



ISBSG

IT Confidence 2021

ISBSG IT Confidence 2021
(Online), October 8 2021

The Third Way and the Emergency of Historical Data

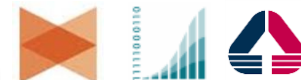


From current ICT contracts to
the post-COVID19 years

Luigi Buglione, *CFPS, CSP, CSMS, CCFL*
Measurement & Process Improvement Specialist
Engineering Ing. Inf. SpA



www.isbsg.org





- ✓ **G1.** Discuss what is DevOps and its «Third Way»
- ✓ **G2.** Verify if DevOps is (or not) using benchmarking tips (and tools)
- ✓ **G3.** Verify which impact brought out on productivity the COVID-19 period through the analysis of ISBSG D&E 2021 data





office + SpacelQ Products Workplace Types Why SpacelQ Customers Resources Company



BLOG

Workplace Productivity During COVID-19: What to Expect

Workplace productivity during COVID-19 is likely to be down. Employees need support during this challenging time. Employers need to prepare for lagged productivity and take a compassionate stance by delivering aid to frazzled workers.

Jeff Revoy

Forbes

May 31, 2021, 08:13am EDT | 6.770 views

How Productive Have Remote Workers Been During Covid?



Adi Gaskell Contributor @ Careers

cnet HEALTH AND WELLNESS


Featured Fitness Sleep Parenting Nutrition Personal Care Dental Care Caregiving

You're not just lazy: Why it's hard to be productive right now

Mental health issues are on the rise, which can affect how motivated you feel at work and in your personal life.

Mercey Livingston Sept. 16, 2020 9:01 a.m. PT

▶ LISTEN - 03:21



Harvard Business Review

Diversity Latest Magazine Ascend Topics Podcasts Video Store The Big

Motivating People

The Pandemic Is Widening a Corporate Productivity Gap

by Eric Garton and Michael Mankins

December 01, 2020

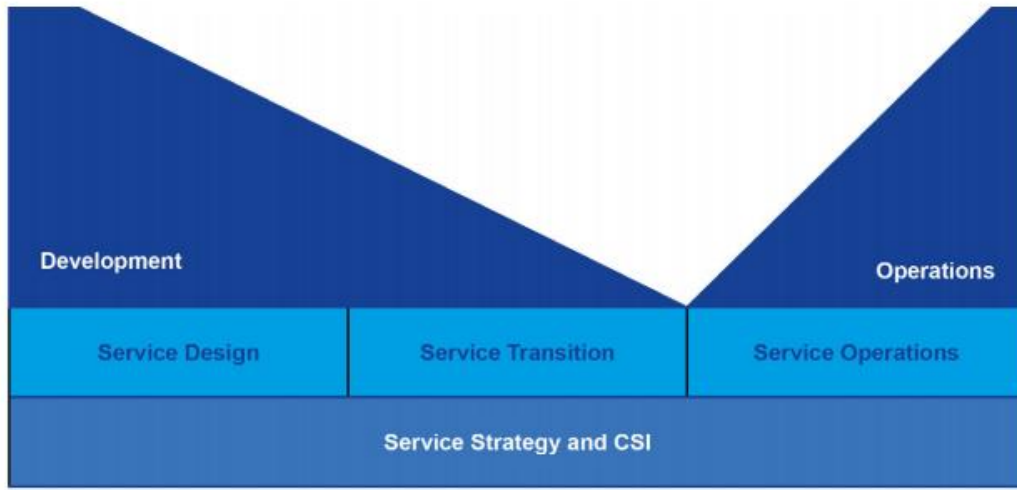




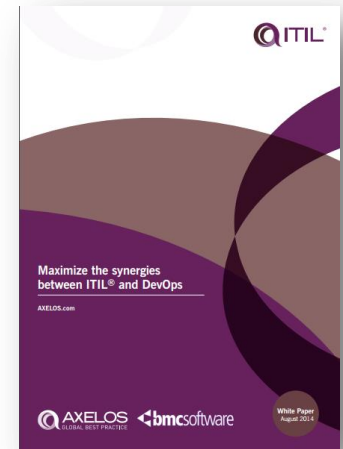
- **Productivity** is very important and central measure for estimating but which is the formula?
- What an ICT project is producing? Only software functionalities?
- Which are the right **drivers** to consider in a productivity analysis in the «2020» years? And what about the **COVID-19 period**?
- Do we have to assume that the traditional formula (outputs produced / effort needed) could be valid also for ICT projects?
- Can ISBSG repositories help for better estimations? How could they be eventually improved, learning from this period?

