

# MetricVIEWS



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A PUBLICATION OF THE INTERNATIONAL FUNCTION POINT USERS GROUP

## FOUR REAL-WORLD LESSONS LEARNED ABOUT SNAP

**THE EXCITING JOURNEY  
FROM SiFP TO SFP**

**VALUE CHAIN, VALUE STREAM  
AND FLOW METRICS: VISUALIZING  
BUSINESS VALUE**



**IFPUG**

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USERS GROUP



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This edition of *MetricViews* reminds me of the many reasons why I love IFPUG and why I am proud to serve the organization as president. IFPUG has had a tremendous year in 2022 and our future is certainly bright.

What is so timely and special about this edition of *MetricViews* is that the feature articles reflect on our past, which help us understand how far we have come and what the future holds for IFPUG. The articles highlight IFPUG's global reach through a historic glimpse in Italy, the development and evolution of Simple Function Points, the continued growth of the Software Non-Functional Assessment Process and how our friends at the International Software Benchmarking Standards Group have grown in parallel with IFPUG. These are all areas that will continue to evolve in 2023.

This year, IFPUG launched a new website and Learning Center, which provide strong foundational tools to continue to promote the value of IFPUG's FPA, SNAP and SFP. The website communicates a stronger message to stakeholders in the function point community and the new Learning Center stores all the valuable resources such as webinars, white papers and publications developed by IFPUG.

Of course, none of this would have been possible without the amazing group of volunteer leaders and committees that dedicate themselves to the further advancement of IFPUG and function points. I would like to congratulate Cinzia Ferrero and Sushmitha Anantha for being newly elected to the Board of Directors, and of course welcome back to Luigi Buglione who was re-elected. They will succeed Dácil Castelo, who has completed her term, and Daniel French, who will continue to lead as the Certification Committee chair. I am grateful for all of our board and committee members who have served IFPUG over the years. If you are interested in volunteering for 2023, please email our headquarters office to get started.

Congratulations to our committee and Editorial Board for another great issue of *MetricViews*.

**Charles Wesolowski**  
IFPUG President



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As evidenced, we have delivered this year's second *MetricViews*. First, I need to remind you that the "we" in meeting this milestone is quite a cast. CMA plays a role throughout this whole process. Whether it's announcing a call for articles on the new website (congrats) or on social media, coordinating key dates and eventually editing, formatting, layout, advertising and publishing, it's a months'-long process. It's probably no less of a time commitment for the authors who research, develop and edit (round after round) the articles you will see. Some members of the Review Board invest many hours helping the authors to communicate the content in the articles, and at times collegially challenging the ideas presented. Committee chairs and other special column contributors keep us current with the many efforts underway within our community.

This *MetricViews* issue contains celebratory updates from ISBSG's 25th anniversary, two more "research-like scholarly" articles on SNAP and Simple Function Points, a glimpse at the history of software measurement in Italy and a follow-up to last issue's Flow Metrics article expounding on value chains and delivery.

This composite resembles feedback that "we" solicited from you in our last issue and from the IFPUG Board of Directors. Board feedback included: short articles, long articles, (medium articles not suggested) research (and statistical) articles, updates, member experiences (implied "positive" experiences), application of measurement approaches (implied, when they work), new ideas, (old ideas were not suggested!) and "edgy" but not too controversial (not sure we satisfied this one!).

If one makes the "bullseye" big enough, you can say we absolutely nailed it. If you make the stadium small enough, you can say we hit it out of the park. Those are the outcomes we target. Or as we used to say, merely close enough doesn't matter except with horseshoes and hand grenades. We encourage the horseshoes or, in keeping with this issue, perhaps bocce ball.

Be well, stay well.

**Joe Schofield**

*MetricViews* Editor



IFPUG is committed to publishing timely articles related to function and non-functional software measurement in every issue of *MetricViews*. While each article is reviewed for relevancy and clarity, articles, especially those that are innovative and thought-provoking, are not necessarily endorsed by IFPUG.



# FOUR REAL-WORLD LESSONS LEARNED ABOUT SNAP

By: Alfonso González

**T**hroughout the last few years due to the pandemic, the war, the chip shortages, supply chain disruption, as well as other global circumstances that surround the software development industry, the need to control expenditures has increased. The estimation and costs forecast required today are of vital importance for any company that seeks profitability in its investments.

In this environment, the Function Point as a tool for estimation, control and expense management is undoubtedly gaining more strength. The need to extend the Function Point coverage to those non-functional investments and those eminently technical has been increasing surprisingly rapidly. The Software Non-Functional Assessment Process (SNAP) fills that void as a complementary metric to Function Points. The IT industry demands and needs a useful and practical application of a metric that imparts transparency to technical development investments and allows a complete software quantification.

## Is SNAP useful?

Yes, SNAP is useful in accounting for product characteristics that the industry demands. However, we must apply it with other criteria to retain its integrity. This article reflects LedaMC's experiences applying SNAP over two years while avoiding its theoretical virtues and its technical component. The focus is not merely on applying SNAP, but on *how* to apply it. It's important

to do it in a trustworthy manner, and in this sense, four lessons learned from the analysis of the project sample are offered that may enable success for others.

## The sample

A sample of 237 projects is examined. All these projects obey two main characteristics:

1. They have been developed for the same client over a period of two years
2. Each of them impacts one of the four main categories of SNAP (five, if we consider the data configuration independently)

Please refer to the SNAP manual to find a more in-depth description of each of these typologies. Broadly speaking, we should know that:

- The **Data Operations Category** relates to how data is processed to meet the non-functional requirements in the Application (it includes the Configuration Data that consist of additional unique business value to users that is provided by adding, changing or deleting reference data/code data information from the database or data storage with no change in software code or the database structure).

- The **Interface Design Category** relates to the end-user experience. This category assesses the design of UI processes and methods that allow the user to interface with the application. No analyzed projects below fit this category.
- The **Technical Environment Category** relates to aspects of the environment where the application resides. It assesses technology as well as changes to internal data and configuration that do not provide added or changed functionality from a Function Point perspective.
- The **Architecture Category** relates to the design and coding techniques used to build and enhance the application. It assesses the complexities of modular and/or component-based development.

**Table 1. Sample characteristics**

SNAP CATEGORY	AGGREGATION	# PROJECTS	EFFORT (md)	MIN. EFF. (md)	MAX. EFF. (md)	SNAP POINTS
1	Data Operations	38		1,0	96,0	8.314,0
1.5	Data Configurations	100		1,0	249,0	24.904,0
2	Interface Design	-		-	-	----
3	Technical Environment	93		1,0	565,0	26.788,0
4	Architecture	6		6,0	19,4	80,0
	ALL	237		9,0	929,4	60.086,0

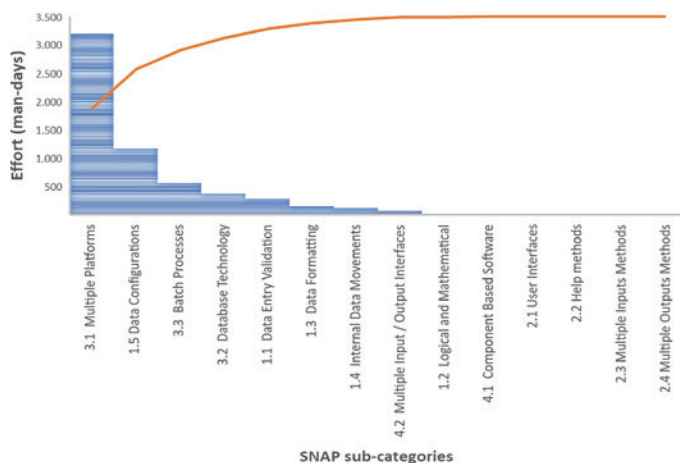
\*There is no data available for category 2.

## Lessons learned

### 1. Not everything is black or white. The partial application of SNAP is usually profitable; it helps to identify what's insignificant.

We must defer to SNAP to minimize our “problems.” Before applying it, we must think about how we want to use it. Although the whole SNAP universe is not complex, it could be too wide to apply properly. Statistically speaking we see as time goes by, the Pareto rule applies and that 80% of our technical investment is centered around the 20% of non-functional characteristics gathered in SNAP.

**Figure 1. Pareto Chart**



In this case, activity 1.5 and in general category 3, comprise 80% of the non-functional investment. Let's use SNAP only for those naturally recurrent and cost-worthy activities. That will ensure:

- *Cost management savings* (don't forget that “measuring” is an investment)
- *More concrete conclusions* (the control of residual activities may distort the results)

### 2. SNAP is useful to support productivity models, and it makes sense to split up the results based on logical groupings of comparable activities amongst each other.

Let's avoid falling into the mistake of “measuring for the sake of measuring.” SNAP offers a wide range of varied activities, so falling into the exercise of pairing them all for responsible decision-making purposes can result in unnecessary expenses. The global productivity of the non-functional activity set is unavoidably impacted by the nature of our developments.

It's very important to consider for our governance models that the productivities per category refer to significantly different values. Otherwise, we would be suffering an important loss of information, putting together projects with very different characteristics in a common productivity result. (The detail of the analysis performed will be displayed at the end of the article).

### 3. SNAP should provide us with transparency, but the metric by itself is NOT useful for that; it needs to be accompanied by a model that implies the collaboration of the software development vendors.

It doesn't make any sense to have a metric granularity of 14 activities if it's not accompanied by the associated effort. Let's balance cost and effort, without breaking down minimum efforts, but rather with a level of detail consistent with the nature of the requirements.

Unfortunately, this usually generates resistance and initial disagreement from vendors. Maybe we don't have the detailed effort for the activities related to all the SNAP subcategories, but we have it for subcategory 1.5. That is a start and it gives us important information. SNAP must not and should not be a black hole where everything is acceptable. We should understand the related costs for each activity with a minimum level of detail.

#### 4. SNAP must focus on covering all of the technical requirements (100%) without splitting processes and capturing much more complex granularity levels.

When we apply function points for a functional requirement then we can translate the count to effort through functional productivity. This effort includes some activities that are not only functional, such as the creation of the screen to support an elementary process, access to a database to recover information, etc.

