

A Research Framework for Empirical Software Engineering Collaboration and Its Application in a Software Development Project

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Demonstrate and verify empirical software engineering methods
A new research framework
In response to government policy
Field data sharing between Industry & Academia
Concept of a “Macro-measurement tools”

Target project:

A Governmental Multi-Vendor Consortium type Software Project

In-process Project Measurement and Feedback Structure

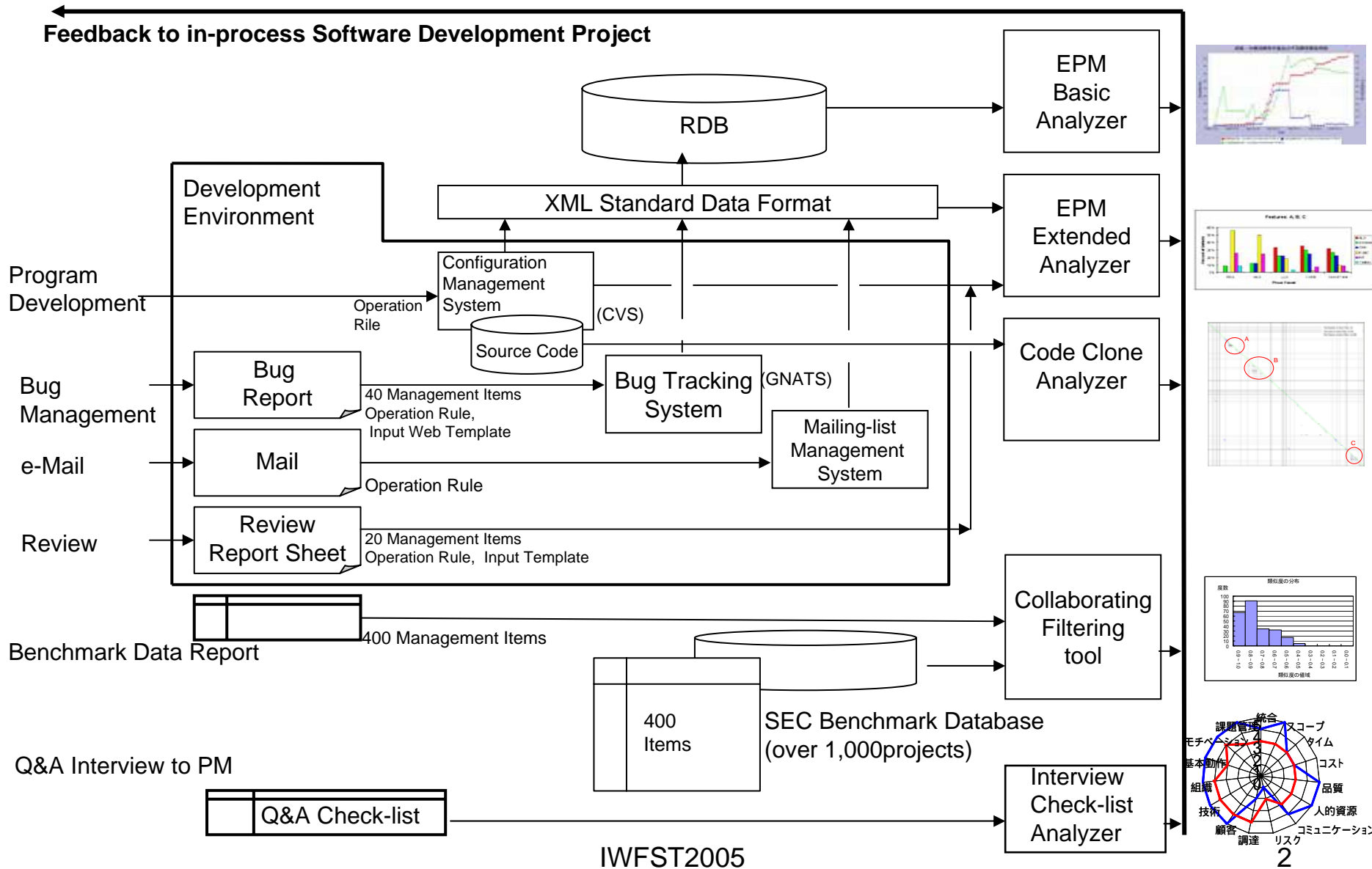
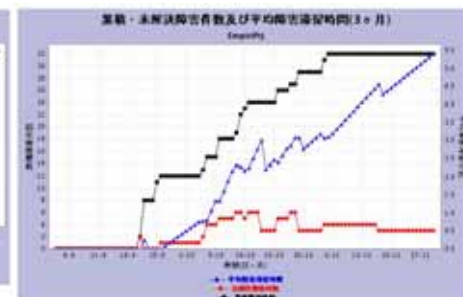
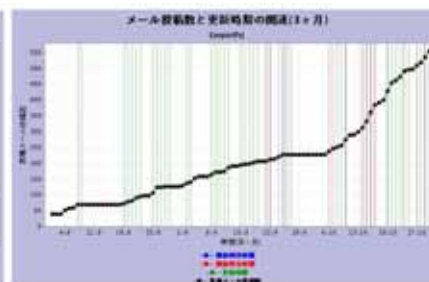
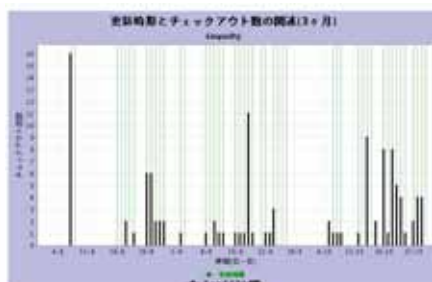
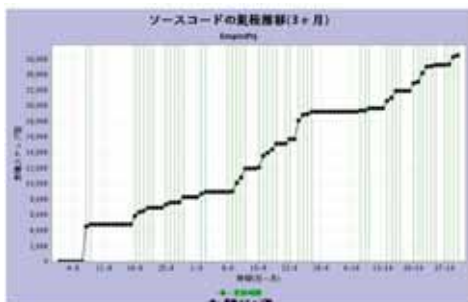


