TOTAL METRICS WWW NEWSLETTER APRIL 1999

'***Think of a number then double it***!" Sound familiar? This is a common response when you ask a project manager how he estimated the costs, schedule and resources for this latest project. Software measurement practitioners have worked hard over the years to improve the process of software project estimation by encouraging project teams to collect actual historical data on project size, effort consumed and elapsed time. All of which can then be used to determine typical productivity rates for software projects built with different software and hardware platforms, different languages and tools and within different application domains. Informed project managers can then apply these historical productivity rates to their next planned project to provide a more objective, quantitative method for developing project estimates. It was to this end that the International Software Benchmarking Standards Group (ISBSG) developed their repository of industry based productivity data. The latest news from this group is that they have extended their offerings and developed a workbook, which is aimed at assisting project managers to macro-estimate their software development effort and duration using the data within the repository. The potential uses and benefits of this new 'estimating tool' are explored in our feature article for this month. We also take a look at the latest work done by the COSMIC group who are working towards an international standard for measuring software size and promise to have a draft version for testing by the third quarter of 1999.

Our key article this month is a review of the work recently published by Chris Lokan from the Australian Defence Force Academy, on the relationship between the key elements (transactions and files) in Function Point Analysis results and how they change with different types of projects and project environments.

Pam Morris
Editor

CONFERENCES

SPICE and other Flavours Seminar (Introduction to Software Process Assessment using ISO/IEC TR 15504:1998)

Adelaide, Perth, Sydney, and Melbourne Australia
5th, 6th, 10th and 11th of May 1999

Assessment and evaluation of the software development process has been the focus of increasing attention over recent times. The SPICE (Software Process Improvement and Capability Determination) model aims at assisting organisations to improve the quality and productivity of the software development environment and increase the purchaser's confidence in the supplier's software product.

The one-day seminar provides a detailed analysis of the framework contained within the ISO standard ISO/IEC TR 15504:1998 on which the SPICE model is based.

The objectives of the seminar are to provide attendees with an appreciation of the principles and purpose of process assessment, particularly in relation to quality improvement and how the assessment results can be applied for both process improvement and capability determination.

- Presenters are Terry Rout who has been a member of the international management board for SPICE since its inception and Tom McBride who is active in the ISO community on quality standards and has used the draft version of 15504 as part of the SPICE trials within his organisation.

Register via email to: tina.dalamagas@standards.com.au

ESCOM – SCOPE 99 Conference
MAXIMISING QUALITY and MANAGING RISK
"Optimizing Software Development and Maintenance"

Herstmonceux Castle, England April 26th - 29th 1999

The three-day ESCOM conference is aimed at practitioners in the process improvement, quality and software measurement arenas.

The 48 presentations will cover the following topics:
- Metrics programme experiences
- Prediction of effort, faults and maintenance
- Functional and OO sizing
- Product quality and usability
- Product quality standards
- Process management and inspection results

Workshops at the conference include:
- Software cost and quality measurement in Practice: an integrated approach – Dr. Lionel Brand
- Measuring Software Size in Embedded and Real-time systems – Serge Oligny
- Experiences of identifying and prioritizing user quality requirements – Dr. Jurek Kirakowski

For more information visit the ESCOM web site: www.escom.co.uk/escom

Other Conference Dates:

- FOURTH INTERNATIONAL SYMPOSIUM AND FORUM ON SOFTWARE ENGINEERING STANDARDS (ISESS '99), Curitiba, Brazil, May 17-21, 1999.Visit the web site at : http://saturne.info.uquam.ca/Labo_Recherche/Lrgl/sc7

  Professor Alain Abran from the University of Quebec and Montreal will be presenting a paper of interest to metrics practitioners. It investigates the ISO 14143-1 standard, which is the first in a set of five documents constituting the international standard on Functional Size Measurement for software. ISO 14143-1 specifies a mandatory set of concepts required for functional size measurement and tackles it from a measurement method perspective. This is a unique perspective in contrast to other standardization work in progress on software. This article presents a structured analysis of ISO 14143-1 to analyze its completeness and mapping to measurement principles and related concepts. This analysis is carried out following the structure of a process model for software engineering measurement methods identifying the distinct steps involved, from the design of a measurement method to the exploitation of the measurement results. Strengths and weaknesses are identified and then discussed from the perspective of the intended users of this standard: users and designers of functional size measurement methods.

- FEDERATION OF EUROPEAN SOFTWARE MEASUREMENT ASSOCIATIONS (FESMA) Hamburg Germany 4th – 7th October 1999

www.ti.kviv.be/conf/fesma.html

- EUROPEAN SEPG CONFERENCE , Krasnapolski Hotel, Amsterdam Netherlands, 7 –10 June www.espi.co.uk

Call for Papers:

THE AUSTRALIAN SOFTWARE ENGINEERING CONFERENCE – ASWEC '99 – November 1 –5 1999 Queensland Australia – is calling for papers that describe basic research, novel applications and experience reports relevant to software engineering. Papers will be published by the IEEE Computer Society press and should be submitted by June 25 to: aswec99@csee.uq.edu.au

INTERNATIONAL FUNCTION POINT USERS GROUP (IFPUG) – October 20-22 1999 – New Orleans USA – Theme " New Millenium – New Metrics" – is calling for papers in the areas of software measurement, project planning and control and trends in software development. Papers should be submitted to Eric Buel – conference committee chair – ifpug@bannister.com

IFPUG – Counting Practices Manual Version 4.1 Released!!!