If we apply SNAP points to these non-functional activities, we are duplicating the count. We must only apply SNAP to non-functional requirements to avoid duplicating requirements that are already included in the function point count.

#### Key takeaways:

- (1) A partial SNAP application is usually profitable.
- (2) Manage productivity per category, respecting the data configuration independence.
- (3) SNAP alone is not enough to increase transparency.
- (4) Use SNAP for all non-functional requirements.

#### Statistical detail of Lesson 2: Splitting productivity by characteristic

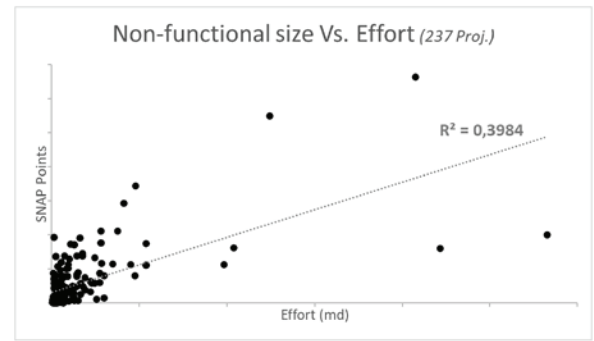
This lesson is based on the correlation and dependence of variables.

Using *correlation analysis* between the variables of "non-functional size (SP)" vs. "effort" for the sample, we can obtain the non-functional size in relation to its associated effort.

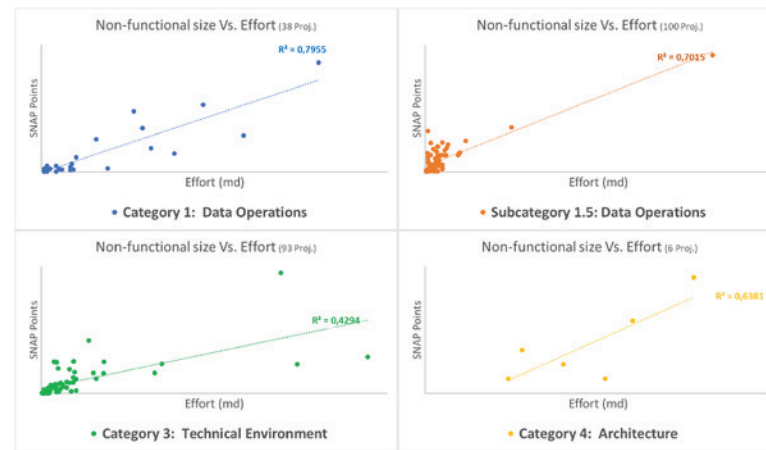
*R-Squared is a statistical measure of fit that indicates how much variation of a dependent variable is explained by the independent variable(s) in a regression model.*

*Therefore, an R-squared of 1 means that all SNAP Points are completely explained by the Effort index.*

**Figure 2. Correlation graphic, size vs. effort, for the total sample.**



**Figure 3. Correlation graphic, size vs. effort, per activity.**



Note: Throughout the study, the productivity index will be shown based on 100.

**Table 2. Results per aggregation**

CATEGORY	ACTIVITY	# PROJECTS	R SQUARE	PRODUCTIVITY
All	All	237	0,3984	100
1	Data Operations	38	0,7955	144
1.5	Data Configurations	100	0,7015	211
3	Technical Environment	93	0,4294	64
4	Architecture	6	0,6381	11

Preliminarily we observe:

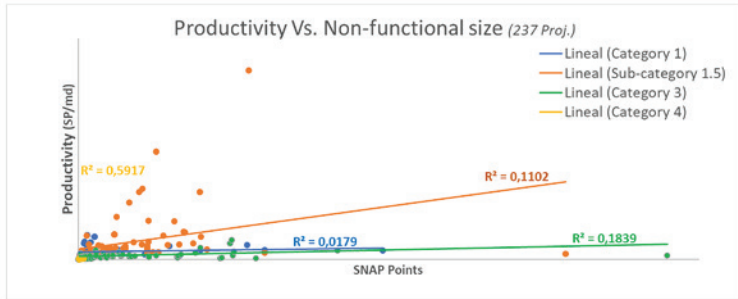
1. The correlation is significantly lower than the result obtained for each one of the categories. The average improvement of the behavior per activity relative to the total picture is 60%.
2. The productivity per category is different for each one of the categories. No productivity value is in an order of magnitude close to any type of category.

Regarding the second point, below is a complementary correlation analysis between the variables "non-functional size" (SP) vs. "productivity," to identify possible initial differences in the behavior of projects, according to the category they belong to.



The relationship between these variables should be very similar in all of the categories. Should that not be the case, we could confirm that the category is influencing the productivity results in the project:

**Figure 4. Correlation graphic, size vs. productivity, per activity.**



We can observe that the data is significantly different and that there's a clear hint that productivity can be dependent on the category.

In the second part of the exercise, we present a dependency statistical analysis between the variables "productivity" and "category" to which the projects belong. That's why we need to verify beforehand if the distribution is normal.

#### 1.-Hypothesis:

Initial hypothesis (H0): Data has a normal distribution

Alternative hypothesis (H1): Data does not have a normal distribution

#### 2.-Significance level:

Trustworthiness = 95%

High significance (alfa) = 5% (0,05)

**Table 3. Kolmogorov-Smirnov normality test**

Tests of Normality			
Kolmogorov-Smirnov <sup>a</sup>			
	STATISTIC	df	SIG.
EFFORT	,343	237	<,001
SCUs	,256	237	<,001
PRODUCTIVITY	,291	237	<,001

#### a. Lilliefors Significance Correction

With the obtained results in the Kolmogorov-Smirnov normality test (adjusted to >50 samples), the significance level for all the variables is < 0,05. Hence, the initial hypothesis (H0) is rejected and the alternative hypothesis is accepted (H1). That is to say, **data does not have a normal distribution.**

Consequently, it is necessary to choose non-parametric tests to verify the dependency between the productivity and category variables. If we employ the Kruskal-Wallis Non-parametric test for independent samples we observe:

#### 1.-Hypothesis:

Initial Hypothesis (H0): Probability distribution is the same between categories

Alternative Hypothesis (H1): Probability distribution is different between categories

#### 2.-Significance level:

Trustworthiness = 95%

High significance (alfa) = 5% (0,05)

**Table 4. Kruskal-Wallis dependency test**

#### ⇒ Nonparametric Tests

#### Hypothesis Test Summary

	NULL HYPOTHESIS	TEST	SIG. <sup>a,b</sup>	DECISION
1	The distribution of Productivity is the same across categories of Category.	Independent-Samples Kruskal-Wallis Test.	<,001	Reject the null hypothesis.

a. The significance level is ,050.

b. Asymptotic significance is displayed.

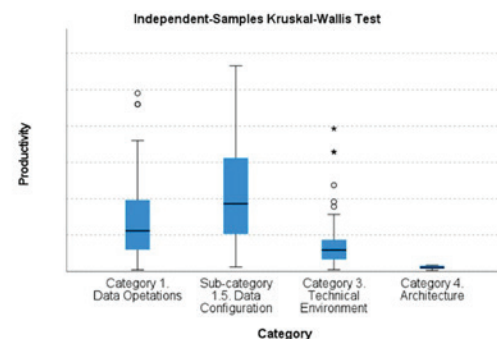
#### Independent-Samples Kruskal-Wallis Test Summary

TOTAL N	237
TEST STATISTIC	73,393 <sup>a</sup>
DEGREE OF FREEDOM (2-SIDED TEST)	3
ASYMPTOTIC SIG. (2-SIDED TEST)	<,001

a. The test statistic is adjusted for ties.

With the obtained results in the Kruskal-Wallis test, the significance level is < 0,05. Hence, the initial hypothesis (H0) is rejected and the alternative hypothesis is accepted (H1). That is to say, productivity distribution is different between the categories.

**Figure 4. Kruskal-Wallis dependency test, results per category**



Below, and taking a step further, we present the same analysis for the category pairs to discard superior groupings:

Table 5. Kruskal-Wallis dependency test for grouping pairs

Pairwise Comparisons of Category

SAMPLE 1-SAMPLE 2	TEST STATISTIC	STD. ERROR	STD. TEST STATISTIC	SIG.	ADJ. SIG. <sup>a</sup>
Category 4. Architecture-Category 3. Technical Environment	69,449	28,876	2,405	,016	,097
Category 4. Architecture-Category 1. Data Operations	117,544	30,116	3,903	<,001	,001
Category 4. Architecture-Sub-category 1.5. Data Configuration	144,533	28,815	5,016	<,001	,000
Category 3. Technical Environment-Category 1. Data Operations	48,095	13,199	3,644	<,001	,002
Category 3. Technical Environment-Sub-category 1.5. Data Configuration	75,084	9,876	7,603	<,001	,000
Category 1. Data Operations-Sub-category 1.5. Data Configuration	-26,989	13,064	-2,066	,039	,233

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is ,050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

For all the possible category pairs, the results obtained in the Kruskal-Wallis test indicate the same conclusion as in the global result. The significance level in all the cases is < 0.05. Hence, all initial hypotheses (H0) are rejected. That is to say, **productivity distribution is different between all the possible category combinations.**

In Summary

- 1. The results of the initial analysis referred to the correlation between variables. It provides hints of the existence of characteristics in each Category that determine differences in the productivity results.
- 2. The normality and dependency tests statistical analysis indicates with 95% probability, that productivity is different between all of the Categories. A productivity dependency exists in relation to the Category to which the projects belong. 🎯

ABOUT THE AUTHOR



**Alfonso González** is a Computer Engineer and he holds a Master's Degree in Software Engineering Management and Project Direction. Graduate from Universidad de Alcalá (Spain) and Wrexham University (Wales), he has +15 years of experience implementing and defining productivity management models and vendor governance. Since 2008, IFPUG CFPS. Alfonso currently works as Account Manager at LedaMC, where he also leads the Benchmarking area. Throughout his professional career he performed as an FPA instructor and consultant in Spain, Italy, Belgium, Portugal and Mexico. Currently, he specializes in model management definition and vendor governance using FPA in agile environments.

