MetricViews

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YES WE CAN
With Function Points!

Inside...

IN THIS EDITION

ISMA[9] in Spain proved a significant milestone for IFPUG. This is the first time ISMA has been held in Europe – and it has been many years since an IFPUG conference was held in Rome. That Rome conference brought a strong understanding of shared values and problems on both sides of the Atlantic.

ISMA[9] in Madrid renewed that understanding. From reviewing the conference papers or just reading of the "warm and sunny embrace" in the summary of the conference from *Dácil Castelo* and *Luigi Buglione* in this issue of *MetricViews*, it is apparent that we are all on much the same page. *"Measuring for Business"* was the theme of the conference and it is a theme that is strongly echoed in articles in this edition of *MetricViews*.

Guilherme Siqueira Simões goes straight to the basic business point, how should you be writing software contracts?

Carlos Vazquez also delves deeply into the business side of IT management. He examines the role of contracts, the role of auditing processes and highlights yet again that functional size measures play an inescapable part in professional IT management.

Julian Gomez lets us have a little fun with function points. Sometimes the way FPA rules are laid out leads to new adherent thinking that they only apply to certain types of transaction-based applications. Julian uses Google, something we all know, to demonstrate how the functional sizing paradigm can be applied to almost any situation.

Kishor Subbaraman is focused more on actual IT practice and thinking. He shows the fatal flaw in many estimating methodologies that attempt to simply ignore size. Kishor also highlights and examines many of the myths and prejudices surrounding function points that have led to these inept processes and assumptions.

Antonio Ferre Albero demonstrates the very basic nature of measurement and shows the critical and unique importance of the Function Points size measure in information technology.

Not quite something for everyone, but some solid material, some good advice and some interesting ideas. Enjoy.

Message from the President

Kriste Lawrence

We are already in the month of July. Wow, it is amazing how quickly this year is going! In light of the theme for this publication, I would like to remind you all of some of the ways our volunteers have said "Yes, we can!" so far this year.

Our Conference Committee has supported the ISMA[9] conference in Madrid, Spain and is in the early planning stages for ISMA[10] which will be in the USA, April of 2015.

The Certification Committee has updated the Certified SNAP Practitioner (CSP) exam for the APM 2.1 and held two manual exams. We have also offered two Certified Function Point Specialist (CFPS) exams. The committee is looking for additional members, so if you are a CFPS or CSP and are interested in

volunteering, please complete a volunteer form found on the website and forward it to ifpug@ifpug.org.

The SNAP Assessment Practices Manual version 2.2 has been made available. Additional CSP exams are being scheduled at various points around the globe throughout the rest of the year. Our Non-Functional Sizing Standards Committee (NFSSC) has developed SNAP Train-the-Trainer materials and we have trained two partner companies. These two companies are now available to offer Introductory SNAP Training upon request.

The Functional Sizing Standards Committee (FSSC) is getting ready to launch its first YouTube video called "Solving Project Testing Sizing Syndrome" and has authored six iTips / uTips so far this year. Look for this and other videos in the coming months.

We also introduced a new Countrywide Membership for corporations who operate in multiple cities within a single country. Refer to the IFPUG website for more information. Our Membership Committee is now known as the International Membership Committee and we have started the implementation

of Country Representatives for Brasil, Italy and India. Our first Country Representative is Marcio Silveira of Brasil.

In the near future, we will be starting the pilots for a new program under the Applied Programs Directorate called the "Special Innovation Program (SIP)". The SIP is intended to be used to develop content with a very quick turn-around.

The International Standards Organization (ISO) Committee has added a new member in the hopes that IFPUG will have a wider representation across the working groups.

Last, but certainly not least, our Communications and Marketing Committee (CMC) has developed and delivered a wonderful new website!

I apologize for those notable items that have been missed from the list above. It is difficult to remember all of the fantastic content that is being produced by our tireless volunteers. As you can see from the list above, "Yes, we can!" is definitely a mantra for our IFPUG volunteers.

Kriste Lawrence
IFPUG President

From the Editor's Desk

Paul Radford

It seems to have taken some decades longer than it should, but it appears that the measurement community and business management are starting to talk the same language. It is one of the more obvious tenets of good management that you need to measure what you do and evaluate performance and opportunities for improvement in that context. It is a link that IT management has strongly resisted and one they have been loathe to promote to business management.

Most of the articles in this issue examine this state of affairs and provide examples, answers and approaches to bring the business of measurement into the business of Information Technology. Whether it be estimating new projects or setting up contracts for long term relationships, measurement should be a critical part of the business relationship.

As some of these articles also point out, one of the biggest problems is the lack of understanding of not only function points but the very concept of size in relation to IT projects and applications. There are many factors which impact effort required for any purpose. In IT terms, we can isolate and have effectively assessed the probable productivity impact of most of them. However, the size of the project including, for enhancement work, the size of the underlying base, is ALWAYS critical to the amount of work to be done and the consequent relevance of any estimate.

It is really not that complex, but this simple message is often confused.

And it is one that we need to ensure is understood by all levels of business.

Paul Radford
Communications and Marketing Committee

ISMA⁹ in Europe: "Measuring 4 Business"

A Warm and Sunny Embrace for the IFPUG Conference Coming Back to Europe

The IFPUG conference – ISMA (International Software Measurement & Analysis) – held its 9th edition in Madrid, Spain. This is the first time that ISMA has been held in Europe.

The event, as in ISMA[8] in Rio de Janeiro, was four days long, including a SNAP onsite training class and certification exams for both CFPS and CSP (the new certification exam on the SNAP method). The conference, organized by LedaMC and held on March 27th, hosted interesting discussions, moving into different shades of measurement, addressing both its technical and management sides.

More than one hundred and fifty participants from more than fifteen different countries attended!

The theme of the conference was "Measuring for Business." The presentations focused on the importance of clients finding measures of size to validate provider estimates and to encourage improvements in the providers' productivity.

Rafael De La Fuente, LedaMC's CEO, opened the event, not only stressing

the importance of measuring but also the importance of practical, observable measures. This emphasis was confirmed by IFPUG past president, Joe Schofield, discussing the risk of making bad interpretations, leading potentially to risks and/or damages. Joe used several real-life examples to show how the business of measurement in IT often fails to pass the common sense test.

José Manuel Martinez Zambrano, Vodafone Spain, presented the first of two case studies. His experience within one of the most important Telco carriers, showed the estimation model they adopted in order to improve their productivity and save money. One of the key points was the introduction of non-functional requirements (NFRs) to be included in their measurement repository and managed in their Balanced Scorecard (BSC), helping to refine estimates where functional size measures alone didn't work.

Luigi Buglione, GUFPI-ISMA President and Measurement & Process Consultant (Engineering group), introduced and presented solutions for interfacing the workflow issue with FPA in a presentation with suggestions about how to count the right and effective number of Base Functional Components (BFCs) for projects using that kind of approach.

Ignacio López Carrillo (LedaMC) discussed the way functional size measures can help the Test Factory provide better project governance, using the concept of TFP (Test FPs), providing an interesting presentation with some data from his industrial experience.

Harold van Heeringen, ISBSG president, discussed how a proper usage of historical data could diffusely help organizations in refining their estimates. And when historical data is missing or incomplete, ISBSG repositories could help provide a base of comparison for benchmarking activities. ISBSG has been collecting data since 1998 and now has more than 7,000 projects and multiple data repositories.

After lunch, Yan Bello (SpaceMinds) gave an innovative demonstration to show why estimates improve with the more information you have. Yan used a pair of scissors and paper rings, including audience participation, which definitely added interest!

Mauricio Aguiar, BFPUG president and IFPUG Director of International and Organizational Affairs presented a short history of software measurement in Brazil, showing benefits and challenges over these twenty years, making Brazil the first country worldwide in terms of number of CFPS-CFPP, and now CSP certified specialists.

Juan José García Ruiz, MAPFRE, presented the second case study, this time within the insurance domain. His experience led to an improvement project, partly adopting overall cost reductions but counterbalanced by higher productivity rates, not lowering the T&M daily fees (a lower tariff doesn't mean a lower price at the same quality). MAPFRE adopted international measurement standards (IFPUG/NESMA) in a non-intrusive way in its development activities, stressing clear communication between parts (client/provider) as part of the overall strategy that led to outstanding results, better than the budget forecasts.

Charles Symons, co-founder and past COSMIC president, discussed software projects' performance and the need for (and often lack of) historical data from publicly-available sources. Here one of the key points was balancing multiple exigencies and goals (e.g. delivery on time-budget-quality, productivity, project speed, etc.). In a root-cause analysis, often problems are behind the project

monitoring & control (PMC) during the project lifetime (leading to project de-scopes, or scope creep). The presentation closed with some suggestions about the way to use FSM measures in contracts, with pros and cons.