The Third Way...

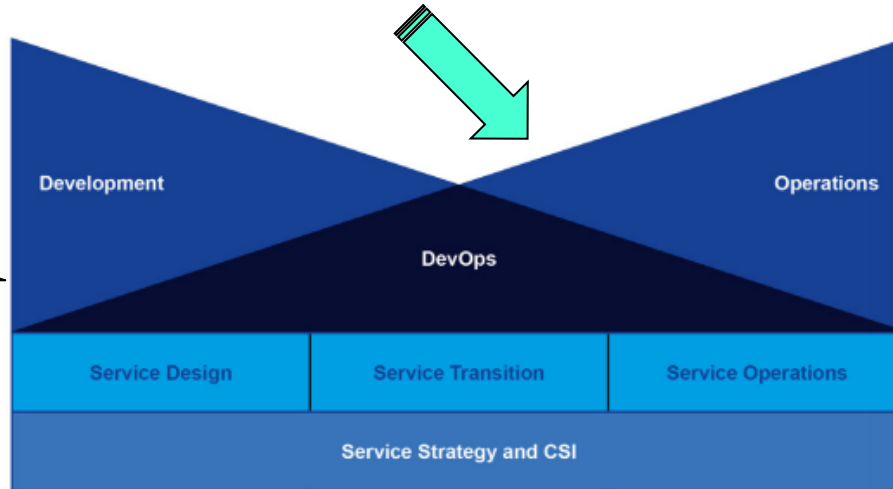
ITIL & DevOps: which relationship?



Yesterday...



...today



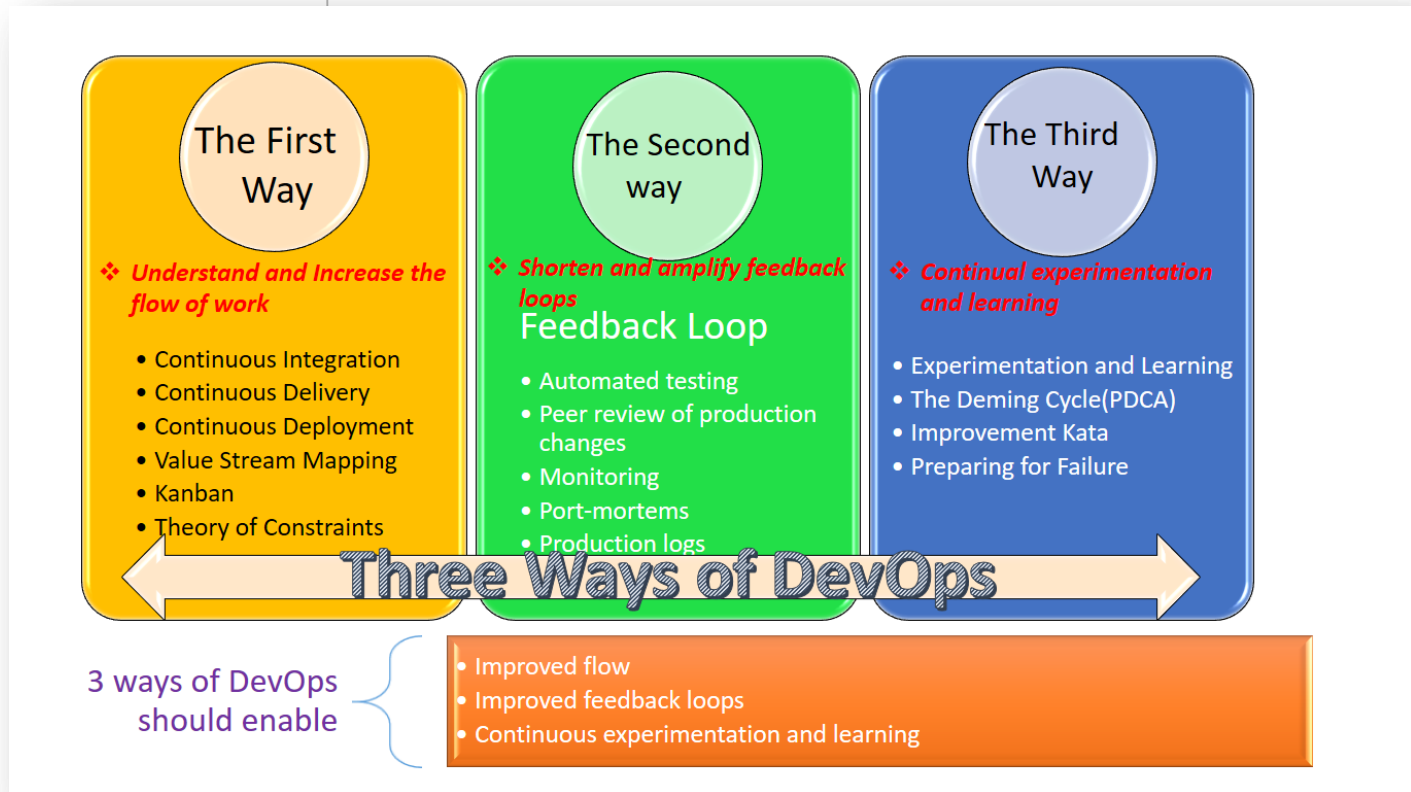
Culture
Automation
Lean IT
Measurement
Sharing