# The Exciting Journey FROM SiFP TO SFP



By: Dr. Roberto Meli

**T**his article describes the exciting journey from the birth of the Simple Function Point (SiFP) method in 2011 to the publication of the IFPUG Simple Function Point (SFP) version published in October 2021, as described by the creator of the method, Dr. Roberto Meli. The story highlights some of the method's technical merits with a focus on the whys and the hows that will lead this functional sizing method to widespread adoption in the software market.

I first encountered the IFPUG function point analysis (FPA) method in 1985 when I was preparing my thesis for my degree in Computer Science and I discovered the original work by Alan Albrecht "Measuring application development productivity" (1979). While this was my first entrance into the world of software measurement, it is still a major part of my professional life

today. One year later (1986) IFPUG was born, and a formalized FPA method became an asset of IFPUG, which remains the most relevant association in this field over the decades.

I will not cover how and why IFPUG function points are useful and represent a strong value for the software engineering and management community as you, the reader, are likely already aware of this and there are thousands of online sources to learn about function points, including the IFPUG website: [www.ifpug.org](http://www.ifpug.org).

With the evolution of the IFPUG FPA method starting with the Counting Practices Manual (CPM) version 1.0 in the 1980s through to its current version 4.3.1 (published in 2010), the rules became more detailed, numerous and complex. Today, the CPM v4.3.1 is made up of 546 pages. The first 26 pages constitute the ISO/IEC standard 20926, with the remaining pages devoted to explanatory



notes, examples, clarifications, equations and a glossary. Mastering the IFPUG FPA 4.3.1 method requires study, devotion, time and a strong attitude to pay attention to the requirements details. Two rigorous certifications for professionals are available, which require mastery of the CPM and achievement of 90% average on a three-hour examination (to achieve a Certified Function Point Specialist or CFPS designation) or an average of 80% average on the same three-hour exam (to obtain a Certified Function Point Practitioner or CFPP designation) good for three years.

Since my first job in the business arena, I realized that one of “the strong needs” of software development, organizations (no matter if public or private), was to have an FP size early in the development lifecycle when little or no information about requirements was available. One customer told me: “we need an FP count for contractual reasons, but we have nothing that could be used to calculate it, please help us.” This seemed to be a new chapter of the saga “mission: impossible X” but, fortunately, the assertion that they had nothing to be used to size the software wasn’t completely true. What was true was that there were no functional details to identify the needed Base Functional Components (BFCs) using IFPUG FPA (i.e., the EI, EO, EQ, ILF or EIF), but they had “macro-requirements.” So, the challenge was to find a way to assign FPs not only to BFCs but also to “sets of BFCs” or BFC groups constituted by a probable number of BFCs in predefined ranges of numerosity.

“ If IFPUG FPA has significance for the software development community, then SiFP does as well. It can be demonstrated that this new FSMM to estimate effort can be applied in an acceptable way.

The Early and Quick (E&Q) Function Point technique was born, and it filled this new customer need: estimation of function points. (Until that moment the word “estimation” was reserved to “effort or cost” estimation but in this case, we wanted to estimate the functional size.) Another term that has been used to identify this need is FP approximation. There were other methods used to approximate the FP size in the absence of detailed information, but most of these methods relied on a partial identification of functionality (extrapolative methods) or an average complexity of all identified BFCs. With the extrapolative approach, it was necessary to identify all of the BFC of a certain type (i.e., Internal Logical Files), and the remaining BFC values were extrapolated using known probabilistic ratios. With the average BFC approach, all of the BFCs must be identified, and an average FP value is assigned in lieu of DET, RET and FTR information. No method existed to recognize the existence of a hierarchy of requirements or a taxonomy of groups of BFCs to directly assign a certain number of FP. The E&Q FP method was presented at the IFPUG conference in Scottsdale, Arizona, United

States in 1997, and was later improved to become a standard in the Italian market for the estimation of FP. Two elements in the E&Q hierarchy were called Unspecified and Generic Elementary Process (UGEP) and Unspecified and Generic Data Group (UGDG). We will encounter them again later.

In 1998, the first in a suite of International Organization for Standardization (ISO)/International Electrotechnical Commission (IEC) standards for functional size was published: Information technology—Software measurement—Functional size measurement—Part 1: Definition of concepts, after which followed an additional five standards for Functional Size Measurement.

The E&Q estimation or approximation FP method achieved the goal of having a quantified value for functional size when it was needed for contractual, or management needs early in the lifecycle. This approach solved the paradox of the usefulness-feasibility of the functional size measurement: the functional size is highly useful early in the software development lifecycle when it is almost impossible to measure it precisely, and it is of limited value (for planning purposes) when all of the details are available (late in the development lifecycle) when it can be precisely measured.

Unfortunately, the use of an approximation technique does not eliminate the need for a detailed (and robust) precise measurement technique later in the lifecycle. So, the Early & Quick FP (E&QFP) method, along with the extrapolative and average approaches, is most useful when detailed requirements are lacking. This does not preclude the use of IFPUG FPA when a precise functional size measurement is needed.

By the time the E&Q FP method and ISO/IEC 14143-1 were a decade old in 2010, the needs of a rapidly changing market evolved. New needs focused on having fast, agile, effective functional size measurement methods with low impact on production processes, and suitable for agile software development. In addition, other constraints emerged that were slowing the adoption of traditional FP methods, including:

- The need for specialized training
- Specialist certification (CFPS) to achieve reliable results that were not dependent on expert opinions and technology
- The need for results to be possibly adequately correlated to the effort, cost and duration of a new development or enhancement project

The next step, therefore, was to simplify and lighten the rules of functional size measurement so that it could be applied earlier in the software development lifecycle, while also providing precision during the overall software development process.

The research hypothesis was: could the two elements of the E&Q FP technique (UGEP and UGDG) be sufficient to be the only BFCs of a new simplified Functional Size Measurement Method (FSMM)? This critical question led to a series of other questions:



- Is it possible to define a simple method (using only UGEP and UGDG) that is compliant with the ISO/IEC 14143-1 standard?
- Is it possible to prove that such a new FSMM is capable of representing a functional value that is significant to the user?
- Is it possible to prove that a positive correlation between this new FSMM and actual software development effort exists?

In addition, two secondary business questions arose:

- Is it possible to correlate the new FSMM values with the traditional IFPUG FPA values so that traditional FPA database measurements (such as those within the International Software Benchmarking Standards Group (ISBSG) application development and enhancement (AD&E) repository) may remain stable if converted to the units of measure from the new FSMM?
- Is it possible to recover the investment in training, procedures and guidelines when moving from a traditional IFPUG FPA approach to the new FSMM approach?

Research provided the same affirmative answer to all of these questions.

The first question was simple to answer. The ISO/IEC standard 14143-2 (Conformity Assessment) provided a checklist against which any FSMM could be checked for compliance and the new method satisfied all checklist items.

The remaining questions took a little bit more effort to answer. Before the availability of a large, publicly available software development project database like that of the ISBSG, it would have been almost impossible to provide the answers. Fortunately, in 2010, the ISBSG was populated with thousands of actual completed software development projects with the AD&E repository version 11. Our Italian research team asked for additional data fields so that we could accomplish the analysis to develop and verify the results of our new FSMM method. For each development project in the database provided in IFPUG 4.2 FP or later, our new FSMM value could be calculated because the definition of UGEP and UGDG were compliant with those units of measure. This correspondence led to the immediate availability of a large set of productivity data for our new FSMM, without requiring us to collect new data.

The initial empirical results were both surprising and validating. Our research led to the development of the first Simple Function Point (SiFP) method and revealed:

- It was possible to correlate results from the new FSMM to the traditional IFPUG FPA values. This meant that existing asset measurements could remain stable if converted to the new FSMM;
- It was possible to recover the investments in training, procedures, and guidelines by moving from a traditional IFPUG FPA approach to the new SiFP approach.

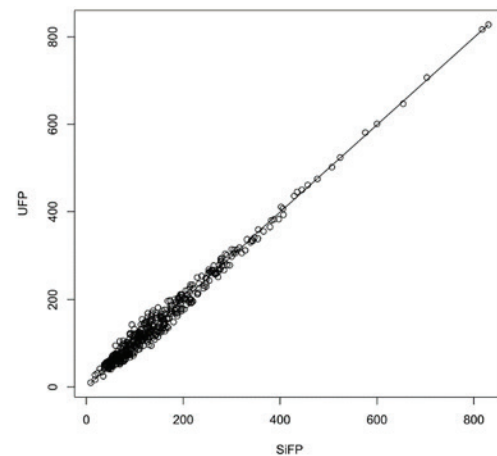
The first published study (Lavazza-Meli IWSM Mensura 2014) has shown this correlation (convertibility)

SiFP = 0.998 UFP

The model has adjusted R2 = 0.994

The accuracy of the resulting model is characterized by:

- MMRE = 11.6%
- MdMRE = 9.9%
- Pred(25) = 92.95%
- Error range = [ -48% .. 41%]



**Figure 1:** Results of the Correlation of IFPUG unadjusted FP (UFP) to Simple Function Points (SiFP) according to the Lavazza-Meli IWSM Mensura 2014 study

This led to the conclusion: If IFPUG FPA has significance for the software development community, then SiFP does as well. It can be demonstrated that this new FSMM to estimate effort can be applied in an acceptable way.

The same study, cited above, has shown that:

- Details of logical data and elementary processes (i.e., DET, FTR, RET, the primary intent of elementary processes, and the internal/external nature of logical files) in functional sizing does not appear to improve the accuracy of effort estimation for a large set of data
- An effort model based on SiFP has the same accuracy as a model based on traditional IFPUG FP

In 2010, these results were shocking and counterintuitive to our research team, but empirical research often changes our preconceived understandings of the world.

The results hold firm for the cumulative behavior of projects in a portfolio of initiatives. A single SiFP count may differ from a corresponding IFPUG FP count by up to [ -48% to +41%] in the worst cases (the extreme values, positive or negative), however, it

is difficult to find such instances in reality. It is possible to recover all the investments in training, procedures and guidelines moving from a traditional FPA approach to the new, simplified SiFP approach.