The latest release of the IFPUG Counting Practices Manual 4.1 is now available to members who may download a PDF copy from the website (http://www.ifpug.org). Members will need to have a User ID and Password to enable the download, if you need to have yours activated contact the IFPUG office at (ifpug@ifpug.org)

Impact studies based on counts using both versions showed minimal differences in the results. The counting practices committee identifies the major enhancements to the CPM 4.1 as being: Additional guidance on:

- counting function points from the "user's view"
- establishing the application boundary
- identifying elementary process
- identifying DETs for data function types (Internal Logical Files, (ILFs)/External Interface Files (EIFs)) and transactional function types (EI/EO/EQ)

Clarification of existing rules on:

- the differences between EOs and EQs
- what constitutes control information
- counting hared ILF/EIFs

Training on the New IFPUG 4.1 Manual

Conversion Workshops

IFPUG will be conducting half-day workshops on the conversion of 4.0 to 4.1 in the upcoming New Orleans meeting in April 1999.

Total Metrics Australia will be conducting one-day workshops to assist organisations converting from IFPUG 4.0 to 4.1. Our two day '*Applied Function Point Counting'* courses will cover the rules from both 4.0 and 4.1. Pam Morris, who is a member of the IFPUG Counting Practices Committee and was one of the authors of both 4.0 and 4.1, will present the both the training and the conversion workshop. Both courses will have practical exercises that illustrate the major areas of change between the two versions.

Course Name	Functional Size Measurement Method	Location	Duration	Dates
Applied Function Point Analysis	IFPUG Function Points Version 4.0, 4.1	Sydney	2 days	13th - 14th July 1999
		Melbourne	2 days	22nd - 23rd July 1999
Conversion of IFPUG Version 4.0 to 4.1	IFPUG 4.1	Sydney	1 day	12th July 1999
		Melbourne	1 day	25th June 1999

Your may express interest or register to attend the Total Metrics training courses by mailing: training@totalmetrics.com or online on our website: www.totalmetrics.com.

Quick Reference Card for the new CPM 4.1

The IFPUG CPC has designed a quick reference card for use with CPM 4.1. It can be ordered online (www.ifpug.org) or by contacting the IFPUG office (ifpug@ifpug.org). The cost is $US1.00 per card with a minimum order of 10.

Investigation into the IFPUG Value Adjustment Factor

Function point counting practitioners have long been disenchanted with the effectiveness of the Value Adjustment Factor in successfully capturing the impact of technical and quality requirements, on the project size. Research over time has consistently shown that the unadjusted size has a better correlation to project effort than the adjusted size, highlighting that the Value Adjustment Factor needed further investigation.

The IFPUG Academic Affairs committee has responded to member concerns and is sponsoring a survey by two Air Force Institute of Technology (AFIT) students as part of their graduate studies. The focus of their survey questions is on the complexity adjustments for FPA, how they are actually used in industry and which general systems characteristics are considered to need further refinement.

It is interesting to note that the ISO/IEC standard for functional size measurement (ISO/IEC 14143-1) which defines the basic concepts of a Functional Size Measurement Method, excludes the step which adjusts the size by quality and technical considerations. Instead it

defines the functional size of software as a result which is equivalent to the IFPUG unadjusted function point count.

PRESS RELEASE

COSMIC – Development of an International Standard Method of Functional Size Measurement which is ISO 14143-1 compliant

COSMIC (Common Software Measurement International Consortium) announced last week at the JFPUG conference Japan 15th of April and at the Software Engineering Australia conference 14th April that a core group of international experts from six countries are currently working on a new standard for functional size measurement.

The objectives of the group are to develop a method, which distills the key elements from the IFPUG FPA, Mark II, NESMA, and Full Function Point Methods into a conceptually sound functional size measurement model. The method aims to be applicable across a broad spectrum of functional domains with an emphasis on being able to measure real-time and embedded software.

A draft version of the proposed method is currently being reviewed and it is planned that a beta version will be available for testing purposes in the third quarter of 1999. Organisations interested in participating in the COSMIC trials should contact the following COSMIC members for further information:
Charles Symons: 100561.1433@compuserve.com
Alain Abran: abran.alain@uqam.ca
Pam Morris : Pam.Morris@Totalmetrics.com

NEW PRODUCT RELEASE

ISBGS WORKBOOK FOR MACRO ESTIMATING OF SOFTWARE DEVELOPMENT EFFORT AND DURATION

Released for Sale April 14th 1999

This is the first volume in a series of software project workbooks being developed by the International Software Benchmarking Standards Group, (ISBSG). This workbook explores

macro-estimation of software development effort and duration, based on the functional size of the product to be delivered. The value of this workbook lies in its "cook book recipe" approach. It provides a simple estimating process that can be used immediately, illustrated with examples that you can work through using a subset of ISBSG Repository data, supplied on the enclosed diskette.