Kriste Lawrence, IFPUG president, wrapped up the day with an inspiring talk, clarifying the importance of IFPUG and the future strategy for IT organizations regarding software measurement. She discussed the mission of IFPUG, which is to be the world-wide leader in software measurement products and services, and outlined a nine-point strategy for accomplishing the mission. Kriste concluded by quoting Michael J. Gelb: "Innovation is the creation and delivery of new customer value in the marketplace," and that we can all help do this by developing ideas, communicating, and volunteering."

Thanks also to the "ISMA⁹ in Europe" sponsors: TI Metricas, SpaceMinds, Forum Calidad and Charismatek Software Metrics.

¡Muchas gracias, Spain!
Dácil Castelo & Luigi Bugilone

IFPUG conference

ISMA 9 IN EUROPE

March 27, 2014. Madrid, Spain

Organized by LEDA mc

www.measuring4business.com

Thanks for joining us!!

From all of our team at LedaMC, (organizers of the IFPUG conference in Madrid) we would like to share our great satisfaction with the end results.

Thanks to your generous participation, the conference was a productive exchange of knowledge and experiences. As well as being an opportunity to meet up with friends in the industry, it provided everyone with opportunities to create new connections and to start building the foundation for future collaborations and interesting new possibilities.

ledaMC

software development productivity management

Software Contracting and Management Using Function Points

by Guilherme Siqueira Simões, CFPS

Introduction

How can function points help improve both contracting and management of software projects? Some answers to this question will be presented in this paper based on my experience in Brazil, the country with the most function point users in the world.

First of all, we are going to talk about the outsourcing phenomena of software services development. Then, I will address the most common models for contracting this service. I will then present how to run a cost model using function points as a metric for software contracting. Finally, both disadvantages and advantages in the adoption of this model will be discussed alongside the possible benefits.

Software Development Outsourcing

The outsourcing of IT services has increased since 1990, including software development services. Before that, software development and maintenance were executed mainly by the company's internal teams, whose members were mostly systems analysts, programmers, and software developers.

Currently, many companies seek to keep IT team members focused on their core business. Therefore, they merged different IT job positions into just one: business analysts. This job was assigned to join both IT and business objectives while acting as a bridge between IT companies and IT services providers.

Common Models for Contracting

Nowadays, many of the software development projects are executed externally. The most common models for software services contracting are:

1. Man-Hour, also Known as "Body Shopping" or "Time and Material"

In this model, software development services, which are not always projects, are executed by professionals outsourced by the client. The payment for these services is based on the talent and effort of the professionals allocated on the contract.

In theory, this is a contract model of easy management by the client. This approach provides flexibility in response to changes during the project. Moreover, contractual renegotiations will not be necessary under this contract model.

However, the "agility" within this contract model can be illusory. Changes in requirements often are uncontrolled and require additional work which almost always is not visible to the client.

In addition, the software provider´s payment is not related to the results obtained. In fact, it is a model that promotes the antithesis of productivity. That is, the longer the service lasts, the higher the compensation for the provider. There is no incentive for the provider to run the project in a more productive way. The project cost is calculated taking into account internal aspects, such as the effort taken and the level of expertise of the professionals. However, these aspects are mostly controlled only by the provider.

2. Fixed Price - It All Depends on the Scope

In this model the cost of the project is defined based on the scope presented by the client. In that case, the scope should be well-defined, which is something that is not always achieved. Therefore, more times than not, the bid includes a scope risk for the provider.

From the client's point of view, it is a comfortable model because there is a predictable cost; after all, the price is fixed!

But what happens if the initial price was poorly defined? What happens if there is a scope change in the project? In those situations, a new negotiation between the parties must take place, because the price will change. As the project is already underway, it is unlikely that the conditions for the renegotiation are the same from the original negotiation. Therefore, most of the time the client will succumb to a less favorable renegotiation instead of switching providers.

One advantage of this model is that the provider has an interest in being more productive, because it means more profitability.

The great challenge of working with a fixed price model is having a very well-defined scope for the software project, with low expectations of change. But how can we achieve this if the only certainty in software projects is that requirements will change? That's why another approach becomes necessary.

3. Unit Price – Sharing Responsibilities

This contracting model tries to balance the risks and responsibilities between both the client and the provider, combining the advantages and overcoming the shortcomings of the previous two models. Here, we can say that the scope

(Software Contracting and Management, continued from page 7)

management becomes the client´s responsibility and productivity management becomes the provider´s responsibility.

It is essential that the contract's unit of measurement represents a value delivery to the client. This means that not just any unit of measure can be used. For example, hours do not represent a value but a cost, and lines of code are difficult for the client to recognize their value.

Therefore, the challenge is to find a unit that is consistent, uniform, business-oriented and easily auditable. That's why the idea of using function points to measure software development contracts arises.

So, how can we use function points to manage software development contracts?

A simple approach is to use the function point size to estimate (or predict) the effort that the client will pay for the project.

To do that, we can use a model to estimate the effort using the size in function points as a primary input. There are several estimation models available in the market, but the simplest and most widely used in Brazil is to apply productivity to the software size project (in function points), as following:

Effort (Hours) = size (FP) x Delivery Rate (H/FP)

The most commonly used productivity indicator is the rate of delivery, expressed in hours per function point, which is the average number of hours spent to produce a function point.

To use this cost model correctly, we need to do a productivity analysis before using this cost model. This study will examine the project's historical data, features and other attributes of the projects developed by the company.

You can find productivity numbers in publications and websites, but using any numbers without careful analysis, can lead to failure. Based on my experience as a consultant, it is a shortcut that does not work. In many organizations involved in process improvement initiatives, productivity analysis is a common practice.

Another useful indicator that can be derived is the ratio of the number of defects and the functional size, called defect level density. It is a useful tool for assessing a dimension of project quality, also useful in comparing software projects and analyzing the performance of the organization over time.

In project management, one of the most critical variables is scope. With function point analysis, it is possible to control the scope changes during project implementation. It allows for a direct and objective measurement of those changes.

Requirement changes are always present in software projects. If there is no way to quantify these changes, it becomes more difficult to assess the impact on the project.

Moreover, it's even more difficult to adequately communicate to the client any costs associated with the changes.

Now that we have talked about functions points benefits in both project contracting and project management, we will discuss some of the challenges faced by organizations when deciding to make the transition to function points.

Difficulties While Transitioning

The first difficulty, and perhaps the most important one, is the adoption of the culture of planning. In many companies, software development and maintenance occur without proper planning. Without an accurate initial assessment of scope, requirements changes during the project end up being much more frequent. Therefore, additional work increases. Trying to adopt function point contracts without minimum planning maturity can be a scary situation because rework will be more visible and at higher levels.

Another common difficulty is to take the easy way of adopting FPA without making an accurate calibration of the estimation model (calibration is to adjust the estimation model with historical data from the organization). Some companies use published numbers, but at the end, they have to go back and make adjustments using their own historical data.

In this transition, we must be careful to use function points only for activities that are directly related to the software development and maintenance of software. I have seen companies that try to apply function points on issues that are not directly related to the software development activities (e.g.: support, training, hardware, etc.), which creates unrealistic expectations for the metric.

Measuring incorrectly and inconsistently is another difficulty, perhaps trivial, but still relevant. Some companies make the decision to use function points without proper team training. Moreover, many others do not have a strategy for quality assurance over its measurements. In that case, inaccurate measurements lead to wrong indicators and frustrating estimation results.

I've had the chance to hear some complaints from companies about the size of projects because the budget estimates were expensive. In those situations in which I could check the size, and the sizing measurement was right, I realized that the size of the project could be significantly reduced simply by streamlining requirements. That is, many requirements can be simplified and/or merged to form a leaner solution. FPA does not assess the quality of requirements; it only measures what has been specified.

Benefits

Now, let's talk about some benefits gained by organizations that have changed their software contracting model to one based on delivered results (and measured by function points).

Increased capacity delivery is one perceived benefit. More projects are delivered in the same period of time due to the direct interest of the provider to achieve an increase in productivity and profitability.

Another positive effect is cost savings as the search for improved productivity and efficiency ends up reducing the number of defects in projects (corrective maintenance usually is not billed in FP contracts).

FPA also provides a very positive side effect: it induces verification and validation of the requirements specification. This leads to specifications improvements and minimizes the cost of repairing these defects in later stages of the project.

From the point of view of corporate governance, another benefit is that contracts using function points are easily auditable. For example, it is possible to track a payment to the provider at any time to quantify the direct result of the outcome. On the other hand, on body shopping contracts, a single payment is only related a number of hours, without assessing the results. In the Brazilian government, the man-hour contracting model was the focus of several public resources deviations.