It follows that an IFPUG CFPS or CFPP or even an un-certified but knowledgeable FPA, will also understand and use the SiFP method using the same understanding of logical elementary processes and logical data groups, without requiring additional training. This is also true for understanding the SiFP procedures and guidelines.

Overall, our researchers concluded that compared to the traditional IFPUG FPA method, the new SiFP method was:

- Easier to apply
- Less subject to human interpretation of functional software requirements because it is based on fewer and more straightforward definitions of base functional components (BFCs)
- Easier to learn and adapt for those knowledgeable with IFPUG FPA: specifically, experts and practitioners familiar with IFPUG FPA could easily adopt SiFP quickly with very little effort
- Fully compatible with the IFPUG FPA

These findings motivated me and the research team to establish the Simple Function Point Association (SiFPA) in Italy almost immediately after releasing the first version of the method. SiFPA members formalized the SiFP method and the publication and evolution of the SiFP manual which was freely available globally under a creative commons license.

The first commercial results from applying the SiFP method were done by large public and private organizations in Italy, Brazil, China, France, Spain, and the USA. The SiFP manual was also translated into corresponding languages.

In 2018, SiFPA sought to increase the method's visibility and worldwide dissemination and approached the IFPUG Board of Directors to incorporate SiFP into its expanding portfolio of products and services. As a result of negotiation and cooperation, the two associations reached an acquisition agreement whereby SiFP rights were assigned to IFPUG in 2019.

Following a two-year task force effort with IFPUG to ensure appropriate SiFP rebranding and reformulation of the method to ensure coherence of definitions and procedures with SiFP version 1.1 and IFPUG FPA version 4.3.1, the new IFPUG Simple Function Point (SFP) version 2.1 manual was published in November of 2021.

Today, the SFP and IFPUG FPA use both familiar terms, definitions, and measurement processes, and have quickly established themselves with a record of more downloads of the SFP version 2.1 manual than any IFPUG document from the IFPUG website over the last decade.

I see this as the definitive sign that the software engineering market was ready for a new step in the evolution of IFPUG FSMM. After having set the standard for functional size measurement and contributing to the evolution of international FSM standards, IFPUG now presents the first-ever, standardized lightweight Functional Size Measurement Method; the first to be available worldwide.




**The standardization and repeatability of the SFP make it ideal for agile software development where the focus traditionally has been on subjective relative effort measures such as Story Points.**

I am currently leading a second IFPUG Task Force composed of representatives from all IFPUG committees to further formalize the SFP method for the international market. Our next steps are to:

- Translate the method's "kit" consisting of the SFP v2.1 Manual, a SFP counting MS Excel® spreadsheet, and a SFP quick reference card, into the core IFPUG documentation languages (English, Spanish, Brazilian Portuguese, Italian, Chinese, Korean, Japanese and others)
- Establish a SFP practitioner certification process
- Approach ISBSG to establish the protocol to incorporate and adopt SFP as an acceptable unit of measure
- Create and follow a marketing plan to promote the SFP FSM method worldwide
- Produce specific SFP white papers, guidelines, i-tips and U-tips.

IFPUG believes that the SFP method will be adopted by the software development industry especially in Agile contexts because of its compatibility with IFPUG FPA results and its applicability to measure the functional size based on high-level (early) software requirements. The standardization and repeatability of the SFP make it ideal for agile software development where the focus traditionally has been on subjective relative effort measures such as Story Points. IFPUG anticipates a promising future for the IFPUG SFP method.

I close this hybrid article (half technical and half historical) with thanks to all those who collaborated in facilitating the amalgamation of Simple Function Points into IFPUG, and the migration from SiFP to IFPUG SFP, especially all the members of the 2018 IFPUG Board of Directors, Talmon Ben-Cnaan and to the three IFPUG Presidents who oversaw these efforts: Mauricio Aguiar, Christine Green and Charles Wesolowski. 

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## ABOUT THE AUTHOR



**Dr. Roberto Meli** graduated in Computer Science in 1984. In 1996, he became CEO of DPO Srl (Italy). Over the past 30 years he has developed focused competences in project management and software measurement and has written more than 75 papers for technical magazines and international conferences. He is a consultant and lecturer on project management and software measurement for many major Italian companies and public organizations. He developed the Early & Quick (E&Q) Function Point Analysis method and the Simple Function Point (SiFP) method. Roberto has held leadership roles over the last 25 years including: IFPUG Board of Directors (Current role), Chairperson of the GUFPI-ISMA (Gruppo Utenti Function Points Italia - Italian Software Measurement Association) board of directors, and coordinator of their Counting Practices Committee; Italian delegate to the MAIN (Metrics Association's International Network), Chairperson of the COSMIC Measurement Practices Committee, Conference Chairperson of SMEF (Software Measurement European Forum), and President of the Simple Function Point Association. He was a Certified Function Point Specialist (CFPS) from 1996 to 2004.







# FUNCTIONAL MEASUREMENT IN ITALY:

## A GLIMPSE INTO THE PAST WITH LUIGI BUGLIONE

By: Luigi Buglione and Joe Schofield

**I**ntroduction: As one surveys the Mediterranean Sea's north boundary, the peninsula nation of Italy rests virtually in its middle. Situated near Italy's vertical center is its capital Rome, a city that dates at least 3,000 years, though some would argue closer to 12,000. Rome is Europe's third largest city with nearly three million residents. A rich source of western civilization's history, Italy can be recognized as also contributing richly to IFPUG and software functional measurement.

The establishment of IFPUG in 1987 included a vision of international participation that went beyond the mere boundaries of North America. In the last *MetricViews* issue, Brazil's prominent role in the international growth and use of Functional Point Analysis (FPA) in Brazil, in particular, was evidenced. In this issue, we explore the impact of functional size measures on a third continent, Europe, and specifically, Italy. Italy hosted the first non-North-American IFPUG conference in 1996 and its citizens have maintained an active role in the evolution and maturity of software sizing.



Italians currently occupy three seats on the IFPUG Board of Directors with Luigi Buglione as the Director of Non-Functional Sizing Standards & Industry Standards, Cinzia Ferrero as the Director of Certification and Roberto Meli as the Director of Functional Sizing Standards, leading the introduction of Simple Function Points (SFP), a simple approximation of IFPUG Function Points.<sup>1</sup> Filippo De Carli served too on the board recently as the Director of Conferences and Education before and for a brief

period as the Director of Certification. In addition, Francesco Gasparro serves as a member of the Certification Committee; Marcello Sgamma, Daniele Zottarel, and Domenico Geluardi are all members of the Functional Sizing Standards Committee (FSSC); Fabrizio Di Cola serves as Chair and Nicolantonio Auciello and Marcello Sgamma as members of the Non-Functional Sizing Standards Committee (NFSSC); and Paola Billia is the Italian Country Representative within the International Membership Committee (IMC).



**Abridged History:** As early as 1990, Loredana Mancini and Domenico Natale established GUFPI<sup>2</sup> (Gruppo Utenti Function Point Italia, the Italian Function Point Users Group) to proliferate the usage of Function Points in Italy. About 10 years later, the then-nonprofit organization added Italian Software Metrics Association (ISMA) to its name to encompass software measurement. The book “Metriche del software” (Software Metrics) was published in 2006<sup>3</sup> to advance the understanding and to further proliferate software measurement efforts.



As interest in non-functional measurement grew, the Software Non-functional Assessment Process (SNAP) project was triggered within IFPUG. Loredana Frallicciardi, Italy's first representative on the IFPUG Board of Directors, was the Director of the team that initiated the SNAP effort. Eventually, SNAP's development was not only sponsored

by IFPUG but was also approved by international standards organizations.<sup>4,5</sup> Many current and former IFPUG members played key roles during SNAP's development.

In 2008, GUFPI-ISMA elected Luca Santillo as President. Shortly thereafter in 2012, GUFPI's members elected Luigi Buglione as its next President. By 2013, GUFPI-ISMA moved exclusively to individual memberships and was sponsoring three conferences annually. The co-sponsorship for ISMA12, Europe's first ISMA conference, by GUFPI-ISMA was a logical next step in the growth of both organizations. IFPUG's ISMA12 was the first ISMA conference held in Europe, in Rome in 2016 with 325 software measurement enthusiasts in attendance. The widely attended ISMA15 returned to Rome in 2018, this time drawing 328 attendees.



The COVID-19 pandemic impacted Italy significantly as it did so many nations. The “EventoMetrico” (Metrics Event) was offered online

beginning in 2018 and had more than 300 online attendees this past May 2022. Mr. Buglione who was re-elected in successive elections is serving his third consecutive term as GUFPI-ISMA's President while concurrently serving on the IFPUG Board of Directors to advance function points globally.

In the past, other Italian members have participated in IFPUG committees and roles including Nicoletta Lucchetti, Certification Committee, and Giovanni D'Alessandro, Italy's country representative on the International Membership Committee.

**Recently:** Today, an estimated 70 to 80 organizations are represented among GUFPI-ISMA's approximately 400 members. GUFPI-ISMA continues as the primary advocate for function and non-functional software measurement with memberships from Europe and Brazil. A non-profit organization, it was historically comprised of three active committees: Counting Practices, Benchmarking and Software Measurement. More recently, working groups were established with one-year terms in an attempt to implement a shorter-term more agile work approach.



**The practical application and ongoing significance of software measurement in Italy are evidenced today in large public bids both within the central government and other local jurisdictions.**

Function points and function point counting organizations constituted some of the early roots of software sizing in Italy. The practical application and ongoing significance of software measurement in Italy are evidenced today in large public bids both within the central government and other local jurisdictions.<sup>6,7</sup> The inclusion of IFPUG's Function Point Analysis as the primary sizing approach began circa 1990. While only slightly speculative, it is very likely that billions of Euros in contracts have been awarded at least in part, based on the use of IFPUG's FPA. Many of these public, as well as private sector bids, also stipulate SNAP<sup>8</sup> and other function point variants as part of those evaluations.<sup>9</sup>

Lastly, as approved in April of 2021, GUFPI-ISMA members contributed to the creation of a national standard for a new competence known as the “metric expert.” This designation recognizes the unique capabilities of individuals devising, deploying and governing with new metrics in the Information and Communications Technology sector.<sup>10</sup>

**The Future Looks Busy:** GUFPI-ISMA is looking to the future to accelerate software measurement, which also aligns with IFPUG membership interests. Some of these include:

- Measuring project value and intangible assets. The now active working group's first deliverable—a publication—is expected before the end of 2022.
- Translating the UNI 11621-6:2021 standard into English as well as the creation of a competence-based certification exam early in 2023.