This Workbook has been developed for those professionals who recognise the need for improved project estimations. Readers are not expected to be knowledgeable of, or proficient in the use of function points. For those who are interested, there are chapters that provide simple explanations and examples of how to use function points. All professional system developers, project managers and lecturers should find a wealth of useful information in the Workbook and in the data provided on the diskette.

A condensed list of the topics covered in the manual are listed below:

The estimating workbook is available from you local representative of the ISBGS group www.isbsg.org.au or contact ASMA. (asmavic@ozonline.com.au)

KEY ARTICLE

REVIEW OF "AN EMPIRICAL STUDY OF ELEMENTS IN FUNCTION POINT ANALYSIS - By Chris Lokan"

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http://www.cs.adfa.edu.au/research/tech_rep/1999/cs0199.htm

1. INTRODUCTION

Chris Lokan is well known for his research on software productivity data, particularly for his excellent work statistically analysing the data within the International Software Benchmarking Standards Groups (ISBSG) Project data repository. It is as result of his work with the ISBSG repository that he noted, as other researchers had done, the strong relationships between the components of a function point count. Ie. relationships between the transactional (EI, EO, EQ) and data (ILF, EIF) function types. This paper investigates the extent of these relationships and the factors that influence them. The full paper summarising his results and discussions can be found on his web site:
http://www.cs.adfa.edu.au/research/tech_rep/1999/cs0199.htm

2. ABSTRACT

Researchers and practitioners have noted relationships between the five types of elements in function point analysis. Practitioners exploit them, researchers have raised concerns about them.

A large data set is analysed here to gain insight into these relationships. The typical contribution from each element is found to vary in different types of projects, and factors are identified which explain some of the variation.

These findings are important to researchers investigating the correlations between elements. They are also important to practitioners who wish to exploit the relationships between elements for prediction of a function point count.

3. BACKGROUND

The analysis was based on the data within the ISBGS repository Version 4. 269 projects were selected based on the likely validity of their data and the sample set only included those projects that were sized using the IFPUG function point analysis method. Projects ranged in size from 13 function points to 13,580 function points with a median value of 258.

4. RESULTS

Chris found statistically significant variations in the proportions of function types to each other for different types of projects. The two most significant factors contributing to this were:

- Programming language level (eg. 3GL, 4 GL)
- Project Type (development versus enhancement)

I.e.

1. Projects developed using third generation languages such as COBOL typically had a greater proportion of files compared to those developed in higher level languages. Within the files, the number of External Interface files was also in much higher proportion than that typically found in 4GLs. Within the transactions the number of inputs also appeared to be lower. This could be an expected result since many applications written in third generation

languages are typically for mainframe environments within large organisations. These organisations typically have many similar types of legacy systems, all of which interface and are highly integrated. In contrast the 4 GL applications are often for mid-range or PC environments where the applications tend to be more 'stand-alone' and are not required to interface with legacy applications.

2. Enhancement projects ie. projects that add, change or delete existing functionality in a maintenance environment typically have a greater proportion of transactions contributing to the count than files. Chris explains this, citing the commonly held understanding, that the data within an application is less likely to be impacted by a change request than the operations on this data. This rationale contributes strongly to this effect but the phenomena may also be additionally explained by the methodology used in counting enhancement counts compared to development counts. Eg. In a development count if a report is added which references files from another application then the report (EO transaction is counted) and the files referenced (EIF data groups) are also included in the count. In contrast if the count is considered to be an 'enhancement' which references previously developed files referenced by other transactions then only the report is included in the FPA assessment, files which themselves are not changed are not included.

Other factors which influenced the proportion of transaction types to each other were the type of organisation, where Banks and business service institutions had fewer inputs than expected and higher outputs whilst public utilities and government departments showed the opposite profile.

Phototyping during the project also affected the proportion of outputs to inputs and enquiries, where outputs tended to be lower in relation to the number of inputs and enquiries.

Application type did not seem to influence the ratio between function types.

4. DISCUSSION

This results of analysis such as this is extremely useful to practitioners who use the profiles of function point counts to predict the size of a project or application, when only limited information is known. Ie. often only the data model has been developed or is available. By knowing the number of logical files and assuming them to be low to average complexity we can use these relationships to extrapolate the number of each type of transaction and their function point contribution. The total size of the application can be predicted very quickly and reasonably accurately with minimal information enabling "ball park" estimations early in the life cycle.

Another common use for understanding the relationships and typical profiles of contributions of transactions and data is when reviewers are validating the correctness of a function point count.

Chris cites the Desharnais and Morris (1997) paper that explores these relationships as part of their function point validation methodology