Let's talk now about possible benefits in project management using function points.

The first point to take into account is the possibility of improving project planning. The size of a software project using function points can be used to produce estimations of effort, cost, time, and to promote a better assessment of the project scope.

In regards to monitoring and controlling projects, function point size reflects a quantification of the scope and permits resizing if any requirement were to change.

Since many indicators can be generated in conjunction with function points (like quality, productivity and scope indicators), it will help both in monitoring and controlling projects as well as software process improvements initiatives.

Last but not least, the communication with the client becomes much better when there is a metric that reflects something that the client recognizes and allows that person to perceive value: the software functions. The function point analysis concepts are the business user concepts, which is a huge advantage over technical metrics.

References

Questions and Answers about Function Points:

http://www.fattocs.com/en/faq

The Brazilian model for the procurement of software function points:

http://fattocs.com/files/en/Articles/Quatic-2012-en-GuilhermeSimoes.pdf

Software Outsourcing based on results:

http://www.fattocs.com/en/services/software-outsourcing

Counting Google3
By Julian Gomez, CFPS

I've heard comments from certain people talking about how they can't measure their applications with function points.

> *"It's not possible, you know, my application is a web app and function points were not conceived to count the web."*

> *"It's not possible; it's an iPhone / Android / Windows Phone app. We can't measure it with function points."*

I'm happy to say: You CAN Measure Your App… with function points!

I'm going to show you a real example. I'm going to measure an application which is common to all of us: I'm going to measure Google.
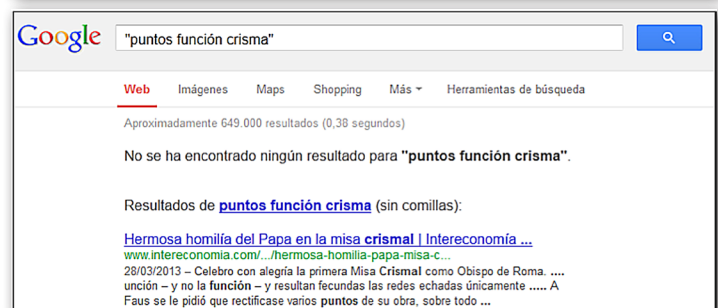
(Counting Google3, continued from page 9)

Requirements

The Google initial screens have a lot of functionalities. To measure all of them could be impossible (I think no one knows it all). For that, we only are going to measure the Google search shown in these images:

The description of the operation is provided here in case anyone does not know:

- **Search with Google:** When we hit the button, the engine searches for the text introduced seeking the secret Google algorithm (good point to start a SNAP Points measurement) and show us the found results.
- **I'm feeling lucky:** In this case, the same search is performed but instead of showing a list of results, the engine surfs to the first result.

Identifying Elementary Process

In this example, we are going to put the focus on the identification of the elementary process or transactional functions by the FPA IFPUG method. Identify Logical Data Groups and the complexity is a very difficult task because we don't have enough information (somebody could ask Google to provide it?).

First of all, we can see that we have two elementary processes:

- Search with Google
- I'm feeling lucky

What is the primary intent in "Search with Google"? The primary intent is to show the search results, that is to show information and for that we have an External inQuiry (EQ) or an External Output (EO).

If we look to the results shown on the screen, we can see the number of results found (approximate). For that the elementary process, we have calculated data and it must be measured as an External Output (EO).

Furthermore almost all know that Google search updates the information system (even without knowing how it is organized) with data about what words you are looking for, your explorer, operating system, etc. for the elementary process with the primary intent to show information and update an ILF (Internal Logical File) is an External Output (EO).

What is the primary intent in "I'm feeling lucky"? **The primary intent is to surf to the first result of the search.** That situation is more difficult to understand but that process (Google process) sends the information about the selected web page to the web browser, sends information out of the application boundary and for that we have either an External inQuiry(EQ) or an External Output (EO).

As in the same way of the first function, the Google system is updated with information that comes from the function "I'm feeling lucky" and for that we have to count an External Output.

Identifying Process Complexity

Now we are going to count the Data Element Types for both functions.

Input DETs are:

- Text to Search: The words we want to look for results.
- Action: It is a special DET defined in the FPA IFPUG method that measures the capacity of the user to hit a button and execute the elementary process.

Output DETs are:
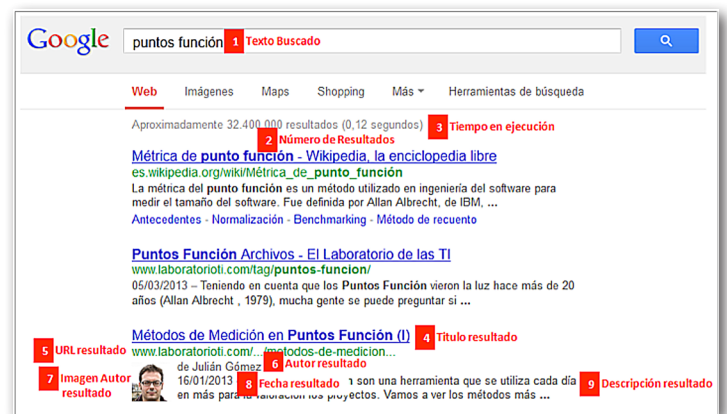
Per the FPA IFPUG method, the same DET that appears in the input and in the output, we only count one time thus "Text to Search" we only count one time.

We have to keep in mind that if the search doesn't find results, the screen shows:
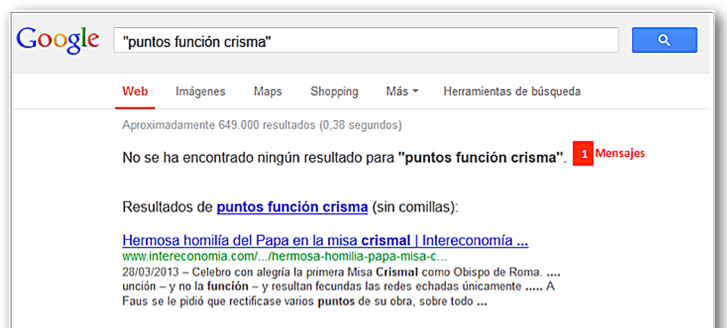
Final list of 11 DETs to Search with Google function:
1. Text to Search
2. Number of results
3. Execution time
4. Result title
5. Result URL
6. Result Author
7. Result Author Image
8. Result Date
9. Result Description
10. Action
11. Messages

Final list of 4 DETs for "I'm feeling Lucky" function:
1. Text to Search
2. Result URL
3. Action
4. Messages

Additional Functionality

Furthermore, in addition to the two identified functions, there exists another one which you have seen a lot of times.

You can see in the image:

Yes, when you begin to type the search words, Google gives you a set of words that match with your current writing. This is an elementary process.

The primary intent is to show the most searched results that match with the text you typed; the primary intent is to show information and will be either an External Inquiry (EQ) or an External Output (EO).

If you look closer at the list, you can see that part of the result is bold and other parts are without bold. It depends on the words that match your current writing. The elementary process is deriving the color of the words and for that it is an External Output (EO).

How many DETs?

The DETs are 2:
1. Text to Search
2. Result Description
In this case, we don't count the action DET because the elementary process is executed in an automatic way. Also we don't count the Messages DET because it is not showing anything.

Final Result

This is the result of the identified functional transactions:

Elementary Process	Type	DETs
Search with Google	EO	11
I'm feeling lucky	EO	4
Most searched values	EO	2

Next time, someone tells you that they can't measure an application with function points, tell him yes. Yes We Can… with Function Points!

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Demystifying Function Point Estimation

By Kishor Subbaraman, CFPS, Infosys Limited

As the IT Industry is maturing, organizations are exploring different methods for measuring productivity improvements and adopting scientific estimation techniques.

IFPUG (International Function Point Users Group) Function Points (FP) methodology has gained prominence over the years as a standard method for 'sizing' software projects to enable productivity improvement measurement and better estimation.

However, there are myths prevailing in the industry that hinder the usage of FP. This article provides an insight into these aspects and explores the power of FP.

How Important is it to Know the 'Size'

Let us start by analyzing some real life scenarios, from buying a house to buying some groceries.

What is the first question that we ask or we look for?

It will always be *"How big is the house?"* or, *"What is the weight of an item?" or "What is the distance between two places?"*

What is the Significance of "Big", "Weight" and "Distance"?

They show the size of a particular product or service. It acts as a mechanism to compare similar products or services. It helps to compare today's performance with yesterday's.

For example, the cost of a 200 square meter house was $10,000 last year, but today it is $15,000 i.e. 50% increase in per square meter cost. Without knowing the size, it is not possible to arrive at such conclusions.

