TOTAL METRICS WWW NEWSLETTER FEBRUARY 1999

This months news letter focuses on software quality and looks at the work done on the USA "National Quality Experiment". This experiment was conducted between 1992 to 1997 to benchmark the state of software product quality and to monitor improvements against stated goals. Our source is quality expert, Don O'Neill an independent consultant specialising in quality related aspects of software development. The metrics collected from the 112 inspection labs which participated in the experiment provide some interesting reading for those interested in establishing defect tracking as a means of monitoring software quality.

Pam Morris
Editor

CONFERENCES

12th International Software Quality Week (QW'99) - Facing the Future

San Jose, Silicon Valley, SF Bay Area, 24-28 May 1999

The 3-day conference will feature over 60 papers, presented in 5 separate tracks.

Keynote speakers include:

- Cem Kaner, "Facing the Future: The Law"
- Martin Pol, "Facing the Future Means Facing Test Maturity"
- Roger Sherman, "Facing the Future: Commercial Product Testing"
- Jakob Nielsen, "Facing the Future: Usability Aspects of Quality"
- Boris Beizer, "The Mavin"

Tutorials will be presented on the following topics:

- Edward Kit & Hans Buwalda, "Integrated Test Design and Automation"
- John McGregor, "Testing Distributed Object Systems"
- Karen Bischop-Stone, "Practical Software Test Case Design"
- Norman Schneidewind, "Assessment Using Reliability, Risk and Test Metric"
- Linda Rosenberg, "Writing High Quality Requirement Specifications"
- Tom Drake, "Measuring Object-Oriented Software Quality for C++ and Java"
- Bill Bently, "How to Test an Object: The Information Flow Approach"
- John Musa, "Software Reliability Engineering: More Reliable Software, Faster"
- Boris Beizer, "An Overview of Testing: Unit, Integration, System"
- Magdy Hanna, "Establishing a Software Inspection Process"
- Bob Binder, "Modal Testing Strategies for Object-Oriented Software"
- Leonard Verhoef, "Improving Software Quality for Users"
- Michael Deck, "Requirements Analysis Using Formal Methods"
- Tom Gilb, "Advanced Inspection"
- Sally Drew, "E-Commerce Testing -- The Clash of the Titans"

SEA'99 - Software Engineering Australia Conference 1999

National Convention Centre, Canberra Australia April 12-14th 1999

SEA'99 is the Premier Australian Software Industry Conference for Providers and Acquirers of Software.

As Australian companies are faced with the challenge of being globally competitive in the software development market, this inaugural conference will alert Australian software firms to the benefits of Software Process Improvement and the increasing attention being given to this factor by overseas buyers.

Significant international speakers from the US and Europe will present sessions that are critical to Australian industry. Keynote speakers currently planned include:

- Larry Puttnam – QSM "Slim"
- Barry Boehm – University of Southern California
- Dr. Steven Cross – Director of SEI

Pam Morris from Total Metrics has been invited to speak at the conferences on the latest advancements in Functional Size Measurement.

ABSTRACT :

Latest Advancements in Software Functional Size Measurement

Functional Size Measurement (FSM) has long been used very effectively by MIS project managers to measure the size of their planned projects. The size is used to calculate project resource estimates and for determining project productivity. However, the most commonly used FSM, IFPUG Function Point Analysis (FPA), has been found to be less successful in measuring software size for the "highly constrained" functionality delivered by the real time, control and embedded software domains than when it is used in the MIS domain.

The limitations experienced by FPA users across these other non-MIS domains has led to the creation of a new international group called the Common Software Measurement International Consortium (COSMIC).
COSMIC has participation from leading software measurement experts sourced from Australia, Europe and North America and aims to develop a new generation of measures of functional size for use in performance measurement and estimating in software activities. The proposed measures will draw upon the best features of existing IFPUG, NESMA, MkII and Full Function Point methods, the emerging ISO standards for functional size measurement (ISO 14143), along with new ideas. They are designed to achieve levels of accuracy and wide applicability beyond that available with current techniques, across both business "information processing" applications and "highly-constrained" software. They are intended as evolutionary improvements of existing functional sizing methods. The presentation will briefly review the origins, needs for the COSMIC approach, and the potential benefits. It will discuss the design principles and report on the project's current organization and status.