Table1 Measurement Data Items

Proceeding Project Data	Data item	Review record, Bug report(40 items), Specification Change report, Inter company mail with basic document, Basic Design Document, CVS repository with source code
	Tool	CVS, GNATS, Mailman, EPM Data input form & template: Review report form, GNATS web template form
	Operation rule	CVS, GNATS, Mail, EPM Collected data are kept safely in SEC secret data room.
	Data collecting Method	Individual IT vender development process: Weekly collect data by media from CVS and GNATS. Integration test process: Use single GNATS system and collect data from it. CVS data are same as individual development process.
Ended Project Data/ Bench mark Data	Data item	SEC defined 400 bench mark data items, IT skill data based on IPA/ITSS
	Data collecting Method	SEC defined bench mark data input form(EXCEL template) Data collection timing; end of basic design and end of development
Project Context	Monitoring project	Observe whole development process, Join to project meeting.

Table 2 Data Analysis Example

Basic Analysis	Source line of code transition, Check-in opportunity, Check-out opportunity & frequency, Number & opportunity of mail, Number & opportunity of bur report, Pending bug transition, Residual bug transition,
Extended Analysis	Review quality analysis from IEEE 982.1(1988):Fault Density, Defect Density, Measurement from PSP (Personal Software Process) ODC (Orthogonal Defect Classification): Review quality File renewal analysis
Code Clone Analysis	Source Code Clone Analysis
Bench mark Analysis	Retrieve similar project from 1,000 past project benchmark data .
Skill data Analysis	Analyze human factor from IT skill data of development persons



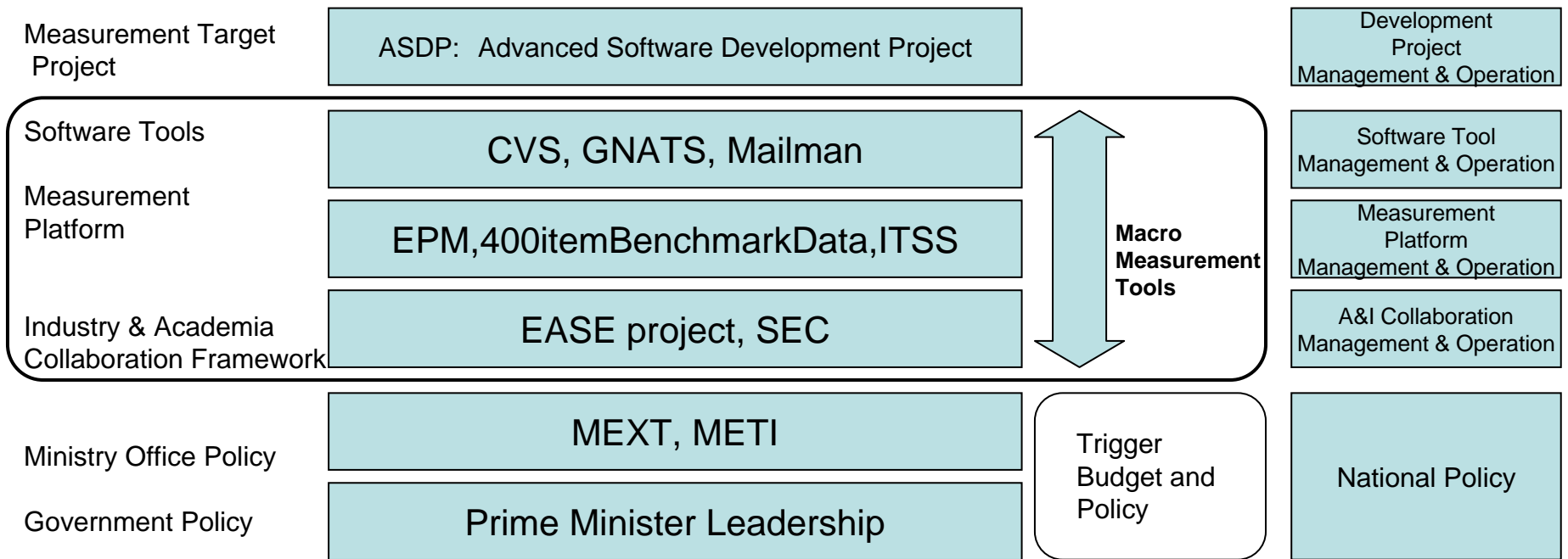


Fig.1 “Macro Measurement Tools” and its Management & Operation for Software Project Measurement

EPM: Empirical Project Monitor
 ITSS: Information Technology Skill Standard

MEXT: Ministry of Education, Culture, Sports, Science and Technology
 METI: Ministry of Economy, Trade and Industry

EASE: Empirical Approach to Software Engineering
 SEC: Software Engineering Center

The major factors to realize measurement and data-sharing

- The fundamental I&A collaboration research framework
- Concept and equipment of measurement platform
- Thoughtful measurement plan
- Total framework coordination

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