It is evident that, without a 'size' factor, it is very difficult to compare performance between two data points. Though there are many factors (like quality, complexity, skill) that affect the cost, schedule and effort for development, size is the primary factor that helps to estimate these measures.

'Size' in Software

It is really shocking to see that most of the IT projects or IT organizations don't have a size measure.

As the IT industry is maturing, CIOs require a good justification for project budgeting and hence a good mechanism to arrive at budget projections. Vendors will have to show productivity improvements using an industry standard technique so that comparison across vendors is possible.

Today there are various Project/Product sizing techniques available in the IT Industry, like IFPUG Function Points (FP), Use Case Points, Lines of Code, Cosmic Function Points and so on.

IFPUG Function Points as a Software Size Measure

IFPUG (International Function Point Users Group) Function Points (FP) methodology has gained prominence over the years as a standard method for 'Sizing' software projects. The reasons being:

1) Easy to understand and apply. FP sizing is based on functional requirements as seen by the user. i.e. it is based on the user functionalities, screens, reports, data stores and interfaces. It not based on technical aspects of the development, like number of programs, lines of code, physical architecture etc.
2) Repeatable and reproducible. FP sizing is based on well-defined rules which ensure that for the same requirement, different FP Experts produce the same result and same FP Expert performing FP at different time period, produce the same result. Hence FP is a consistent technique.
3) Provides insight into functional as well as non-functional requirements separately.
4) Can be used for estimation even during early requirement stages.
5) Used as a standard size measure for reporting productivity.
6) Independent of implementation technology.
7) Auditable. As FP is based on standard and well defined rules, it can be easily audited by an FP Expert. Technology expertise is not required for FP Sizing.

Myths That Hinder the Usage of FP

Some of the myths that are prevalent in the IT industry regarding the use of FPs are:

1) *"We have not reached process maturity for implementing FP technique."*

There is no process maturity requirement for implementing FP. The only requirement is that the project requirements are mainly functional as opposed to non-functional in nature. If FP is implemented across all the projects, it will act as a common base for comparing different projects and trigger process improvement activities.

2) *"There are too many requirement changes. Hence FP cannot be applied."*

If there are too many requirement changes, it is very important to perform FP sizing for a project because FP can be used to evaluate and quantify scope creep and rework size due to scope changes. This quantification will aid to analyze requirement volatility and justification for additional effort or schedule extensions.

3) *"Productivity range using FP is huge, i.e. FP based project productivity varies between 7 FP/person-month and 17 FP/person-month for Java. This huge range makes FP productivity not so useful for estimation."*

It is important to note that FP is a functional sizing method. That means it cannot size non-functional requirements. Also, estimation depends not only on functional size but also on resource skill, process maturity, non-functional effort, reusability, processing logic complexity and implementation technology.

It is important to consider these factors during estimation and not just functional size. Most of the industry standard estimation tools use FP as the size measure and consider these additional factors to arrive at a reasonable estimate.

4) *"FP Counting is a time-consuming activity."*

FP Counting requires time, but not too much time. It is observed that FP counting effort is usually 0.1% to 0.5% of the project effort (phases included are Requirements until Implementation). The effort depends on the Project SME support, availability of good project documents and FP SME's knowledge on the Application/s. FP Counting can be done faster when the Project SME is available to explain the system requirements to FP SME.

FP in Estimation

An FP Size can be arrived at even during early requirement stages; therefore, Project Estimation using FP can be performed during early project life cycle. Once the requirements become clear, Project FP Size can be accurately measured which in turn will ensure better estimates. As FP is a consistent measure, FP Productivity can be applied across projects and also across organizations.

Organizations must ensure that there are FP experts available to review FP counts performed by project teams so that sizing error is minimized.

FP in Reporting Productivity Improvements

FP can be used as a common base to arrive at productivity ($ spent for delivering a FP) for various projects executed in different time periods and to analyze year over year productivity improvements.

Organizations try to spend more on functional changes (such as adding new functionalities and changing existing business functions due to new/changed business rules) rather than non-functional changes (corrective maintenance, look and feel changes, performance tuning etc.). As FP sizes only functional requirements (i.e. functional changes of applications/systems) it is very easy to find the split between functional spent and non-functional spent.

Sample FP Productivity Analysis

NFR- Requirements that are non-functional and cannot be sized using FP technique
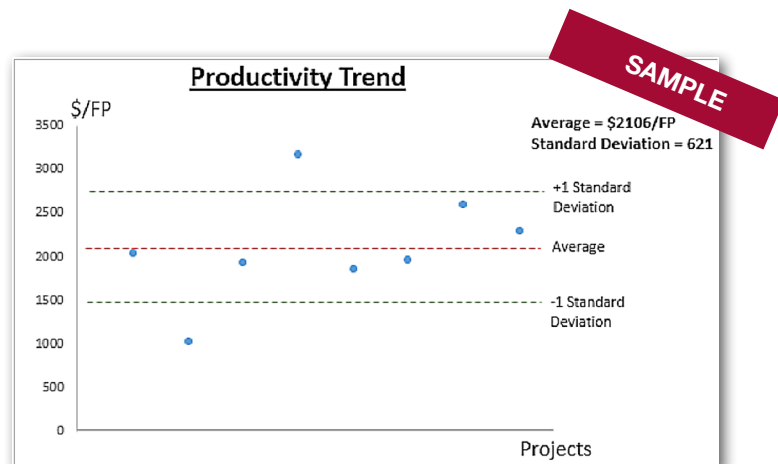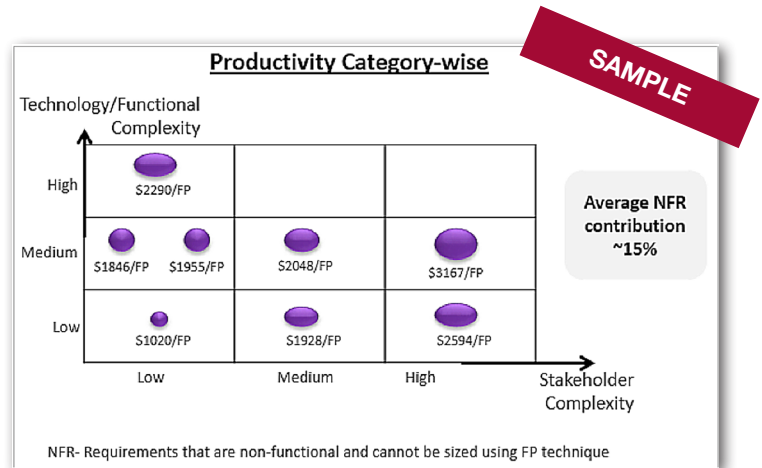
Summary

Function Points should be a mandatory size metric for development and enhancement projects, irrespective of organizations' process maturity. It is a simple and straightforward technique which can be easily implemented.

Function Point based Project Estimation improves estimation accuracy and reduces schedule overruns.

As FP is auditable, it is not possible to tamper FP size to show improved productivity.

Function Points Leveraging Transparency and Enabling Control Over Software Procurement

By Carlos Eduardo Vazquez, CFPS, FATTO Consultoria

Methodology to Suggest Objects of Interest for Procurement Auditing Purposes

Introduction

The tragic scandal from Enron Corporation bankruptcy triggered in motion the events that culminated with the Sarbanes-Oxley Act. Now for over a decade, higher levels of transparency and chargeability are qualities pursued for every business, government and non-profit organization.

The C levels of Management have their attention drawn to corporate governance due to increased priorities derived from those goals. The goals set for overall business operations ripples its way to the IT organization. Outsourcing contracts and project procurement management play a major role as areas of interest to assure compliance to internal controls and auditing practices.

Management establishes software supplier agreements terms and conditions in different ways. Those agreements span over a series of issues, the two most relevant for the theme under discussion are:

- Pricing and compensation methodology that enables calculation of charges for the services provided to the acquirer.
- Pricing and compensation schedules that provide for charges for the products and services provided, including frequency, term, and pricing type (e.g., fixed price, lump sum, time and materials) as well as rate cards, and a skills matrix.

Regardless of the pricing type chosen, function points play a pivotal role when it comes to audit and control over software procurement.

Motivation

That is so because some half millennia ago Luca Pacioli introduced one of the most revolutionary measures towards control goals above mentioned: the double entry bookkeeping. This concept comes in handy when it comes to software procurement and software production, planning & control.

Function points accounts for assets as results from an investment of time and money. Without the "double entry" perspective, things get confused. Furthermore, function points measure the assets in a management understandable way since its foundation is the user view.