ISBSG IT Confidence 2021- October 8, 2021)

www.isbsg.org





- The «Third Way» is the higher «maturity level» in a DevOps approach
- It implies «**Experimentation & Learning**», to plan a possible failure for learning
- Thus, it implies also the qualitative/quantitative **data gathering** from your own projects, as requested also in [ISO 15939](#) (measurement) and [29155-x](#) (benchmarking) standards



- On the opposite, too often productivity values are «established» with any measurement and with reference to a generic kind of service....(CONSIP, Italy, Jan **2018**)



- I PF di CHG verranno riconosciuti al 50% della tariffa unitaria del PF per la tipologia di servizi offerta dal concorrente;
- I PF di DEL verranno riconosciuti al 10% della tariffa unitaria del PF per la tipologia di servizi offerta dal concorrente.

Si precisa che il valore economico di un Function Point è determinato per ogni tipologia di servizi dall'offerta economica del Raggruppamento applicando un fattore di produttività medio pari a 1,7.

- PS: we're dealing with a «nominal productivity»...Function Points (FP) must be related to the overall project effort, also for NFR and PRJ-related activities



- In other cases, the PDR shall be calculated only on the Functional Size Unit (FP) and for «development and testing»...**thus**, what about the «analysis & design» phase and the management of NFRs/PRJ-related activities?
([EU-LISA](#), Europe, 2020)

- **Price per function point for development and testing:**

The profile distribution required for Development and Testing activities shall be provided to allow the calculation of the '*Total function point for development and testing*' for both IFPUG FPA and COSMIC FPA methods, and is calculated by multiplying:

- *Indicative volume of function points* (to be provided by the Contracting Authority for both IFPUG FPA and COSMIC FPA methods),
- *Total weighted hourly rate for development and testing*, and
- *Project Delivery Rate (PDR) for development and testing for respective FPA method.*

