The Research on Relationships Among The Developers in Cooperative Software Development

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1 Background and Purpose

In the cooperative software development, the developers have to produce artifacts according to the predetermined development process. Rational Unified Process(RUP) used widely in the world is a kind of artifact-centered development process.RUP has three basic axioms. They are "use case driver","architecture centric" and "iterative and incremental".

Our experiences make it confirmed that not only the process for producing the artifacts but also the communication among the developers is important for the software development.Athough the population of RUP,there aren't any discussions in it.

By talking about the communication path,the organizational patterns by J.Coplien become a family of patterns that can be used to shape a new organizaion and its development processes.In this paper,I define a process model supporting the communication and artifact production by combining RUP and organizational patterns by J.coplien.

2 The Combination of RUP and Organizational Patterns by J.Coplien

In order to combine RUP and Organizational Patterns by J.Coplien,we analyze the basic concepts(role and communication) of Organizational Patterns by J.Coplien. The pattern5(Form Follows Function) tells us that group closely related activities and name the abstractions resulting from the grouped activities,making them into roles. The pattern26(Shaping Circulation Realms) tells us that proper communication structures between roles are key to organizational success and communication follows semantic coupling between resposibilities.

Fortunatly,RUP also uses the concept of role.In orde to make the concept of role of RUP clear,We abstact the roles of RUP.We find that the role of RUP consists the developer who works as this role and a group of related activities.So we think it's possible to combine RUP and Organizational Patterns by J.Coplien with the roles.

In order to combine RUP and Organizational Patterns by J.Coplien with the roles,we define a Role Management Model of RUP by analyzing all the roles of RUP. In this model,We divide the roles of RUP into six groups.They are System Engineer,Architect,System integrator,User Interface designer,Use Case Engineer and Component Engineer.By analyzing the relationship among the artifacts produced by the roles of RUP,we define three kinds of relationships among the roles. They are realization,reference,traceability.

By comparing the activities of roles,we combine the RUP and Organizational Patterns by J.Coplien.The result is that pattern13 combined with architect of RUP, pattern11 combined with usecase engineer of RUP,pattern11 combined with component engineer of RUP,pattern19 and pattern18 combined with test designer of RUP, pattern19 combined with test engineer.

With these combinations,we define the communication paths among the roles of RUP.

3 Process Model

The process model is based on team structure model by Koichiro Ochimizu.

Artifact activities and communication are merged by this process model.In order to define the personal responsibility,the role is also used in this process model. The roles appearing in this process model are System Engineer,Architect,System integrator,User Interface designer,Use Case Engineer,Component Engineer, Project Manager and Customer.The activity will be devided into two types,artifact related activity and communication related activity. The artifact related activities are defined with the artifact activities of RUP and communication related activities are defined with the communication paths found before.

The communication path object is composed of roles and sematic.The sematic is defined by the operation on the artifacts.

4 Validity Verification

We verify the validity of the process model defined before by a simple sample in the book named "The Unified Software Development Process". The sample in the book become a inpout to the process model and we compare the artifacts produced by the process model and result in the books. There are nearly no defference between these two results.But the test case will be designed when the use case is being designed by our process model. we consider that carrying out the test design benefit the software development.

5 Conclusion and Future Works

In this paper,I define a process model supporting the communication and artifact production by combining RUP and organizational patterns by J.coplien. At first,we analyze the RUP with the basic concept(role) of organizational patterns by J.coplien.Then we merge the communication into RUP.Finally,We define a process model whose responsibilities consists communication related activity and artifact related activity.

As future work,the process model will be used by a software development team to improve the accuracy of it.