Whenever, there is an analysis based only on costs or investments, scenarios as the one described in Figure 01 arise. It is a meme (or idea) I have recently found when browsing my Facebook timeline. Read it carefully:

You´ve found a shirt for US$ 97.00.

But, you have no money, so you´ve borrowed US$ 50.00 from your mother and US$ 50.00 from your father. So:

US$ 50.00 + US$ 50.00 = US$ 100.00

You´ve bought the shirt, and there is change of US$ 3.00.

You pay US$ 1.00 back to your father, US$ 1.00 to your mother and keep the other US$ 1.00 to you.

Now you owe US$ 49.00 to you mother and US$ 49.00 to your father.

US$ 49.00 + US$ 49.00 = US$ 98.00 + your US$ 1.00 = US$ 99.00

What about the other US$ 1.00?

Figure 01

At the end of this article, there is the solution explaining the right approach to the *meme* presented.

Surprising as it may seem, the presence of this kind of mathematics is more frequent than you might imagine in the context of software development and maintenance contracts. Money (as well as time) without a clear function attached to its use leads to confusion.

Scenarios as the above depicted conspire against transparency and that is so whenever there is not a clear product unit in place and there is no strong bound binding investments of time and/or money to deliveries measured in those units.

In those scenarios, if the CEO asks the CIO (really looking for a clear understanding of his/her answer) about how software production planning and control takes place or how the software development and maintenance contract agreements are drawn, then they would realize a universe not so far from the meme depicted previously.

If the only issue under discussion is money or time invested in a software project or operation without something to play a role as comparable product unit, then there is no way to associate a meaning to those numbers. As a result, you cannot assign importance to the information. Finally, you cannot make an informed decision or compare projected (or accomplished results) with prior results.

For instance in 2009, a law firm (working for a software contractor who had acted as a part in a contract where the other part had been a government agency) hired my company. They were seeking help to support their efforts to elaborate the defense thesis for a local Court of Accounts process in course.

The contract established function points as the only pricing and compensation methodology. My company has been keeping records about public software agreements like the one our

(continued on next page)

clients' client had been engaged for over a decade. Therefore, we were able to certify some measurements and to point out flaws. Those flaws not necessarily were in the measurement but in the agreements' terms and conditions themselves, so explaining some deeds otherwise easily perceive as acts of bad faith.

If there had been no function points as a product unit, had the contract pricing and compensation model defined for each demand an a *posteriori* (knowledge or justification is independent of experience) negotiated bunch of hours with no product unit to quantify the deliverables, then the discussion would rest only in expert opinion without whatever benchmark available regarding the process or its performance.

The Function Point Role in Transparency

The major merit of Function Point Analysis (FPA) is to introduce a management understandable, quantifiable and comparable, enterprise and market wide, product dimension in a world where there still prevails the perspective of investment and cost with no standard measure for the assets delivered. Function Points Analysis plays a role doing so and, therefore, establishes the means to plan and evaluate productivity. Without some metric like function points, there is no governance, no management: there is bargaining at most in software procurement.

Another merit of FPA is to identify deviations from a common behavior in order to point out objects of interest for auditing purposes. Sometimes, those exceptions do not necessarily correspond to actual deviations; sometimes, actual deviations do not show as an exception to a common behavior. However, there is a way (even though not the only way) to define a standard operational procedure to select contracts for a more detailed analysis.

Suppose an analysis of prior contracts reveals productivity (expressed by their delivery rates) distributed as depicted in Figure 02. According to the analysis of those 37 contracts, there is an 80% chance of the delivery rate to be about 09 Staff-Hours per Function points (SH/FP) or less.

Of course, FPA does not measure a series of relevant dimensions about the software process with impact on the productivity. That is why the selection presented includes only software development contracts for the Oracle platform. There is no contract addressing enhancement projects nor other platforms comprising different variables not measured by FPA that would cause unnecessary bias in the productivity data.

The information depicted by the analysis of productivity distribution enables software managers or client organizations to define criteria to select objects of interest in the future for auditing purposes.

Even if we focus in the present and consider those past contracts as the focus of our attention, the plot points out as *outliers* 04 cases, possibly items subject to further inspection.
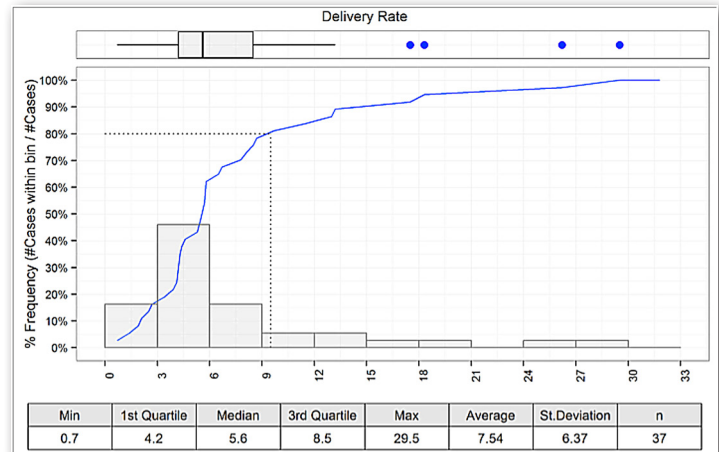

Figure 02

Linear regression is another way to define criterion to select contracts for audit purposes. In this article, we will simplify the analysis and apply no transformation. In a professional application considering the range from about zero to 4.000 functions points, there either should be a segmentation of the data in ranges with less amplitude or a log transformation to the data followed by a series of tests to ensure the robustness of the regression. Figure 03 depicts the regression results in this simplified approach.
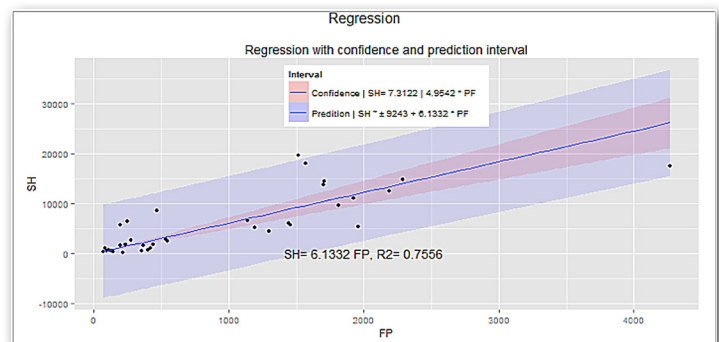
Figure 03

The data analysis presents the range with 95% confidence interval that the average delivery rate of a contract or demand will be within 4.95 SH/FP and 7.31 SH/FP. So, those contracts with actual productivity rates beyond the confidence interval range are candidates as objects of interest for auditing purposes.

The main reason I mentioned the need to either log transform or perform the same analysis with narrow ranges of size is to foster smaller prediction and confidence intervals.

Pricing Prescribed from Function Points

The procedures so far discussed, are valid in scenarios where the pricing and compensation methodology have as core measures time & material or a lump sum amount. Scenarios where the contract terms and conditions define pricing and

(Function Point Leveraging, continued from page 15)

compensation methodology using function points as core measure require another procedure to identify objects of interest.

Agreements like those have the functional size of the project measured in function points as the primary cost factor to prescribe how much the value of a contract or demand within an umbrella contract are. Since productivity is constant, there is no point for deviations from the prescribed productivity.

We can look for deviations in size for instance. If we plot the distributions of the contracts or individual demands size, then we can identify a pattern and look for exceptions for further evaluation. Figure 04 depicts the distribution of functional size of the very same dataset used so far.

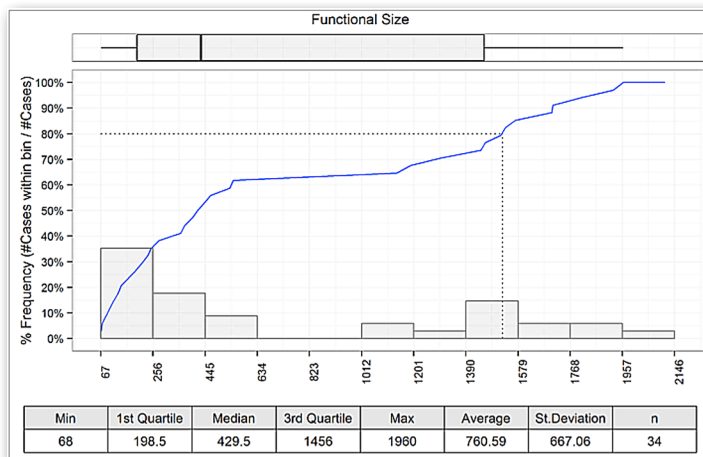| Min	1st Quartile	Median	3rd Quartile	Max	Average	St.Deviation	n
68	198.5	429.5	1456	1960	760.59	667.06	34

Figure 04

According to my experience, distributions like the one in Figure 04 are common when it comes to software projects contracts. Since the range is too wide (ranging from 68 to 4,272 function points), a good practice is to split the data set into two. First, because those projects with over 1,000 FP are naturally objects of interest for auditing purposes due to its cost. Second, it is easier to analyze the data distribution with a shorter tail. Figure 05, depicts the same data considering only cases up to 2.000 FP.

