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A CMMI-based automated risk assessment framework

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A CMMI-based automated risk assessment framework

Abstract

Risk assessment is crucial to the increase of software development project success. Current risk assessment approaches provide only a rough guide. Risk assessment experts and domain experts are required in conducting risk assessments in software projects. Therefore, traditional risk assessment approaches require extra activities besides development tasks, and possibly leading to extra costs. We believe that an effective risk assessment approach should be transparently embedded in software development process. This paper aims to present an automated risk assessment framework using CMMI and risk taxnomy as a guidance to develop a risk assessment model. A pragmatic approach will be applied as a basis in building this suggested risk prediction model and the case studies of our practice. These studies are considered as our proof of concept.

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A CMMI-based automated risk assessment framework

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Introduction

- Risk Assessment – crucial to success
- Success rate was below 30% (1996-2004)
- Low quality of risk assessment leads to project failure
- Traditional risk assessment process
  - Risk identification
  - Risk analysis
  - Risk prioritization

- Current risk assessment
  - Only provides a rough guide
  - A lot of effort from experts
  - Involves extra activities which lead to extra costs

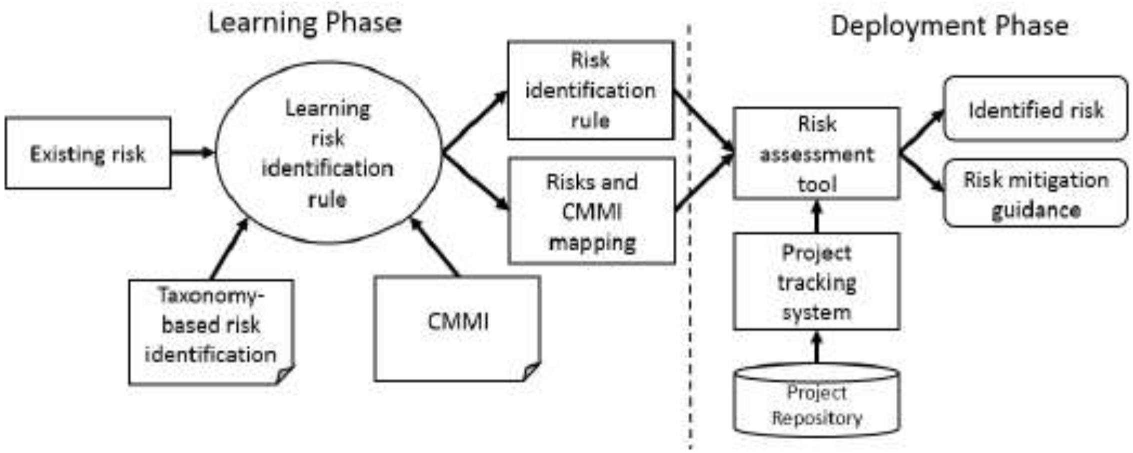
Aims

- An effective and practical risk assessment framework
- An automated assessment tool to avoid subjective judgments
- Using Capability Maturity Model Integration (CMMI) approach

Proposed Framework

- Assumptions
  - Risk is a probability of loss
  - Risk is related to the quality of software development process
  - Cost and effort could be minimized
- Step-by-step procedure
- Using data collected from a project tracking system