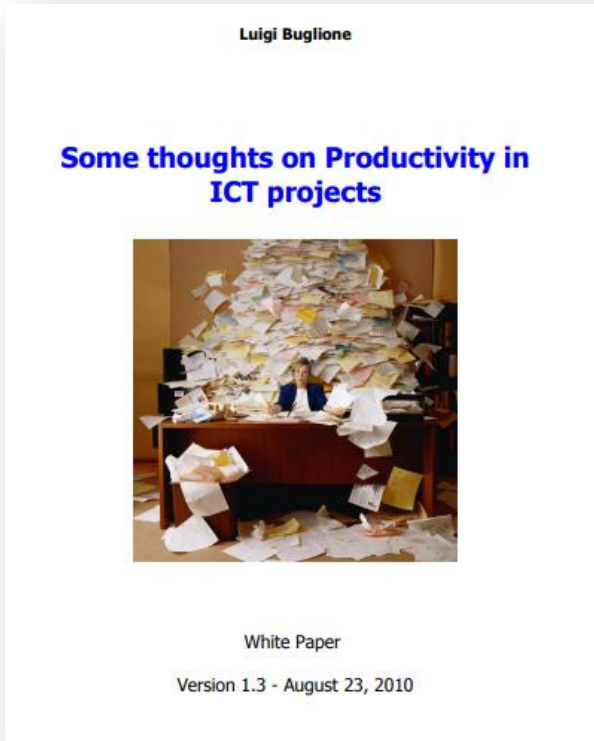




ISBSG Project ID	Effort			Schedule								
	Normalised Work Effort Level 1	Normalised Work Effort	Summary Work Effort	Project Activity Scope	Effort Plan	Effort Specificy	Effort Design	Effort Build	Effort Test	Effort Implement	Effort Unrecorded	
10001	1850	1850	1850	Planning;Specification;Build;T	100	400		1000	200	150	0	
10003	741	741	608	Design;Build;Test;Implement;							608	
10007	314	314	288	Specification;Design;Build;Test;Implement;Proj Management;							288	
10011	856	856	796	Planning;Specification;Build;Test;							796	
10012	1100	1100	1100								1100	
10014	28	28	28								28	
10015		23913	22000	Specification;Build;Test;Implement;								
10016	4582,5	4582,5	3666	Design, Build, Test, Scrum Master (No Requirements and No Implementatic	1084,4		1459,2	1122,4				
10019	324	324	266	Design;Build;Test;Implement;							266	
10026	18160	18160	18160	Planning;Specification;Build;Test;							18160	
10028	2954	2954	2422	Design;Build;Test;Implement;							2422	