Min	1st Quartile	Median	3rd Quartile	Max	Average	St.Deviation	n
68	198.5	429.5	1456	1960	760.59	667.06	34

Interval	Cases	Frequency (%)	Cumulative Frequency (%)
= 67 e < 256	12	35,29 %	35,29 %
= 256 e < 445	6	17,65 %	52,94 %
= 445 e < 634	3	8,82 %	61,76 %
= 1012 e < 1201	2	5,88 %	67,65 %
= 1201 e < 1390	1	2,94 %	70,59 %
= 1390 e < 1579	5	14,71 %	85,29 %
= 1579 e < 1768	2	5,88 %	91,18 %
= 1768 e < 1957	2	5,88 %	97,06 %
= 1957 e < 2146	1	2,94 %	100,00 %

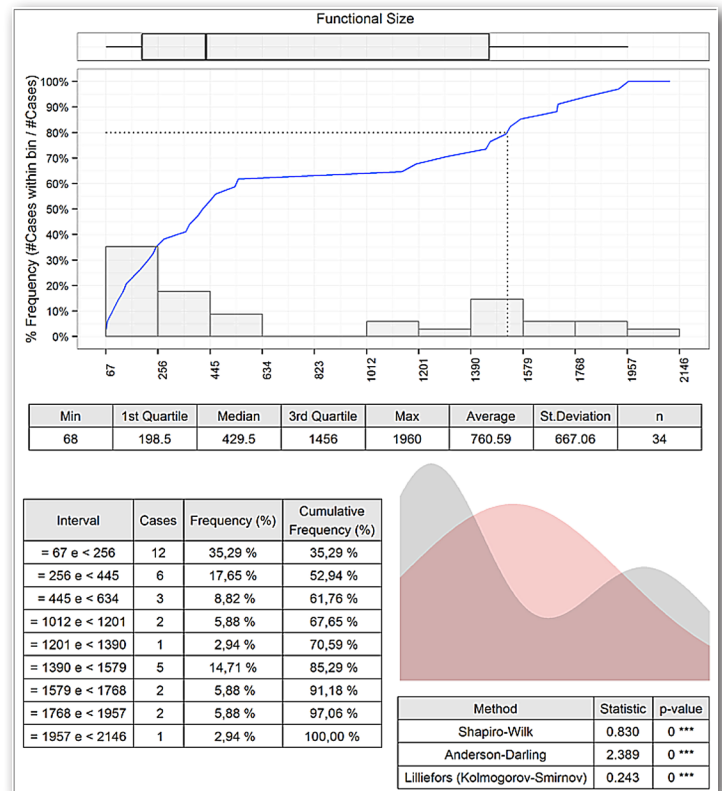| Method	Statistic	p-value
Shapiro-Wilk	0.830	0 ***
Anderson-Darling	2.389	0 ***
Lilliefors (Kolmogorov-Smirnov)	0.243	0 ***

Figure 05

Suppose the distribution above is set as criteria of comparison over a one-year period. The next year, the audit team will compare the actual distribution against the one set as criteria (in the same fashion the density distribution graph within Figure 05 compares the empirical distribution function derived from the data to the normal distribution function).

Cases within the interval bin with greater variations may have a higher priority for objects of interest selection for audit purposes.

Another strategy, complementary to the one using deviations from size distributions, is the one using staff-hours negotiated or amount paid as criteria to compare distributions. Figure 06 presents the same data set used in Figure 05 (both excludes cases with over 2,000 FP).
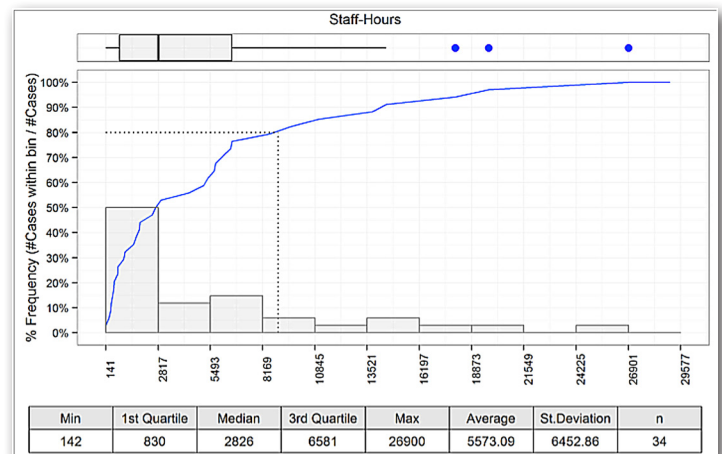

Min	1st Quartile	Median	3rd Quartile	Max	Average	St.Deviation	n
142	830	2826	6581	26900	5573.09	6452.86	34

Figure 06

(Function Point Leveraging, continued from page 16)

When we analyze the data, we realize 50% of the overall cases are up to 2,817 hours. Therefore, instead of using the size as criteria to define the cut off between two classes of projects to analyze, the number of staff-hours might be a better choice. The cut off criteria definition is in practice comprised of a series of iterations until the distribution best suited for the business needs rise.

Conclusion

When each contract or demand is negotiated in terms of an amount of hours in a context where the hourly fees are defined in a corporate agreement, management may be under the impression financial decisions are made by people with right authority to make them. However, it is often the case the sizing in staff-hours is just another currency, such as Euro, Pound or Brazilian Real and its exchange value is the hourly fee determined in the corporate agreement.

Function points allow establishing corporate productivity ranges and enabling standard market benchmarking more easily segregating those with responsibility to settle strategic and tactical corporate or departmental agreements from those responsible for technical decisions.

Even if your business IT organization does not use function point as a support tool for its procurement process, it is a great value for auditing purposes.

The Solution to the Puzzle

Our goal with this example was to establish the relationship between expenses and incomes (money, time) and its function (assets and liabilities).

The first step, in Figure 07, is the borrowing that creates a US$ 100.00 liability and, at the same time, an asset of the same amount of cash on hand.

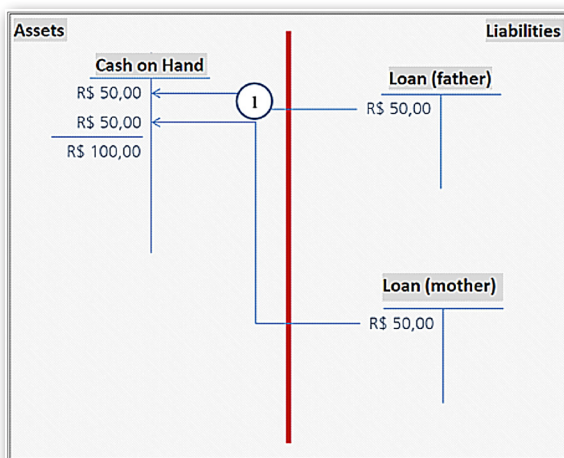*(Note: replace 'RS' with 'US' in all figures.)*

Figure 07

There is balance and harmony! There is US$ 100.00 on one hand and, on the other, US$ 100.00. The second step, in Figure 08, is buying the shirt for US$ 97.00.
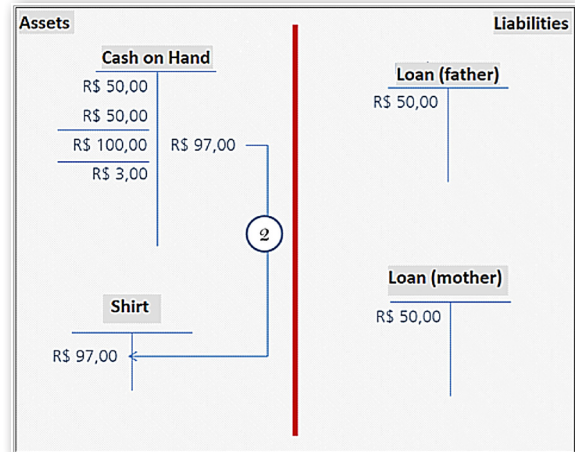
Figure 08

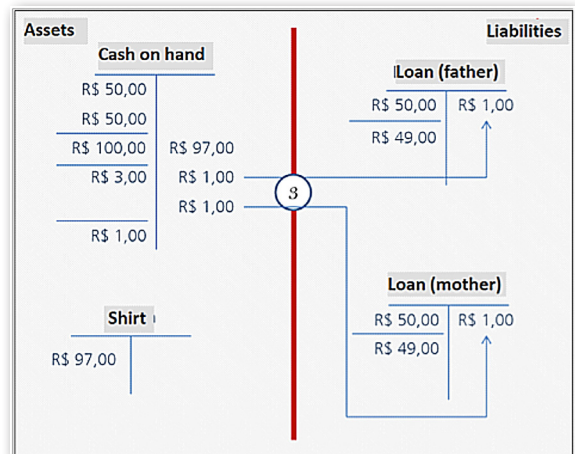There is still US$ 100.00 on both sides. The next step, in Figure 09, is returning US$ 1.00 for each parent.