Conceptual Framework



- Two main phases
  - The learning phase
  - The deployment phase

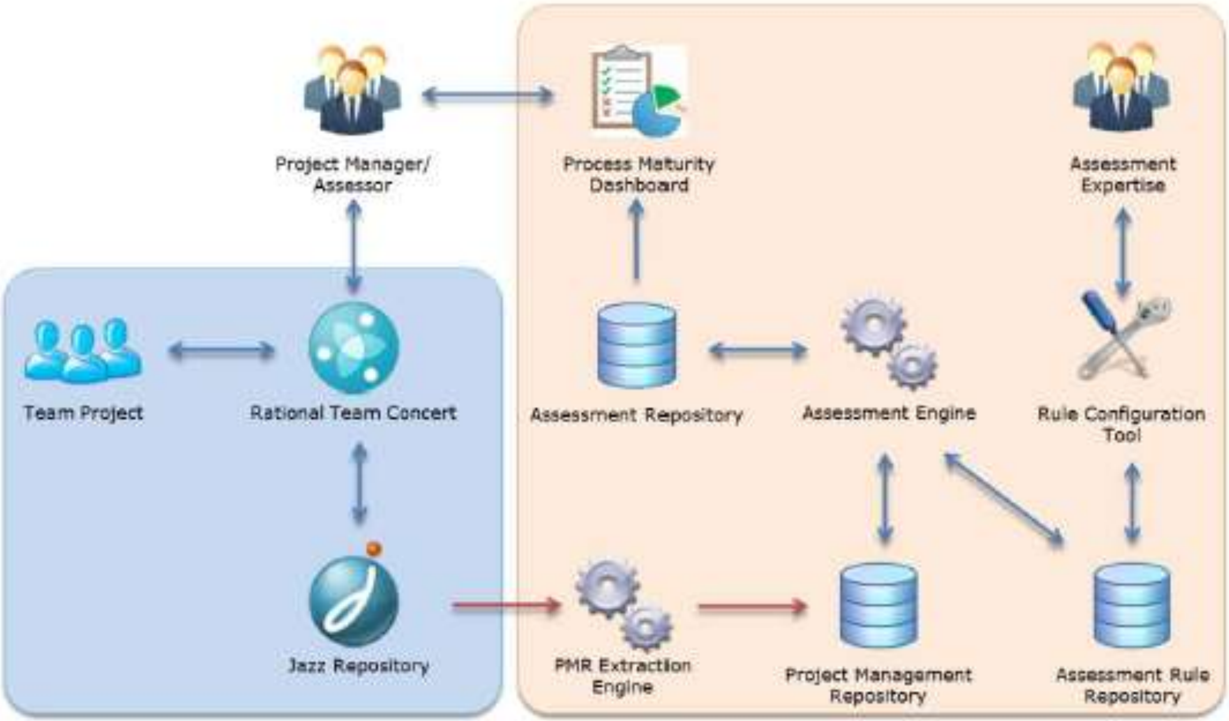
The Learning Phase

- Step 1: Study existing risks
- Step 2: Identify risk taxonomy
- Step 3: Identify the best practice
- Step 4: Derive the risk identification rule