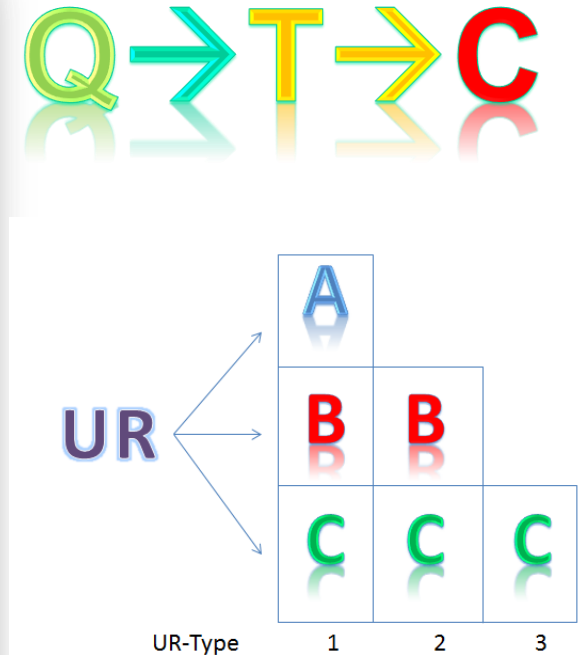
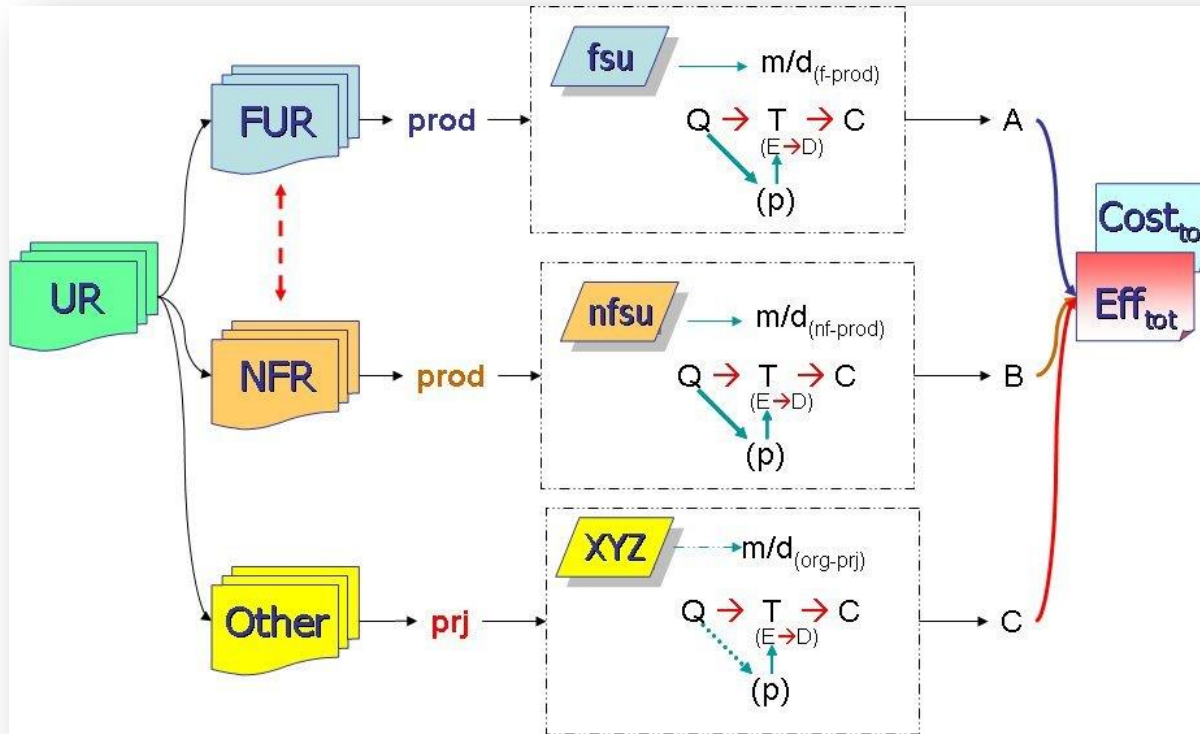
- Three (3) definitions of Normalized Work Effort (WE) in man-hours [Effort ‘columns’]
- Split of the overall project effort per (main) project phases/activities [‘Schedule ‘columns’]
- Classification done not taking into account the nature of User Requirements (URs)
- Not all the projects declare the effort: often the «Effort unrecorded» is equal to 100%
- Useful to determine a ‘nominal’ productivity but not a strict functional productivity, keeping off all the effort not related to the (real) production of a «functional size unit» (e.g. all the ISO/IEC 25010/25012 related-activities and again, project management, measurement, QA, set-up activities, roll-out, ...)





- <http://www.semq.eu/pdf/fsm-prod.pdf> (2010, v1.3)
- Started a discussion about the need for publishing which is the productivity formula in a contract
- **Need to split User Requirements (UR) into FUR (product), NFR (product), PRJ (project)**
- The «current» formula consider as the (main) output from a software project the number of Function Points (whatever the method applied)
- ...but something more is produced and needed in a project to properly run (NFR + PRJ requirements and related output) → e.g a user manual is not software, the measurement activities to estimate and size a project are useful to improve its management but do not have a direct impact on the product size, an enhancement only about usability or reusability doesn't have an impact on the functional side but on the quality one...
- **At least three different productivity formulas could be applied...**

