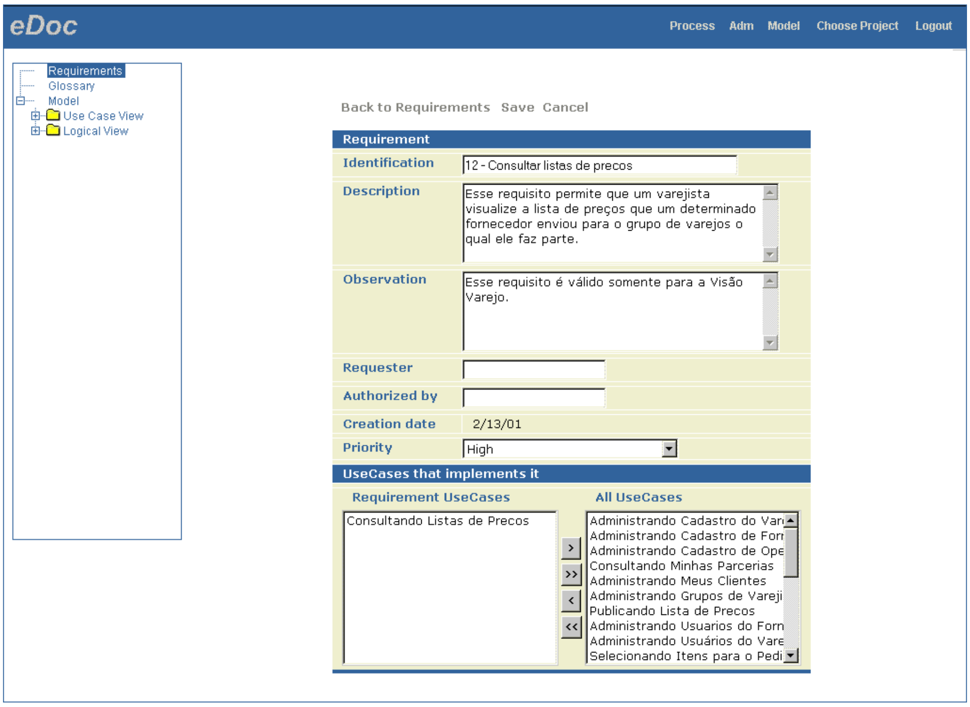
Use Case	
Name	Atualizando Nota Fiscal
Documentation	O operador logístico pode atualizar informacões de uma nota fiscal.
Actors	Operador Logistico
Pre Conditions	1. O fornecedor deve ter enviado a nota fiscal correspondente ao pedido(via Integração EDIFACT).
Script	1. Inicia-se quando o Operador Logístico seleciona a opção **Consultas/Notas Fiscais**. 2. O sistema apresenta a lista de notas fiscais relacionadas ao Operador Logístico. 3. O Operador Logístico seleciona a nota fiscal que deseja atualizar. 4. O sistema apresenta as informações da nota fiscal. 5. O Operador Logístico atualiza a data de entrega e o responsável pelo recebimento da mercadoria, e seleciona a opção **OK**.
Exceptions	
Post Conditions	O sistema atualiza com sucesso a nota fiscal.
Observation	Analista: **Fernando Fontes** Data da última atualização: **06/06/2001**
Abstract	N
External Documents	
Package	Visao Operador Logistico
Use Cases that it uses	
Use Cases that use it	
UseCases that it extends	
Use cases that extend it	

This snapshot demonstrates a use case template as well as the tree model through which the user accesses the model elements of the project. This tree model is very much like Rose's. If the user has the appropriate access right, he or she can edit the use case.



Use Case Diagram	
Name	Fazer pedido
Diagram	39DCE3E6000A.gif
Documentation	
Observation	
External Documents	
Package	VisaoVarejista
UseCases	Fazendo Pedido Submetendo Pedido Selecionando Itens para o Pedido de Compra
Actors	Varejista Sistema Cash

This snapshot demonstrates a use case diagram template. If the user click on the gif link, eDoc will show a popup window with the diagram picture.



Requirement

Identification	12 - Consultar listas de precos
Description	Esse requisito permite que um varejista visualize a lista de preços que um determinado fornecedor enviou para o grupo de varejos o qual ele faz parte.
Observation	Esse requisito é válido somente para a Visão Varejo.
Requester	
Authorized by	
Creation date	2/13/01
Priority	High