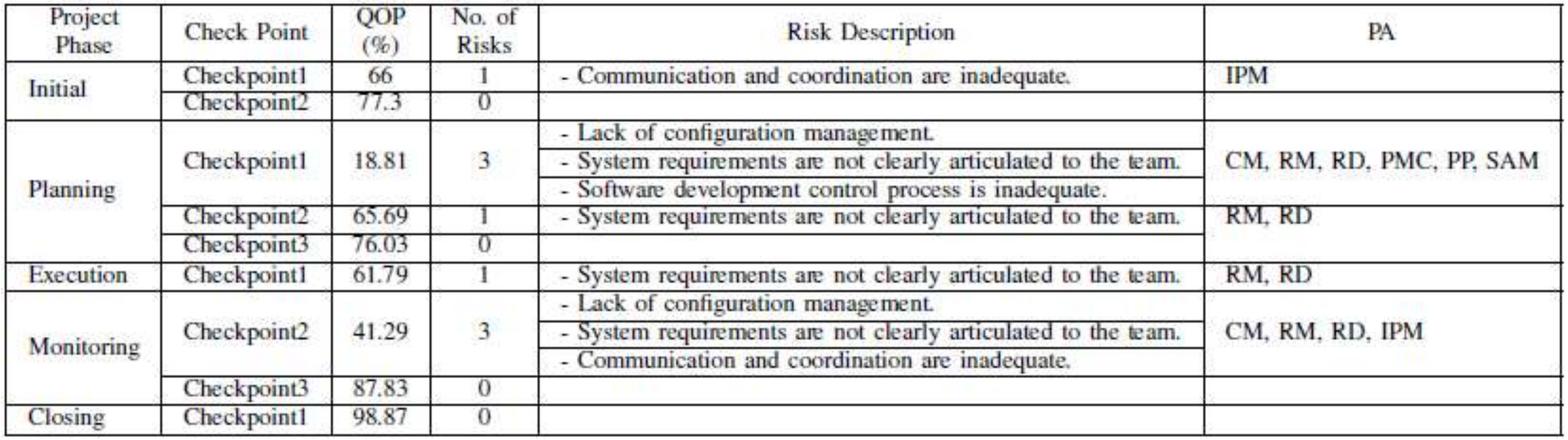
The Deployment Phase

- Step 5: Deploy the risk identification rule
- Step 6: Assess risks in current projects

Architecture

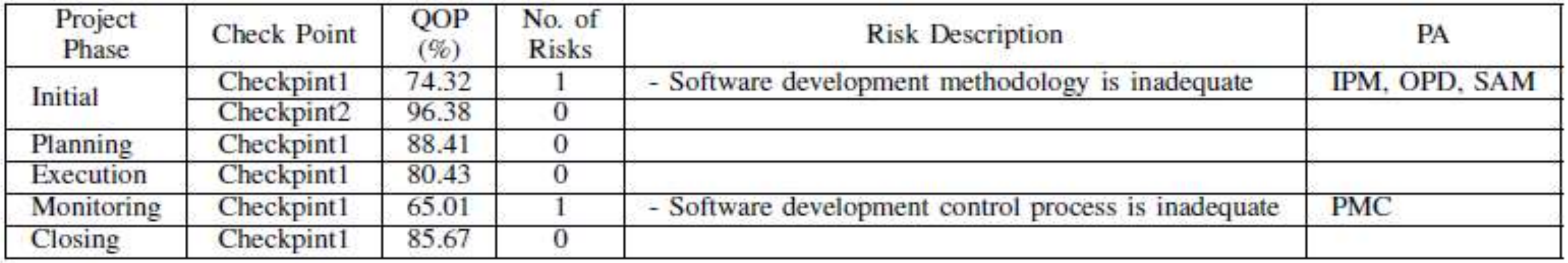


Evaluation



Project Phase	Check Point	QOP (%)	No. of Risks	Risk Description	PA
Initial	Checkpoint1	66	1	- Communication and coordination are inadequate.	IPM
	Checkpoint2	77.3	0		
Planning	Checkpoint1	18.81	3	- Lack of configuration management. - System requirements are not clearly articulated to the team. - Software development control process is inadequate.	CM, RM, RD, PMC, PP, SAM
	Checkpoint2	65.69	1	- System requirements are not clearly articulated to the team.	RM, RD
	Checkpoint3	76.03	0		
Execution	Checkpoint1	61.79	1	- System requirements are not clearly articulated to the team.	RM, RD
Monitoring	Checkpoint2	41.29	3	- Lack of configuration management. - System requirements are not clearly articulated to the team. - Communication and coordination are inadequate.	CM, RM, RD, IPM
	Checkpoint3	87.83	0		
Closing	Checkpoint1	98.87	0		

Case study 1



Project Phase	Check Point	QOP (%)	No. of Risks	Risk Description	PA
Initial	Checkpint1	74.32	1	- Software development methodology is inadequate	IPM, OPD, SAM
	Checkpint2	96.38	0		
Planning	Checkpint1	88.41	0		
Execution	Checkpint1	80.43	0		
Monitoring	Checkpint1	65.01	1	- Software development control process is inadequate	PMC
Closing	Checkpint1	85.67	0		

Case study 2

Conclusions

- Risk assessment process – within software development activities
- Better solution and contributions to project success
- Guidance for the development of auto-risk assessment
- Future works – open source projects