Profile

Ms Pam Morris has extensive experience in software development, specialising in software process improvement and software metrics. She is a founding member of the Australian Software Metrics Association (ASMA). She represents Australia internationally as the international project editor of the ISO Standard 14143 for Functional Size Measurement and is the convenor of WG12 (the ISO/IEC standards group responsible for the development of functional size measurement standards). She is also a founding member of the Common

Software Measurement International Consortium (COSMIC) and is a member of the International Function Point User Group (IFPUG) Counting Practices Committee and the Full Function Point Counting Practices Committee. She has consulted and presented numerous Software Measurement and FPA courses in Australia, United Kingdom, USA and New Zealand.

For more information contact :www.sea.org.au/conference

CALL FOR PAPERS

9th International Workshop on Software Measurement

Sept. 8-10, 1999, in Montréal - Mont-Tremblant (Québec) CANADA

This conferences is hosted by:

- German Interest Group on Software Metrics and the
- Canadian Interest Group on Metrics (C.I.M.)
- In cooperation with COSMIC - Common Software Measurement International Consortium

FEES: none

More details visit: http://lrgl.uqam.ca/iwsm99

THEME & SCOPE: SOFTWARE SIZE MEASUREMENT

Software measurement is one of the key technologies available for controlling and managing the software development process. Measurement also forms the foundation of both the sciences and engineering, and much more research in software is needed to ensure that software engineering is recognized as a true engineering discipline.

Software suppliers face the challenge of translating customer requirements into the size of the software to be produced as a key step in their project cost estimation. Customers also want to know the size delivered, as it is an important component in measuring supplier performance. Given the explosive growth and diversity of software contracting and outsourcing, suppliers and customers need more accurate measurement methods, which must work equally reliably across all types of software.

Current methods for measuring the size of software are not always of sufficiently strong to meet market needs, or work only for certain restricted types of software. Industry urgently needs software size measures with extensive coverage across diversified software portfolios and which can function consistently in a rapidly evolving market.

Therefore, it is necessary for researchers and practitioners to share their experiences on the design and uses of measurement methods in order to stimulate further theoretical investigations with a view to improving the engineering foundations of software measurement.

The purpose of the workshop is to review the set of issues surrounding measurement methods, identify deficiencies in the design of the methods that are currently available, and identify design criteria and techniques.

The outcome of the workshop is to be the joint authorship of white papers to be tabled as inputs to COSMIC (Common Software Measurement International Consortium) for the design of the next generation of software size measurement methods.

We are looking for position papers in the area of software measurement design and software measurement size applications on (but not limited to) the following issues and topics:

A- Objects and size attributes to be measured

- Types of measurement object targets (functional domains, type of software layers, specific functional characteristics - algorithms).
- Timely adaptation of the designs of measurement methods to new and emerging technologies (OO, Multi-media, Web-based applications, etc.).
- Size attribute categories (Functional, Technical, Quality, etc.).

B - Measurement methods: design issues

- Design issues surrounding measurement methods: definition of base components to be measured, ISO conformance, weight assignment and theoretical foundations (basis for consensus, degree of consensus, etc.).
- Normalization issues: time dependence, technology dependence, infrastructure changes.
- Integration of measurement types: when and how.

C - How to address practical deficiencies which slow down penetration rate among practitioners:

- requirements prior to measurement process (documentation gathering, reformatting of documentation, etc.).
- Requirements during the measurement process (automation of data collection, integration with historical data, validation of results, etc.).
- Quality of measurement methods (repeatability accuracy, correctness, traceability, uncertainty, precision, etc.).

D - Uses of measurement results in relationship with other measures:

- Productivity Analysis (foundations of productivity models, quality of productivity models, experimental basis and constraints that limit its expandability to contexts outside the experimental basis).
- Estimation process (uncertainty, identification of inputs, expectations, technical estimates versus business risks estimation, etc.).

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WORKSHOP TIMETABLE

- Abstract submission deadline: April 1, 1999
- Notification of acceptance: April 15, 1999
- Position paper deadline: August 1, 1999
- Workshop date: Sept. 8-10, 1999

Authors should send abstract (1-2 pages) by mail, fax or e-mail by April 1, 1998, to: Alain Abran or Reiner Dumke

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IFPUG – Certification Exam

Australia

The Australian Software Metrics Association (ASMA) will be conducting an IFPUG certification exam for Function Point Practitioners (CFPS) on April 12th in Melbourne Australia. Interested participants should contact asmavic@ozonline.com.au. Total Metrics will be conducting an exam preparation workshop on March 26th in Melbourne. For more details contact : Training@Totalmetrics.com.

Canada
Revenue Canada is planning to host the CFPS exam on May 17. The application form and further details on the regional exam are available on the IFPUG web site, WWW.ifpug.org.