- Encouraging the usage of measures throughout the industry and the public sector with instruments like Balanced Scorecards and Visual Measurement to promote overall market maturity.
- Teaching and coaching students from universities and secondary schools about the need and value of proper measurement to support good decision-making processes.
- Preparing for the next EventoMetrico in Italy. Or as they say in Italy, it's more than a conference, it's an experience.

**In Closing:** The saying “all roads lead to Rome”<sup>11</sup> may reflect the Roman Empire's engineering of the first “roads” in 300 B.C. Soon thereafter, almost 30 such “paved” military highways emanated from its capital.<sup>12</sup> Today's “information highways” are much faster and require far less physical labor; of course, moving bits and bytes is not quite the same as moving legends of militia and their equipment. The efforts and contributions of the individuals and organizations in this article continue to pave the way for future software estimation, measurement and development. 🇮🇹

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- <sup>5</sup> ISO standard 32430:2021 “Software Engineering—Trial Use Standard for Software Non-Functional Sizing Measurements”
- <sup>6</sup> <https://tinyurl.com/jajfvnph>; retrieved 7/22/2022
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## INTERNATIONAL SOFTWARE BENCHMARKING STANDARDS GROUP: **SERVING THE SOFTWARE INDUSTRY FOR 25 YEARS**

By: The ISBSG Board

**P**robably anyone who works with functional size standards, like the IFPUG, NESMA or COSMIC functional size standards, knows about the International Software Benchmarking Standards Group (ISBSG). This not-for-profit organization was formed in Melbourne, Australia in 1997 by several national and international function point user groups. The idea was that functional size measurement is an important activity, but if there is no data available, what can you do with it? So the ISBSG was created to collect data from the industry in a standardized way so that organizations can use that data for estimation, project management, performance measurement, contracting and benchmarking of application development and maintenance.

At that time, software measurement in Melbourne was being used in corporations and also in the Victorian government because it was part of the Southern Scope project management

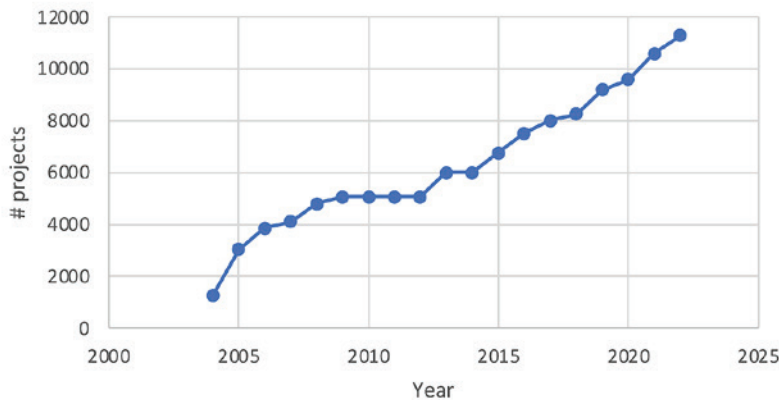
methodology. Terry Wright, the first president, was instrumental in setting up ISBSG and growing it for the first eight years. Software measurement consultancy companies in Melbourne, such as Total Metrics and Charismatek, were instrumental in educating the software development industry and providing much-needed tools to store sizing measures.

The ISBSG Development & Enhancement (D&E) repository began as a local database of software measurement but when marketed internationally evolved into a database with content submitted from more than 20 countries.

The data has grown during these 25 years and the most recent version includes 11,281 projects with more than 250 fields for filtering data and for creating customized datasets for benchmarking purposes and analysis.



## Development & Enhancement Repository



A maintenance and support (M&S) repository was created to collate productivity for the maintenance of an application rather than as a project as in the Development and Enhancement (D&E) repository. The M&S repository started in 2008. It suffered from a lack of submissions from 2012 to 2020 but has been revived lately with 1,673 applications.

### What was the industry like back in 1997?

The Victorian government was requesting productivity measures with the tender responses. This was forcing software development companies to introduce software measurement into their processes. Large outsourcing contracts involving productivity measurement targets were in place. Software measurement consultants were kept very busy and they contributed to the worldwide software measurement industry to a large extent. Pam Morris, Robyn Lawrie and Paul Radford were three of those people who not only led the software measurement in Australia but were also heavily involved with IFPUG.

SouthernSCOPE, which is a process for managing project size, was introduced. This was derived from NorthernSCOPE, which originated in Finland. In 2004 Pam Morris wrote a paper titled "Metrics Based Project Governance," which outlined SouthernSCOPE and is still relevant today.

### Structure of ISBSG

ISBSG is a not-for-profit organization. Originally, partners of ISBSG were other global not-for-profit organizations that supported the software industry in their relevant countries. Gold Members are directors who help ensure the ISBSG data keeps up with industry needs. Over the years these organizations have been gold members. Current members denoted by \*\*

- AEMES (Asociacion Espanola de Metricas de Software)
- AMMS (Mexican Association of Software Metrics)

- Beijing Kexin Science and Technology Ltd \*\*
- CESI (China Electronic Standardization Institute)
- China SPI (System and Software Process Improvement Association) \*\*
- FiSMA (Finnish Software Measurement Association) \*\*
- DASMA (Deutschsprachige Anwendergruppe für Software Metrik und Aufwandschätzung)
- Galorath, USA \*\*
- GUFPI-ISMA (Gruppo Utenti Function Point Italia - Italian Software Metrics Association) \*\*
- IFPUG (International Function Point Users Group) \*\*
- JFPUG (Japan Function Point User Group) \*\*
- LedaMC, Spain \*\*
- NASSCOM (National Association of Software & Service Companies) in India
- NESMA (Nederlandse Software Metrieken Gebruikers Associatie) \*\*
- QESP (Quantitative Enterprise Software Performance)
- SSCI (Systems and Software Consortium, Inc)
- SwissICT (Swiss Association on ICT and metrics)

The supporting organizations in the past included the Victorian Government, Total Metrics, Fenwick Software, David Consulting Group (DCG), Software Productivity Research (SPR), Seer by Galorath, Charismatek, 4SumPartners and SolidSource IT.

ISBSG is a very small organization with less than 1 FTE staff. Volunteers are critical to continue the use of this database to support the software industry.

In 2012, corporate Gold Partners were established to help ISBSG continue to grow the repository, which in turn assists software productivity consulting. Current corporate Gold Partners are LedaMC from Spain, Galorath from the USA and Beijing Kexin from China.

### Cycles of Change

Scope management, contract management and productivity in tender responses were all the focus in the late 1990s. As the people within the Victorian government changed and offshoring in large contracts wasn't producing the desired productivity results, the focus shifted away from software measurement. Software measurement in countries has grown in popularity and shrunk, only to gain momentum in different countries. As an example, Australia has very little software measurement now whereas Mexico, Italy, Brazil and the Netherlands are very active in software measurement. Today, European Union tender responses are requesting productivity measures replicating what was happening 25 years ago in Australia.

The popularity of software methodologies and processes has changed over time. The SW-CMM® and CMMI® were very popular



in the early 2000s. Waterfall was the original methodology in use. Object-oriented became popular in the early 1990s. New functional sizing methods such as COSMIC were introduced to cater to non-traditional customer interface applications. Software measurement has decreased in popularity with Agile methods. However, a resurgence is occurring as management regains control and brings software measurement into those projects.

Another important achievement in 2011 was the primary involvement in the creation of the ISO/IEC 29155 series about "Information technology project performance benchmarking framework." Its four parts: Concepts and Definitions, Requirements for Benchmarking, Guidance for Reporting, Guidance for Data Collection and Maintenance, were recently taken into account by IFPUG for a new AD/M Benchmarking Certification.

### Who is the Executive Committee?

Most of ISBSG's early developers have retired. Terry Wright worked for the Victorian government. Peter Hill was the CEO for the first 16 years; John Ogilvie for four years after that and currently Paula Holmberg for the last five years. Others who have been heavily involved in the ISBSG Executive Committee include Pierre Almen, Mauricio Aguiar, Luigi Buglione, Ton Dekkers, Charles Gold, Thomas Fehlmann, Raúl Fernández, Pekka Forselius, Christine Green, Harold van Heeringen, Helen Huang, Pam Morris, Stavros Pechlivanidis, Eberhard Rudolph, Tony Rollo, Andrew Sanchez and Luca Santillo.

In addition to the Executive Committee, all the board members contribute to ISBSG and some have been there since the beginning. Hosting conferences, providing important strategy direction, submitting data and giving their valuable expertise are some of the ways everyone contributes.

### Supporting Research

ISBSG has offered the repository to university researchers for substantially discounted prices. ISBSG is the only open database available to anyone and is quite valuable for research. A complete list of the universities and approximately 70 research papers developed using ISBSG data exists. Researchers must apply and be approved for the discount.

### Main Achievements

- Grew the development and enhancement (D&E) repository to 11,281 projects in 25 years
- Grew the maintenance and support (M&S) repository to 1,673 projects
- The Productivity Data Query (PDQ) web tool was introduced five years ago. It is designed to give a quick answer on hours/FP, speed of delivery and defect density by applying filter criteria. A subscription is available for those who want to understand the specifics of the results
- Yearly workshops with the Gold Partners to improve both the organizations and the products

- Yearly IT Confidence conference since 2013, a thematic event about the value of objective data for decision-makers

A short video chronicles these changes over time.