$\frac{FP_{FUR-prod}}{Effort_{prj}}$ <p>(a) Nominal productivity</p>	$\frac{FP_{FUR-prod}}{Effort_{FUR-prod}} + \frac{SP_{NFR-prod}}{Effort_{NFR-prod / Org-Prj}}$ <p>(b) Functional and Non-Functional Productivities (Level-1)</p>	$\frac{FP_{FUR-prod}}{Effort_{FUR-prod}} + \frac{SP_{NFR-prod}}{Effort_{NFR-prod}} + \frac{XYZ_{Org-Prj}}{Effort_{Org-Prj}}$ <p>(c) Functional, Non-Functional and Org-Project Productivities (Level-2)</p>
--	---	---

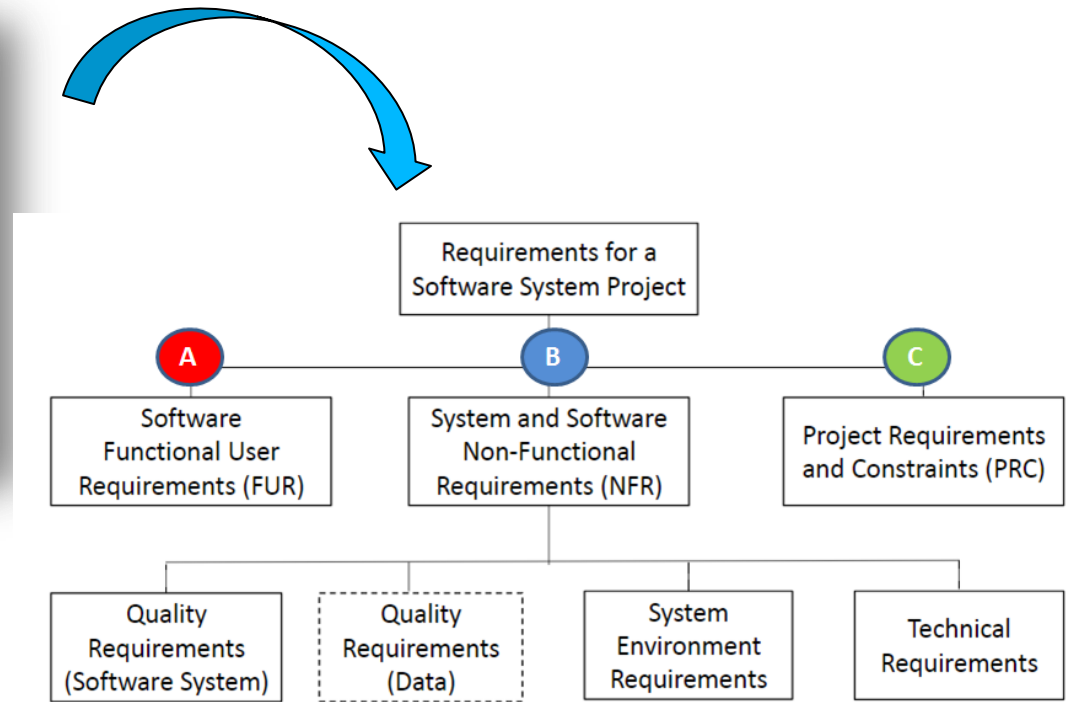
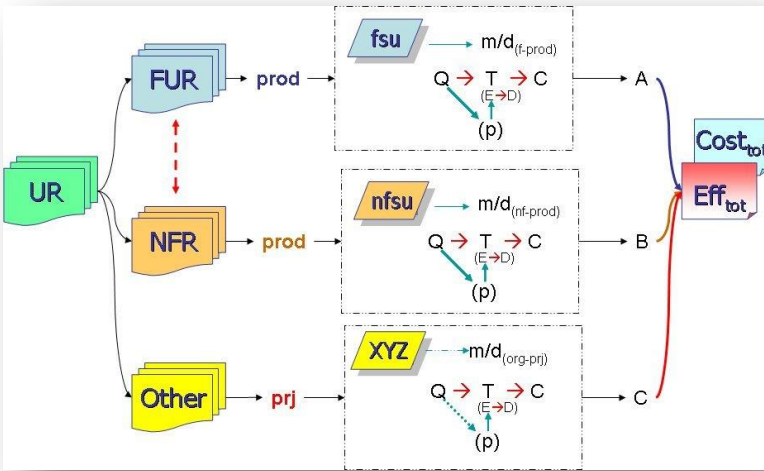