Figure 09

The balance of assets and liabilities end up with US$ 98.00. There is US$ 1.00 available for whatever use and a shirt US$ 97.00 worth. As liabilities, there is a balance totaling US$ 98.00. The balance is possible due to expenses and incomes allocation to its function… but if we forget this perspective there is madness.

Billions of dollars are spend every year by organizations worldwide in software development and maintenance without a standard product unit. People without the responsibility or authority by financial decisions bargain services on "too many hours" or "too few hours" basis.

Can you see enterprise governance without accounting? I cannot see software development and maintenance without a product unit measurement enabling software planning and control production.

Conference & Education Committee

By Luigi Buglione, Acting Chair

The Conference & Education Committee (CEC) is working on the upcoming ISMA[10] Conference that will be held in the US on April 27-30, 2015. After Rio de Janeiro (ISMA[8]) and Madrid (ISMA[9]), the IFPUG Conference returns to the US. The focus will be balanced between technical and business topics, including of course FPA and SNAP, counting experiences, and also other measurement experiences, looking at a broader, holistic perspective. The aim of ISMA is, as from its acronym, to be the 'International Software Measurement & Analysis" conference. That includes putting together the 'Measurement' and the 'Analysis' parts in order to have valuable information for the decision-making process. Further details will be available on the website.

CEC is also preparing a series of recorded webinars from the authors of the IFPUG Book, *The IFPUG Guide to IT and Software Measurement* that will be available to IFPUG members in the second half of 2014. You will find information on purchasing the book on the IFPUG website. There are forty-three chapters by fifty-two authors from thirteen different countries, providing a comprehensive view on IT and Software measurement.

Just a reminder, Conference content can be found in the "Knowledge Base" on the Members' Services website at no charge. Please consider volunteering for an IFPUG Committee to give your support and ideas. Send an email to ifpug@ifpug.org or complete the volunteer form.

Communications and Marketing Committee

By David Thompson, Chair

A new committee member, a new website layout, a conference in Europe, and many content updates and eBlasts

In February, we welcomed Antonio Ferre as our newest member of the CMC. Antonio lives and works in Valencia, Spain for GFT IT Consulting S.L.U., performing Quality Assurance and Metrics activities. And while it is not his day job, Antonio does have some experience with website development, using WordPress, the web authoring and support tool we use for IFPUG.

Shortly after he came onboard, Antonio took on the challenge of designing a new website layout, one that is more dynamic and appealing than the layout it replaced, one that we had adopted back in April, 2012. Antonio started with a list of eighty-five functional and non-functional requirements. With that list he worked through March and April to lay out, and refine, in our test region, a new format. On April 30th he migrated it over to the production region. A few additional minor layout modifications are now in the works.

In the meantime, the ISMA[9] conference, **Measuring 4 Business,** kicked off in Madrid at the end of March, sponsored and hosted by LedaMC, with directors Dácil Costello, our CMC Board Liaison, and Luigi Buglione helping to organize and run the event, attended by over One hundred and fifty professionals. Antonio Ferre of our CMC was there in person, and other CMC members helped out remotely with website updates and eBlasts promoting the conference.

The CMC has been working with the Conference and Education Committee to plan a series of pre-recorded webinars that cover selected topics discussed in the latest IFPUG Book, *The IFPUG Guide to IT and Software Measurement.* We have other assignments pending: develop a SNAP Logo; and develop a marketing plan to increase the number of members taking certification exams via Prometric. We will stay busy!

Functional Sizing Standards Committee

By Tammy Preuss, Chair

What do Agile, Data Conversion and Real-Time Data Sharing have in common? These were the topics of papers published by the FSSC over the past 6 months. The Agile white paper, which is available in English and Portuguese, has proved to be one of the most popular items in the IFPUG on-line store.

As part of the IFPUG and ICEAA partnership, The FSSC again held their annual committee meeting at the International Cost Estimating & Analysis Association (ICEAA) annual conference in Denver, CO. FSSC Members discussed and reviewed new iTips, uTips and white papers, which will soon be published, as well as presented papers on the conference's Information Technology track. FSSC members also manned the IFPUG booth at the ICEAA conference, spreading the word about IFPUG to the 350+ attendees.

Look for new publications on Real-Time Data Response, Derived Data, Estimating and Data Analytics in the next 6 months.

Non-Functional Sizing Standards Committee

By Talmon Ben Cnaan, Chair

SNAP method of non-functional sizing continues to evolve, after a successful presence of SNAP in ISMA[8] Rio and ISMA[9] in Europe, (including a SNAP workshop and CSP exam at both conferences), the NFSSC is looking to expand SNAP implementation in more areas, focusing on Europe, India and Japan.

In addition, the NFSSC is increasing its support to current users, through discussions in the IFPUG – SNAP Interest Group, and in LinkedIn. Starting soon, we will publish iTips and uTips, based on the experience and the challenges of SNAP users.

In the US, two companies are now certified to provide SNAP training: David Consulting Group and Q/P Management Group.

NFSSC MISSION AND GOALS

NFSSC mission is to maintain SNAP the leading methodology of software non-functional sizing. The NFSSC wants to inspire people to broaden sizing, to include functional and non-functional requirements, by:

- Providing continuous technical support to users and potential users.
- Serving as a forum for resolving issues in SNAP methodology.
- Expanding the exposure of SNAP to all types of potential users - sizing experts, software development companies, system integrators and software consumers.
- Increasing the confidence of potential users that SNAP meets their needs.
- Providing guidelines on how to apply SNAP and FPA as best sizing package.
- Providing feedback and support to SNAP trainers and SNAP practitioners.
- Satisfying the market needs and demands for benchmarks, implementation hints, and technical assistance.

During the next two years, NFSSC seeks to achieve the following goals:

- Increase the exposure of SNAP to at least 500 active users by October 2014 and 800 active users by October 2015.
- Provide non-functional benchmark to users.
- Increase the number of certified practitioners worldwide: The US, Latin America, Europe and Asia.
- Build strong relationships with software consumers (mainly governments and corporates), sizing and measurements consultants, and software suppliers.

Functional Size or the Excellence of Having Strategic Information

By Antonio Ferre Albero
IFPUG CFPS. Member of the IFPUG CMC and CEC Committees. Project Management, Quality and CMMI, IT Measurement Expert, Technology Strategist, DB2 and IBM Mainframe Specialist

How many software products were produced by your IT company or your IT department the last year?

To transform data into information and to use this information to manage and improve companies, projects, processes or products is challenging, and at the same time, fascinating work. We can say that what gets measured gets managed and as a general rule, what gets managed gets better. Well known are quotes such as, "If you can't measure it, you can't improve it", from Peter Drucker, or "If you can't measure something, you can't understand it; if you can't understand it, you can't control it; if you can't control it, you can't improve it" from James Harrington.

Sometimes only announcing the fact that something will be measured will automatically cause it to be improved by those developing it.

In the Information Technology sector we can talk amongst others about financial metrics, productivity metrics, quality metrics, time to deliver metrics, reference metrics, and about what is even more interesting - to know and to manage the different drivers that influence, in a positive or negative way, those metrics. And then to collect and record periodically this information and to use this strategic information for doing things better.

But I would like to mention this magic word, "drivers." We can say that our productivity in a specific technology and under a set of circumstances is 1.25, for example. We deliver products under this productivity with an extremely low ratio of defects; our competitors have a lower productivity; and standard market repositories (such as ISBSG, for example) indicate that our productivity ratio is good. But it is totally essential that we consider that the "project size", for example, can influence this 1.25 value: the productivity can be different if the project is very small, or alternately if we are talking about a two year project with a team of 400 people.

It is important to have different refinement axis: project size, project team size, time constraints, application or project criticality, multisite development, product complexity, etc., all impact productivity.