#### Other reports/books

- 2004 Software Metrics Compendium containing 1,239 projects
- Benchmark Release 6 containing 789 projects
- Benchmark Release 8 - Software Defect & Quality edition
- Benchmark Release 10 - Project Planning edition
- Estimation Reality Checker tool (replaced by PDQ)
- Comparative Estimating tool (replaced by PDQ)
- Reality Check tool (replaced by PDQ)
- Practical Software Project Estimation: A Toolkit for Estimating Software Development Effort & Duration 1, Hill, Peter, International Software Benchmarking Standards Group, eBook - Amazon.com
- A new free monthly short report highlighting some interesting facts from the data in the ISBSG repositories. This can be found under resources.



Submitting data not only gives you a snapshot of how your project compares to the industry, but more importantly, it enables measurement to be used in contracts, tender requirements, project management and to identify best practices.

### IT Confidence Conference

With the worldwide momentum of software measurement, ISBSG introduced the IT Confidence conference in 2013 and has convened every year since. The last few years have been online as with most other conferences but previously they were held in Brazil, Japan, Italy, the United States, China and Mexico. Presenters are leaders in the industry who give their time to help improve the measurement community. All the conference papers are available on the website.

### The Value of Using ISBSG Data

A few of the success stories we have heard from our customers are:

- Winning a multimillion-dollar bid based on a price per function point for the implementation of a large data warehouse and Business Intelligence solution for a European Government agency by an international system integrator.
- Measuring, benchmarking and understanding high-performing and low-performing agile teams, as a start

for learning and improving at a large European Insurance organization.

- Supporting the outsourcing deal of hundreds of applications to a single vendor, based on the functional size of applications and the expected workload based on industry averages by a European sourcing support organization.
- Software Cost Estimation support of large agile multiyear programs to understand the amount of budget per year to deliver a certain scope of functionality by a large international credit bank.
- Benchmarking the team performance of internal agile teams and external agile teams against industry averages by a U.S. bank.


## Why is it Important to Contribute?

Submitting data not only gives you a snapshot of how your project compares to the industry, but more importantly, it enables measurement to be used in contracts, tender requirements, project management and to identify best practices. If an open database does not exist then it makes it very difficult to accrue these benefits, instead relying on consultants with their own software measurement repositories. The ISBSG focuses on a long-term view. Every ISBSG submission (SUBMIT DATA – ISBSG) receives a Project Benchmark Report. With more than five projects, participants can receive access to report(s) and the Productivity Data Query tool.

Becoming a corporate subscriber or a separate data subscription is easy using the ISBSG site ISBSG Subscriptions – ISBSG.

## What is Next?

Future ISBSG actions include:

1. Feeding our repositories with more data from the newest technologies and producing reports based on new datasets over time
2. Stimulating the benchmarking culture in organizations (also VSEs – Very Small Enterprises) for better estimates
3. Impacting in the contractual ICT world, being inserted as a reference for productivity/PDR levels (refer to the EU Lisa project using ISBSG in the contractual documents)
4. Contributing to the update of the ISO 29155-x family of standards for their update/confirmation 



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# Value Chain, Value Stream and Flow Metrics: **VISUALIZING BUSINESS VALUE**



By: Tom Cagley and David Herron

**E**ffective use of measurement data requires a clear understanding of what the data represents and an effective interpretation and a visual display of that data. In this article, we first introduce Value Chains and Value Streams and their contribution to business value. The article then describes in greater detail various flow metrics and how they too represent and provide business value. It is important to have the right measures and analytics in place necessary to identify current trends, evaluate performance and identify areas for improvement. Of equal importance is to have the ability to effectively and efficiently present the resulting measurement data to business management in a format that is easy to understand. The optimal way to do this is through data visualization.

Data visualization is the practice of translating information into a visual context, through the use of common graphics such as charts, diagrams, plots, infographics and, when possible, animations. These visual displays of information communicate

data relationships and data-driven insights in a way that is easy to understand.

## **Value Chain Mapping**

Value Chain Mapping is a representation of how an organization transforms raw materials into a product and then delivers that product to its customers. From a software perspective, an example of a value chain begins with a market need that is then transformed into functionality and then delivered and supported. Value chains are developed so that the organization can get a full understanding of the process to see how they can generate the greatest possible value for the organization and the customer. Once you understand the flow, it is far easier to improve it. Value Chain Mapping is a lean technique. Like Kanban, which focuses on the flow of work and which steps add business value, Value Chain Mapping helps to target process improvements.

Historically much of the academic work concerned with Value Chain Mapping can be traced to Harvard Professor Dr. Michael



Porter. Porter's framework provides a basis for developing a high-level view of how value is created, augmented and delivered to the organization's customers. A value chain identifies all of the direct activities (activities that transform the product), indirect activities (activities that help keep the transformation steps running smoothly) and quality assurance (QA) activities (for example, testing and reviewing activities that ensure the product meets standards).

A value chain will follow the flow of work at an organizational level, showing the linkage between the different parts of the business that directly add value, provide support and/or enforce standards.

The goal of a Value Chain Map is to reflect the steps an organization takes to create value. It supports process improvement because it helps us see bottlenecks and steps that do not add value to the product.

Three terms often are conflated. Value Chains, Value Streams and Process Maps. While related, like different species of felines, each is different and has its own specific use. Value Chains show flow across organizational units. Value streams track the flow of value creation for a specific product from inception to ultimate use. Process maps get into the nitty gritty of activities. Each is valuable but one can't substitute for the other.

## Do I Need a Value Chain Map or Process Map?

What is the difference between a Value Chain Map and a Process Map? A Value Chain Map provides a high-level view of a whole company's flow of goods or services from raw materials to the customer. It is a lean technique that has its origins in manufacturing. The raw material for an organization that ships software will be knowledge and effort with shiny DVDs or software as a service (SAAS) as the final product. A Process Map, on the other hand, focuses on the sequence of a process, including the tasks, activities and parameters. The Process Map is generally constrained to a specific set of activities within a broader organization. Therefore, a Value Chain Map generally differs from Process Maps in two areas:

- Level of Focus or Granularity
- Measures

The first difference between the two mapping methods is the level of focus. Value Chains represent the big picture of an organization. Models such as Porter's Value Chain break the organization down into approximately 10 components that represent all of the processes within the company. A rule of thumb to determine if the scope is right for a Value Chain is to ask the sub-group within the organization to have its own profit and loss statement. However, this can sometimes be a red herring, as organizations sometimes create mock P&L statements to get leaders to run their portion

of the organization more entrepreneurially. Process Maps are a deeper dive into the organization. They detail tasks, activities and most tellingly, decision points. A rule of thumb for Process Maps is that individual processes tend to include decision steps and generally do not have a P&L statement.

Measures represent a second area of distinction between Value Chain Maps and Process Maps. Value Chains need a wide range of metrics. Flow metrics are a major component but not the only component. At this level, metrics include lead time or cycle times (e.g., time to market or order to delivery time), delivered defect rates and wait times that affect delivery, headcount, inventory levels and P&L. These measures are focused on the flow of work through the entire process and the overall value delivered. For example, if an order was placed on June 1 and delivered on June 30, the order-to-delivery measure would be 30 days even if the order sat in someone's inbox for 29 days and was only acted on for a single day. Measures supporting Process Maps tend to focus on the effectiveness and efficiency of a step or group of steps (e.g., the effectiveness of software development). These measures tend to focus on capturing and comparing the inputs and outputs of the step—a micro version of flow metrics.

Do you need one or the other? The answer is you need both. You need to understand your value chain before you can consider improvement. However, to effectively make specific changes process maps will be needed.



By measuring the flow of work, we can identify areas where efficiencies can be gained thus providing more value to the business as we enhance our flow of work.

## Value Stream

There are a number of practices and processes that take place during the development and delivery of software. Each step may be considered part of a flow of work that ultimately leads to a deliverable that is of value to the business. This flow of work is often referred to as a value stream or a product value stream. As a point of differentiation, a value chain reflects the organization while a value stream reflects a single product. A value stream is a series of steps that occur to provide the product or service that a customer wants or needs. To provide that service that the customers desire, a series of tasks are performed by a variety of technical, analytical and design specialists in hopes of producing a high-quality product and maximizing productivity.

A product value stream is measured using a set of flow metrics. The purpose of flow metrics is to provide information on how value transforms as it moves from idea to business. These metrics are



presented in terms of value and flow. By measuring the flow of work, we can identify areas where efficiencies can be gained thus providing more value to the business as we enhance our flow of work. These flow metrics provide a common language between IT and the business. Flow metrics measure the composition of work, the rate of value delivery through each value stream and the speed of delivery of work from start to finish.

## Flow Metrics

So, what exactly do the flow metrics measure and how is that of value to the business? Simply stated, flow metrics measure the output that a value stream produces. In the past, we have communicated with our customers in technical terms such as function points, defects, stories, etc. These are useful measures for product, project, and program managers but it is a language that most customers do not speak.

In Mik Kerstens' popular book, *Project to Product*, he suggests that all the work that we do can be grouped and measured in one of four flow items. Units of value flow through the software value stream. For the most part, flow items are visible and relatable to the customer and therefore we consider that they 'speak' to the customer.

There are four flow items and they include:

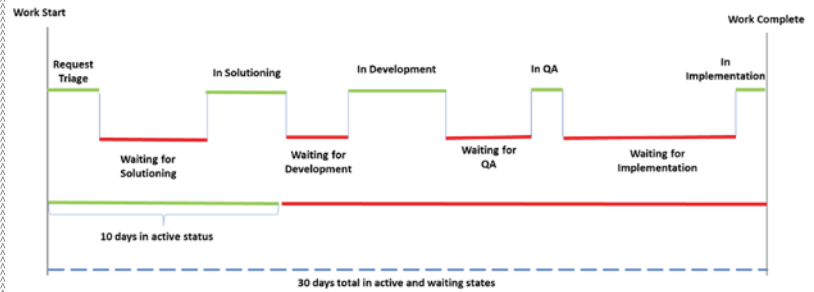
- **Features** - added or enhanced features and functions based on customer requirements. These items are visible to the customer and represent new value-added.
- **Defects** - these are quality problems that do or could impact the customer experience. These items are also visible to the customer.
- **Debt** - is sometimes referred to as technical debt. It can come from implementing patches and quick solutions instead of full-scale fixes. It represents shortcuts taken to get work done with little to no testing and lack of adherence to coding standards.
- **Risk** - This type of item includes various kinds of privacy, security, regulation and compliance exposure that need to be rectified.