UseCases that implements it

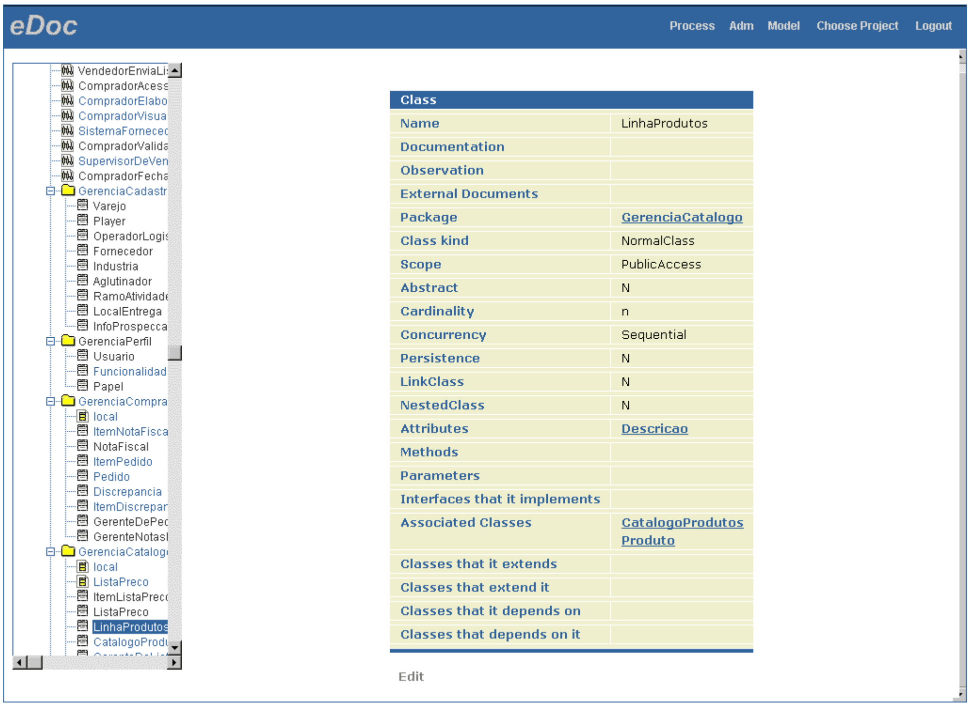
Requirement UseCases

Consultando Listas de Precos

All UseCases

Administrando Cadastro do Var
Administrando Cadastro de Forr
Administrando Cadastro de Ope
Consultando Minhas Parcerias
Administrando Meus Clientes
Administrando Grupos de Vareji
Publicando Lista de Precos
Administrando Usuarios do Forn
Administrando Usuários do Vare
Selecionando Itens para o Pedi

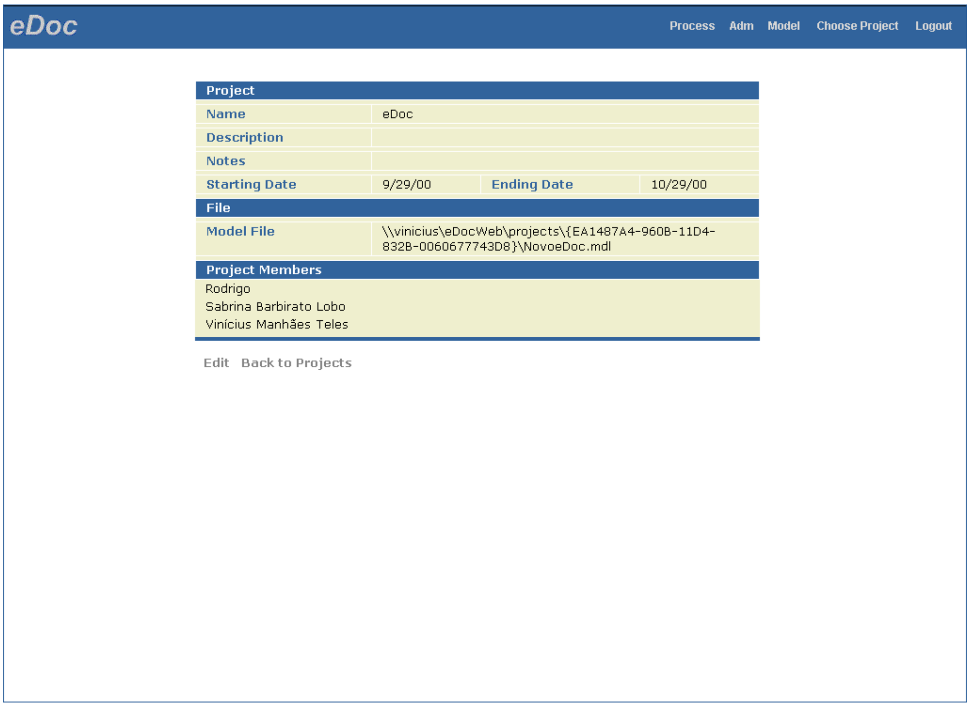
This snapshot demonstrates a requirement template in the edit mode. The user can relate the requirement with the use cases that implements it. In the right box, there is a list of all uses cases, and in the left box, there are all use cases related to that specific requirement.



Class

Name	LinhaProdutos
Documentation	
Observation	
External Documents	
Package	GerenciaCatalogo
Class kind	NormalClass
Scope	PublicAccess
Abstract	N
Cardinality	n
Concurrency	Sequential
Persistence	N
LinkClass	N
NestedClass	N
Attributes	Descricao
Methods	
Parameters	
Interfaces that it implements	
Associated Classes	CatalogoProdutos Produto
Classes that it extends	
Classes that extend it	
Classes that it depends on	
Classes that depends on it	

This snapshot demonstrates a class template. The user can easily navigate throw its related interfaces and classes by clicking on the links.



Project			
Name	eDoc		
Description			
Notes			
Starting Date	9/29/00	Ending Date	10/29/00
File			
Model File	\\vinicius\eDocWeb\projects\{EA1487A4-960B-11D4-832B-0060677743D8}\NovoeDoc.mdl		
Project Members			
Rodrigo Sabrina Barbirato Lobo Vinícius Manhães Teles			

This snapshot demonstrates a project template. When in edit mode the user may select which users will be member of the project.

8. Bibliographic References

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SCHMITZ, E. A., SILVEIRA, D. S. **Metodologia Rápida para Desenvolvimento de Sistemas Orientados a Objetos Utilizando Delphi** , 1999.

WINBLAD, A. L., EDWARDS, S. D., KING, D. R. **Object-Oriented Software**, Ed. Addison-Wesley, 1990.