KEY ARTICLE

NATIONAL SOFTWARE QUALITY EXPERIMENT

By
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1. INTRODUCTION

Don O'Neill is a seasoned software engineering manager and technologist currently serving as an independent consultant. Following his twenty-seven year career with IBM's Federal Systems Division, He completed a three year residency at Carnegie Mellon University's Software Engineering Institute (SEI) under IBM's Technical Academic Career Program. He offered to share the metrics data from the National Software Quality experiment with our readers. The full metrics results can be found on his web site http://members.aol.com/ONeillDon/index.html.

2. ABSTRACT

In 1992 the DOD Software Technology Strategy set the objective to reduce software problem rates by a factor of ten by the year 2000. The National Software Quality Experiment is being conducted to benchmark the state of software product quality and to measure progress towards the national objective.

The National Software Quality Experiment is a mechanism for obtaining core samples of software product quality. A micro-level national database of product quality is being populated by a continuous stream of samples from industry, government, and military services. This national database provides the means to benchmark and measure progress towards the national software quality objective and contains data from 1992 through 1997.

The centerpiece of the experiment is the Software Inspection Lab where data collection procedures, product checklists, and participant behaviors are packaged for operational project use. The uniform application of the experiment and the collection of consistent measurements are guaranteed through rigorous training of each participant. Thousands of participants from dozens of organizations are populating the experiment database with thousands of defects of all types along with pertinent information needed to pinpoint their root causes.

To fully understand the findings of the National Software Quality Experiment, the measurements taken in the lab and the derived metrics are organized along several dimensions including year, software process maturity level, organization type, product type, programming language, and industry type. These dimensions provide a framework for populating an interesting set of analysis bins with appropriate core samples of software product quality.

3. RESULTS

Defect Severity

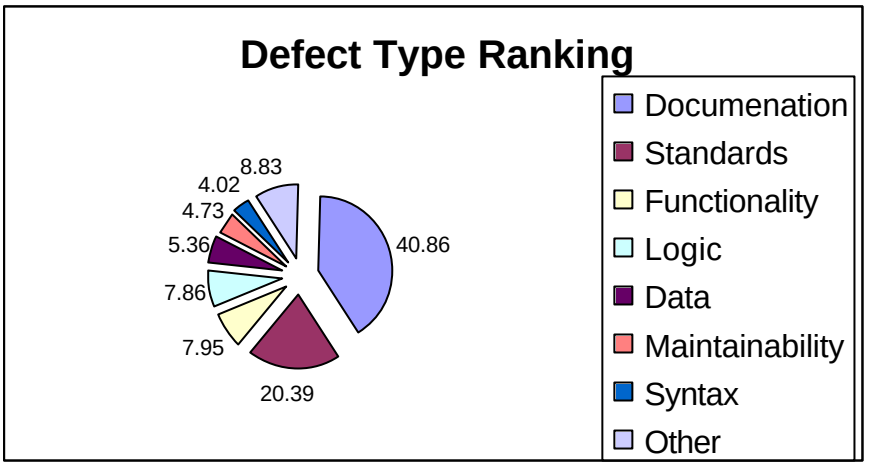
Defects were identified through inspection sessions, which identified 11,375 defects of which 1,854 were classified as major (affects software execution) and 9,521 as minor.

Of the 788,459 lines of source code inspected, there was on average 2.35 major defects detected in each 1000 lines and 12.08 minor defects.

Defect Type Ranking

Results indicate that errors in guidance documentation (40.86%) headed the list of the foremost types of defects found. The next most common groups of errors was in errors in compliance with product standards (20.39%), the remaining types of errors were almost equally distributed between errors in:

- Failing to state or meet intended functionality.
- Logic errors in correctness.
- Data definition or initial value setting or use.
- Maintainability – error in good practice impacting the supportability and evolution of the software product.
- Language syntax compliance.



4. SUMMARY

Based on the results to date and the identification of common problems, the National Software Quality Experiment challenges organisations to:

1. Establish a tradition of baseline management with fine-grained traceability among requirements, specification, design, code, and test artifacts.

2. Establish a tradition of modern software engineering design and coding practices.

3. Establish a tradition of uniform recording style and its enforcement.

4. Establish a tradition of visible evolution of modern domain architectures and product lines.

The usefulness and success of the National Software Quality Experiment depends on sustaining a continuous stream of core samples. Organisations from industry, government, and the military are invited to participate and enrich this national database resource.