Many IT shops gather a lot of metrics such as productivity, quality, cost, customer satisfaction, etc. Flow metrics do not replace those metrics, rather they provide a different and unique set per each value stream correlated to business outcomes. Flow metrics measure the rate of value delivered for each value stream—correlate to desired business outcomes and support data decision making leading to greater predictability.

Here are five basic flow metrics:

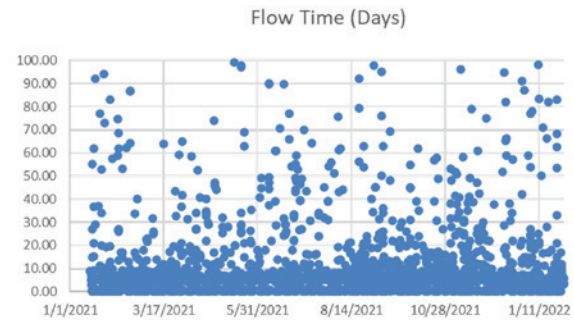
1. **Flow time** measures how long it takes teams to complete work from the moment it has been accepted to the moment it is released. It is the total time it takes for flow items to go from work start to work complete including both active and wait states.

This metric helps you understand your actual time to market and becomes more predictable over time.



In the above example, the flow time is 30 days.

An example of flow time data collected over time is shown below.



2. **Flow efficiency** is the ratio of the time an item is being worked on to the total time it is in "process." The metric helps to realize inefficiencies and bottlenecks in your value stream. It can identify if teams are waiting for work for significant periods of time. It is the proportion of active time vs. wait time out of the total elapsed time (flow time). This metric can identify when waste is increasing or decreasing in your processes.

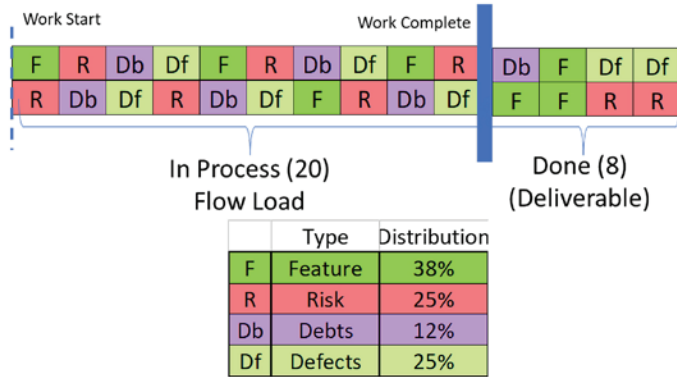


$$\text{Flow Efficiency} = \frac{\text{Active Time}}{\text{Total Time}}$$

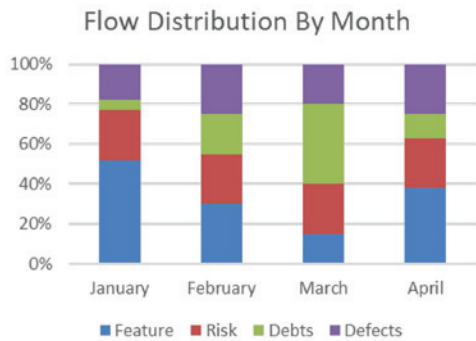
In the example above, flow efficiency is 33% (10 days of active time divided by 30 days between work start and completion).

3. **Flow distribution** provides data that helps you to understand whether the features, risks, defects and debt are being allocated in sync with strategic goals. It is the ratio of the four flow items completed over a particular period. Used as input to prioritize

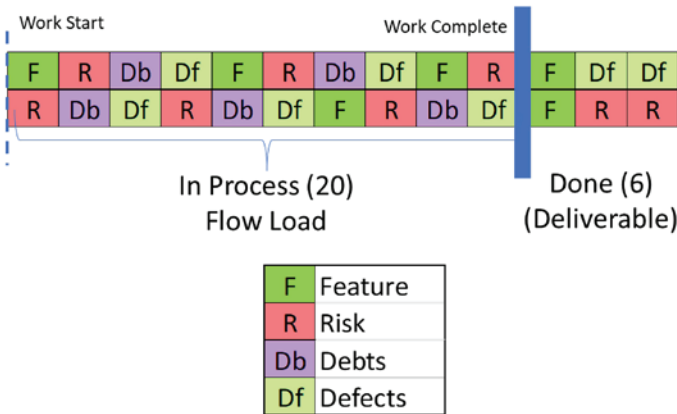
specific types of work during specific time frames to meet the desired business outcome.



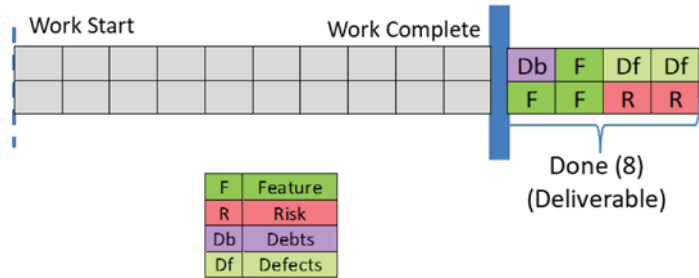
Flow distribution over time can be used to understand what is being delivered. Executives and teams can use the distribution to set a strategic vision and then determine how the organization is performing against that vision.



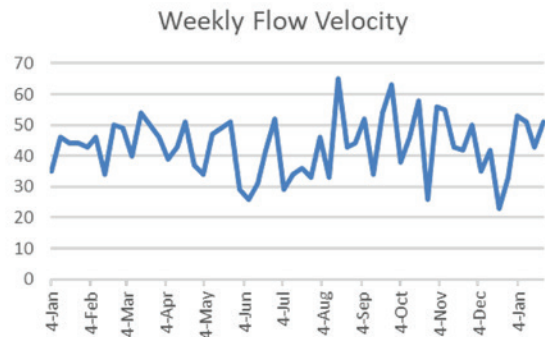
4. **Flow load** helps teams and organizations to find the right balance between demand and capacity. Provides insight as to whether or not value delivery is suffering because teams have too much work in progress. It is the number of flow items in progress within a particular value stream. This metric monitors over or under-utilization of value streams which can lead to reduced efficiency.



5. **Flow velocity** measures how many flow items are completed within a reporting period. This metric is used to gauge whether value delivery is predictable and whether delivery is accelerating.



In the example above, the team delivered eight items; their flow velocity is eight items. The graph below shows the weekly flow velocity of work items that an operations team delivers.



Value chain and value stream mapping combined with flow metrics are an appropriate way to understand the delivery of value. The combination allows organizations to visualize and predict the flow of value. The main goal of data visualization is to make it easier to identify opportunities where processes and practices need to be improved thus contributing to greater business value.



## ABOUT THE AUTHORS



**Tom Cagley** is a consultant, speaker, author and coach who leads organizations and teams to unlock their inherent greatness. He has developed estimation models and has supported organizations developing classic and Agile estimates. Tom helps teams and organizations improve cycle time, productivity, quality, morale and customer

satisfaction and then prove it. He is an internationally respected blogger and podcaster for more than 11 years focusing on software process and measurement. His blog entries and podcasts have been listened to or read more than a million times. He co-authored *Mastering Software Project Management: Best Practices, Tools and Techniques* with Murali K. Chemuturi. Tom penned the chapter titled "Agile Estimation Using Functional Metrics" in *The IFPUG Guide to IT and Software Measurement*. His certifications include CFPS, IT-CMF Tier 2 Certified Associate, CSM, SAFe SPC, TMMi Assessor and TMMi Professional.



**David Herron** is an authority in the areas of performance measurement, process improvement and functional size, among others. For decades he has been an IFPUG unconditional servant: IFPUG MetricViews editor, chair of the IFPUG Management Reporting Committee, member of the IT Performance Committee, member of the Communications and Marketing Committee... He has put in practice in a huge number of entities, from

different parts of the world, the use of metrics to monitor the impact of IT on the business, in governing outsourcing contracts and has brought the name of IFPUG and its concepts and added value to the highest levels. He was one of the founders of the David Consulting Group and has provided consulting and coaching services for a high number of IT companies. He has been presenter in a number of IFPUG conferences, with topics such as "Identifying Your IT Organization's Best Practices," "The Need for Auditing Your Measurement Program," "Early Lifecycle Identification of Software Quality Risk Factors," "The Lighter Side of Software Measurement;" author of a number of articles and co-author of different books such as *Measuring the Software Process: A Practical Guide to Functional Measurements* and *Function Point Analysis: Measurement Practices for Successful Software Projects*.



## CERTIFICATION COMMITTEE

By Cinzia Ferrero

The Certification Committee works daily to:

- Support IFPUG members to take the CFPS/CFPP (IFPUG FPA) and CSP (IFPUG SNAP) exams.
- Help IFPUG members in applying the CFPS Certification Extension Program (CEP) to maintain certifications without retaking the certification exam.

We are working with the Japan Function Point Users Group (JFPUG) and our partner Brightest to have the CFPS/CFPP exam available in the Japanese language as well. From December 2022, it will be possible to find it in the online exam offering.

We have finished development of the Certified SNAP Specialist (CSS) exam, which is currently being tested on the PearsonVue platform.

This new certification, which will be available very soon in English, will provide a specialist certification for measuring non-functional software requirements.

A dedicated CEP will be applicable to this certification. The CSS CEP will also allow the certification to be renewed beyond its three-year validity, as is already possible at present with the CFPS certification.

For those who will have an active CSP certification by the time the online CSS exam becomes available, it will be possible to have the upgrade to CSS certification by taking the exam only on the Case Studies section.

Translation of the APM into Italian is underway in order to have a CSS/CSP exam in Italian as well.

Work has also begun on creating the certification for SFP measurement. Stay tuned for new information on this opportunity.

**IMPORTANT INFORMATION:** Those who lost their CFPS/CFPP certification due to impediments due to COVID during the period of June 2020-June 2022, please contact IFPUG Headquarters as soon as possible by sending an email to [ifpug@ifpug.org](mailto:ifpug@ifpug.org).