We need to be able to answer, with recorded and accurate metrics, questions such as, "What is our expected productivity of a 15,000 hour project, under a specific technology and framework?" And "What can change in case of a project of 600 hours?", "What are the drivers that affect our productivity, quality or delivery time, and how do they influence them?" Some of these will be internal. Others will be external, for example, on the customer side. Both might be well-known and managed, at least the ones that we can control. It is possible that your answer has been "yes" or a kind of synonym answer like "yes, I am an experienced project manager and I have all of this under control", but the key words when asking the question are "accurate" and "recorded metrics". Do we have accurate and recorded metrics that fulfill the reality?

Sometimes mature IT departments, working with well-defined procedures, technologies, frameworks and products, can easily answer these third-level metrics questions. It will be more difficult for IT companies working for dozens or hundreds of clients, applying their clients' procedures, documentation requirements, customer development standards, frameworks and defined rules, to answer those questions with accurate information because sometimes each big customer is a

concrete and different world, even if the technology used is the same.

Here is where Function Points come in: it is not possible to have a complete set of IT metrics if we do not have the "Functional Size" of an IT product/project, and this Functional Size is determined by using Function Points.

When a 4,000 Hour Project is Smaller, in Functional Size, Than One of 1,000 Hours - Comparing Projects

Sometimes it can be difficult to understand that an IT project of 4,000 hours can be smaller, in terms of product delivered, than an IT project of 1,000 hours. It is important to not confuse the cornerstone concepts, project effort and project size, and that both concepts might not always have the correlation that more size = more effort, and less size = less effort.

It is very interesting: if you have a farm and you produce oranges, you will record, for example, how many kilos of oranges you produce, and how much time/effort you need to collect 1,000 kilos of oranges. Even more … for sure that you will know that in certain circumstances 1,000 kilos of oranges will be collected in more time or in less time; factors such as if the terrain is wet or not, or if the trees are bigger or smaller, would determine that you can collect more or fewer oranges in a given time. Here we talk about "size" (kilos of oranges), about "effort" (how much time, or persons x time), about "productivity" (kilos collected by day, for example), and about drivers that influence the productivity, for example if the trees are bigger or smaller. If we have big trees, perhaps we will need to climb into the trees resulting in a lower productivity. For sure other questions will arise and we need to be ready to have strategic information, as mentioned above; e.g., it more valuable to have big trees that produce more oranges by tree, or to have small trees with a higher harvesting productivity, regarding time to collect the oranges? But quality, productivity, market strategy and profit might be aligned. Perhaps to collect oranges from big trees is less productive, but the product has a higher quality, and we can sell them more easily and with higher profit margin. Who knows? We need to have information and manage it.

The concepts of size, effort, productivity, and productivity drivers have been used for centuries. It will be difficult to find a small or big company that produces shoes or cars that cannot answer in less than one minute questions such as "How many shoes or cars did your company produce in the last year?", or "Did you produce more or fewer shoes or cars than the previous years?"

Try to ask the same question to some IT software company: "How much software did your company produce in the last year?" Or, "Did you produce more or less software than in the previous years?" Be ready to hear, as answers, financial incomes; number of projects; number of employees working on IT projects; or just the project hours spent in IT activities. Perhaps, in some cases, you will receive a "financial" answer or an "effort" answer, but not the answer to "How much software did your company produce last year?"

The answer to this question only can be determined by quantifying the product. In a car factory the answer can be units of cars, in a farm perhaps number of kilos of product, or in a shoe factory the number of pairs of shoes produced. Even more, we would need to add a second axis that refines this info with the type of car, for example, because for sure it is not the same to produce 1,000 economy cars as 1,000 luxury cars.

A given software project can be developed using different approaches; in fact, there is a high artisan design component in developing software solutions. Externally you will see the same product, but if you have a look at the technical design and the software code you will see different internal products. I have seen programs with thousands of lines for doing almost nothing, and programs of dozens of lines that do a lot of things, even with the same technology and in the same program language level.

Who is more productive, a development team that creates, in 100 hours, a software application with 20 programs of 2000 lines of code each? Or a second team that creates, in 80 hours, the same application with 10 programs of 800 lines of code each?

The first team has built a given application containing 20 programs and 40,000 lines of code. The second team has built the same application with 10 programs and a total of 8,000 lines of code.

Just a detail: the product required by the customer is the same. If we talk about "Functional Size", both projects are identical because both do the same things; both have the same Functional Size.

Functional Size, the Cornerstone

Some companies measure the application size according the number of programs, or number of Lines Of Code (LOC) or Statements, for example. These measures will provide misleading results. If we measure the size according the number of programs created, as in the example above, the first team has been twice as productive as the second. If we take into account the number of lines of code, the first team has been five times as productive as the second one. This leads to the erroneous conclusion that we need to reward the first team and possibly apply some kind of sanctions on the second team.

If we measure the size according to the project functionalities, the conclusions are totally different: a) the project size delivered for both teams is the same, b) the first one has created five times more code for doing the same, c) more code by general rule usually means more errors, d) more code means more maintenance effort during the life of the product.

We can say than the better team is the one that creates the

same application with less code and in an easy-to-maintain way. It saves time now and in the future. We can say that if you have more experience in a matter you will convert a complex problem into an easy solution, whereas other teams may develop complex solutions for solving easy problems. The art of excellence is to produce things as easily as possible.

For an IT company or IT department, it is essential to measure the product. It is curious that while small and big manufacturing companies measure products produced some IT departments or IT companies, working with the most advanced technologies, measure as product produced by the number of hours or effort.

In Information Technology, to measure the product produced is to measure the "Functional Size" of the products produced. Combining the Functional Size with the Project Effort will obtain the Productivity (or PDR; Productivity Delivery Ratio/ Rate). This PDR is essential in order to compare projects internally, for analyzing why some projects are more or less productive than others. The reasons for performing this analysis are many: for improving the future estimates; for applying measures that can improve projects, for providing feedback to the customers, especially when the productivity is low due to external factors, for comparing "how" productive and competitive our company or IT department is in the market and comparing with standards ranges.

Combining the Functional Size with Defects and with a set of attributes for those defects (time to solve them, severity,

impact …) we will have the "Defect Density" ratio that measures the quality of the product prior to installation or post installation.

The ideal objective is to have a higher productivity, while delivering a high quality product that fulfils all the requirements with a product internally as simple as possible.

Based on this Functional Size, some other reference indicators can be obtained. Indicators such as ideal team size, optimum project duration, number of test cases planned or just a number of functional/ technical analysis pages. Capers Jones, for example, has given a lot of interesting reference indicators.

If we do not have the Functional Size, we cannot have objective metrics; we can say that the Functional Size is a common denominator for having the most strategic metrics such, as mentioned, Productivity or Defect Density. The IFPUG method, as documented in the IFPUG Counting Practices Manual (CPM) is actually the most used Functional Size Measurement technique recognized by the International Standards Organization (ISO/IEC) for sizing software projects and applications (other well-known methods such as COSMIC or NESMA are variations of IFPUG).

The interesting point of this is that two different IFPUG experts (or specifically, Certified Function Point Specialists, or CFPS) might count the same Functional Size for a given project, independent of "how" the application has been built. It does not matter if the application has been done with 20,000 lines of code or with 200,000 lines of code. But thinking again, perhaps we need to ask why a team has used ten times more code than the other.

In fact, this Functional Size, sometimes known as number of Function Points, is the cornerstone for obtaining the more strategic and essential software metrics for any small or big IT company or for an IT department. Functional Size provides the excellence of having strategic information. Information that answers questions such as, "How much software was produced last year by your IT company or your IT department?"

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Behind the Scenes
By Constance Holden, Executive Director

We hope that you have accessed the Members' Service Area of the website to take advantage of the resources in the Knowledge Base as well as to check your personal information. The IFPUG members and members receiving benefits are important to the strength of our association. In order to provide the best member services possible Headquarters needs your help with updating your personal information. On your profile you have the ability to list two email addresses; business and home. It is extremely important to list a personal email in case your employment changes. Emails are the main source of correspondence between IFPUG and its members and we want to ensure you receive notifications (such as certification expiration reminders) as well as news of events. With the upcoming elections, we would also ask that you update your mailing address since nomination forms and ballots will be sent by mail. Membership is required to be eligible to vote, so don't forget to renew on time. Let us know if you need any assistance.

Please also visit the IFPUG Insights area and let us know what you think of the articles in this edition or previous editions of MetricViews. You will find this an excellent place to ask questions and discuss what you have read. This is YOUR IFPUG community, so get involved!

Lastly, we would also like to let you know that we have added to our Headquarters Team. Jamie Noonan will be assisting in the certification area and Nicole Lauzon will be assisting with membership and publication needs. You may reach them through ifpug@ifpug.org .

Best regards,
Constance Holden

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Visit UPCOMING EVENTS to register now.**

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THANK YOU FOR YOUR MEMBERSHIP!