The Certification Committee is available to reassess the situation and possibly reactivate the certification.

A big thank you to all the members of the committee who, with their dedication, competence and professionalism, allow the achievement of these great results!

## COMMUNICATIONS AND MARKETING COMMITTEE

By Julián Gómez

This new *MetricViews* issue has a very clear point to talk about. For sure, this point is to celebrate that our new website is live, and that we are enjoying a lot of the new capabilities that it brings to all of us as well as its design.

The face of our community has changed but it is not the only change. We are changing, a little bit, our way to communicate and our way to share information with our community. This new way to do the things is the result of the collaboration among the IFPUG committees.

The collaboration is the base of our community. A collaboration among parts that share their knowledge, that deliver their best without expecting anything in return and that enrich the full community that is around the functional sizing, around software product.

Now we are collaborating closer with the NFSCC. We are working together to bring you new material to learn more about the advantages of SNAP for your organization. I'm very happy with that, because it shows us the power of collaboration—when people of different countries, different continents and different backgrounds make the difference with their efforts to create very good results.

Be well, stay well and stay tuned to the new things to come. We are changing our way of doing things to ensure we deliver great value as usual.

Make the difference and step forward to volunteer with IFPUG to make our community strong.

## FUNCTIONAL SIZING STANDARDS COMMITTEE

By Esteban Sanchez

Our goal at the Functional Sizing Standards Committee (FSSC) is very simple: to generate value for IFPUG and its members by maintaining the Counting Practices Manual and constantly producing guidelines to aid in the application of Function Points to emergent technologies. We have a team of the best professionals from around the world making sure this happens. And by the way, we are growing our team so if you are interested in joining please get in touch with us.

One of our latest papers on Microservices is a “must read,” especially if you work in a Cloud or Service-Oriented Architecture environment. We have also recently published a new paper on the topic of Elementary Processes. Agile continues to be on our table; we are working on related papers for User Stories and Kanban. Mobile Applications, Workflow Engines and System Clock are other topics we are developing. Stay tuned for all the amazing things we have in the oven for you!

The FSSC is very proud of our newest addition to the family of standards: Simple Function Points (SFP). We have contributed to the revision and release of the manual and continue to support the ongoing efforts of the SFP task force in the creation of related artifacts such as training and marketing materials, certification exam, quick reference guide and counting forms. Working together with other committees, we will continue to grow the adoption of SFP.

If you want to be part of the team that is making all these great things possible, just get in touch with us. Please complete the IFPUG Volunteer Form and send it to Michael Canino at [mcanino@cmasolutions.com](mailto:mcanino@cmasolutions.com).

Our mission is to serve IFPUG and its members and we love to innovate. If you have feedback or suggestions for new projects, we definitely want to talk to you. Please kindly submit your comments to [esanchez@galorath.com](mailto:esanchez@galorath.com).

## INTERNATIONAL MEMBERSHIP COMMITTEE

*By Loami Barros*

The International Membership Committee (IMC) is looking for an enthusiastic Brazilian country representative who will replace myself. I'm currently serving in both roles, and I think it could be a good opportunity to have someone else to work with the Brazilian community. IFPUG members from Brazil are invited to volunteer for this role.

Currently, Malaysia is also in need of a new representative. Other country representatives are more than welcome.

Please access the IFPUG Volunteers page if you would like to participate in the IMC or other committees at <https://ifpug.org/about-us/committees>.

The IMC is working on managing academics affairs. This task force will collaborate with universities and colleges around the world that use Software Estimations/Function Points in their curriculum.

The IMC is also responsible for the Simple Function Point manual translation process; we review if the translation group is following all the requests necessary.

The IMC is responsible for the Volunteer process; we are involved in all parts of the process between the volunteer and committee chairs.

The IMC has been acting as the primary contact point for all non-English, IFPUG-related queries and engages IFPUG members so that they continue to benefit from their memberships. We are more than eager to assist you with all IFPUG-related queries. Currently, we have representatives for France, Spain, Brazil, China, India and Italy may soon have a new country representative too!

## NON-FUNCTIONAL SIZING STANDARDS COMMITTEE

*By Fabrizio Di Cola*

The IFPUG Non-functional Sizing Standards Committee (NFSSC) continues its activities to explain to the industry what SNAP is, the benefits from its use, how to measure certain sizing scenarios, and to train future trainers on SNAP. We are also exploring other groundbreaking topics. Our latest public education activity was delivering a 40-minute presentation to the US Military Operations Research Society's national Emerging Technologies Forum in Washington, D.C. in October regarding functional software user requirements, non-functional user requirements, and how to measure the size of software non-functional user requirements using SNAP to an audience of software cost estimators.

We will soon post short videos on YouTube to highlight the theory and benefits of using SNAP. We will then add more short videos addressing each subcategory. You will be able to watch and listen to these videos in different languages, not only English, to make it easier to reach individuals and organizations around the world. It requires a team effort by IFPUG to spread all the good reasons for organizations to take the path of non-functional requirements measurement. For example, we are partnering with both the Communications and Marketing Committee and the Partnerships & Events Committee to achieve this goal.

Do you want to use SNAP in contracts and need a certification that has a renewal process, similar to the CFPS CEP? This way you can be sure that you have staff properly trained and ready to measure software non-functional user requirements related to SNAP non-functional requirements. IFPUG will soon be launching the Certified SNAP Specialist (CSS) certification, which

will complement the existing Certified SNAP Practitioner (CSP). This will help you introduce nonfunctional measurement from a contractual perspective as well. So, you are only a short time away from having the opportunity for this certification level.

We have released the important white paper "Boundaries and Partitions." "Partitions" is a new concept in the IFPUG methodology and this paper describes the concept and provides examples of the important relationship between application boundaries and their partitions (when those partitions exist). This white paper was the result of joint work between us and the Functional Sizing Standards Committee. You can download this white paper from the IFPUG Learning Center. We also presented and explained it in a "Knowledge Café Webinar Series" event that you can find in the Learning Center in the IFPUG member area. We encourage SNAP counters (useful both along with function points and along with simple function points) to use this SNAP-related white paper along with the APM when performing SNAP counts.

We are also working on:

- The definition of an estimation method for SNAP.
- The translation of the APM into Italian.
- The writing of a new white paper that will give guidance on how to apply SNAP applications built with microservice architectures.
- We are involved in the Simple Function Point Task Force for anything that falls under the responsibility of our committee.

We always need your help. For those interested in working with us on a groundbreaking topic such as non-functional dimension measurement with SNAP, you can send your application by going to <https://ifpug.org/about-us/committees/volunteer>.

If you would like to contact us, you can do so at [nfssc@ifpug.org](mailto:nfssc@ifpug.org).

## PARTNERSHIPS & EVENTS COMMITTEE

By Kiran Yeole

The Partnerships and Event Committee (PEC) continues to arrange events for bringing our member base together for knowledge sharing and driving strategic partnerships for IFPUG.

### Events:

#### ISMA19:

ISMA conference is a good platform to share ideas with the measurement community and to learn from other experts. We successfully conducted the ISMA19 virtual conference on June 24 in collaboration with other IFPUG committees and the IFPUG

board. ISMA19 featured the following four interesting sessions -

1. Simplifying Software Sizing with Simple Function Points
2. Successful Implementation of SNAP: Integrating FP & SNAP Together
3. Defining and Sizing Extensive Logical and Mathematical Operations in Software Using SNAP
4. Modeling and Measuring Software Requirements with Function Points

Last two sessions were CEA approved for one-year extension of CFPS and CSP certifications.

### Knowledge Café Webinars:

Before the ISMA19 conference, in the month of May, Brad Clark from the "University of Southern California Center for Systems and Software Engineering" presented the topic "Comprehensive Estimation: Function Points, SNAP and COCOMO®" covering analysis results and its implications when using COCOMO® III model together with the functional and the non-functional sizes.

Also, in the month of September, Fabrizio Di Cola (Chair of IFPUG NFSSC) and Daniele Zottarel (Member of IFPUG FSSC and NFSSC) from Sogei Spa presented the topic "A Journey Inside the White Paper Boundaries and Partitions: How to Escape the Trap of Subjectivity". Speakers walked attendees through the concept of partition and the IFPUG's new white paper "Boundaries and Partitions".

We planned two more webinars in the months of October and November.

1. The October webinar was on "Analytics of the International Software Benchmarking Standards Group (ISBSG) Development and Enhancement Repository" and was presented by Charley Tichenor (Member of BAC and NFSSC) and Pierre Almen (ISBSG President and chair of IFPUG BAC) and covered the analytics performed on the ISBSG database and lessons learned.
2. The November webinar on "The FP-Based 'Productivity Paradox,'" presented by Luigi Buglione (IFPUG board member and director of sizing and standards committees) and Carol Dekkers (Chair of IFUG ISC and CEO of Quality Plus Technologies, Inc.) covered the advancements in software development productivity over the time and various paradoxes.

### Partnerships:

IFPUG is advancing the partnership with the Netherlands Software Metrics Users Association (NESMA). As part of this, IFPUG announced an agreement with NESMA recognizing that we share specific objectives. IFPUG and NESMA have agreed



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to cooperate in overlapping domains of expertise, as well as mutually work on endorsement of the sizing standards, mutual development of content, facilitating professional networking opportunities and joint development and promotion of educational activities in the area of software sizing, metrics, and measurement.

As part of this partnership, IFPUG and NESMA has agreed to work together on the development of a new white paper on "Functional Sizing in Lean and Agile Development Methodologies". We believe that this joint work will benefit the entire measurement and sizing community to a great extent. Currently we are in the process of

finalizing the team members for this joint taskforce which will have the members from both IFPUG and NESMA.

We regularly offer platforms for interesting topics to be discussed at our Coffee Talks. Please write to [pec@ifpug.org](mailto:pec@ifpug.org) with your suggestions for topics and speakers. If you are interested in working with the PEC, please complete and send a volunteer form to [pec@ifpug.org](mailto:pec@ifpug.org) or submit the form using <https://ifpug.org/about-us/committees/volunteer>.



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