- **IFPUG MetricViews, Vol 6, No.2, Aug 2012 – <http://goo.gl/hgrJt>**
- UR split into three possible types, each one sized with its Unit of Measure (UoM)
- Each UR can derive **three possible UR-types**
- UR generates a Quantity (Q), that generates an Effort/Time (T) applying a certain **productivity (p)**, and T generates Costs (C) and related Prices
- Only after determining Efforts and Costs for each stream, it's possible to sum them up



The Third Way...

IFPUG/COSMIC NFR Taxonomy (2015)



- <http://www.ifpug.org/cosmic-and-ifpug-glossary-of-terms/>
- IFPUG/COSMIC moved from the ABC schema, considering the same for a joint paper written in 2015
- A-B-C in the picture on the right is an addition we did for make more clear in the follow any reference to ABC activity or related-effort



The Third Way...

How to determine the ABC effort?



ID	Task Name	Work
1	'Splitting Effort' Project	278 hrs
2	Project Management	19 hrs
8	Quality Assurance (QA)	9 hrs
11	Analysis	38 hrs
17	Design	72 hrs
23	Construction	80 hrs
27	V&V	56 hrs
30	Release	4 hrs

(a) – compacted view

ID	Task Name	CMMI-DEV PA	CMMI-DEV Process Group	Req. Type	Work	FUR-related Effort	NFR-Prj related Effort
1	'Splitting Effort' Project				278 hrs	0	0
2	Project Management				19 hrs	0	0
3	Planning	PP	Prj Mgmt	Org-Prj	16 hrs	0	16
4	Monitoring & Control				3 hrs	0	0
5	Meeting #01	PMC	Prj Mgmt	Org-Prj	1 hr	0	1
6	Meeting #02	PMC	Prj Mgmt	Org-Prj	1 hr	0	1
7	Meeting #...	PMC	Prj Mgmt	Org-Prj	1 hr	0	1
8	Quality Assurance (QA)				9 hrs	0	0
9	Product QA	PPOA	Support	NFR	6 hrs	0	6
10	Process QA	PPOA	Support	Org-Prj	3 hrs	0	3
11	Analysis				38 hrs	0	0
12	Req Elicitation	RD	engineering	FUR	20 hrs	20	0
13	User Requirements				18 hrs	0	0
14	UR - functional	RD	engineering	FUR	8 hrs	8	0
15	UR - nonfunctional	RD	engineering	NFR	6 hrs	0	6
16	FP-sizing	MA	Support	NFR	4 hrs	0	4
17	Design				72 hrs	0	0
18	Functional Specification	RD	engineering	FUR	28 hrs	28	0
19	Architectural Specification	RD	engineering	NFR	14 hrs	0	14
20	Test Plan				30 hrs	0	0
21	TP - Functional part	VER	engineering	FUR	12 hrs	12	0
22	TP - Non-functional part	VER	engineering	NFR	18 hrs	0	18
23	Construction				80 hrs	0	0
24	Construction	TS	engineering	FUR	52 hrs	52	0
25	Customization	TS	engineering	NFR	12 hrs	12	0
26	Fixing bugs	TS	engineering	FUR	16 hrs	16	0
27	V&V				56 hrs	0	0
28	Black-box	VER	engineering	FUR	20 hrs	20	0
29	White box	VER	engineering	NFR	36 hrs	0	36
30	Release				4 hrs	0	0
31	Release F-xyz	VAL	engineering		4 hrs	0	4

(b) by requirement type

$$FUR = A // NFR = B // PRJ = C$$





$$P = Q/T$$

$$P_{(NOMINAL)} = FP/EFFORT$$

Product
(FUR)

Project
(ALL)

Thus adding effort for type B / C tasks (not increasing the FP) would we be less productive? ...paradoxical!

A

B

C

FUR
(product)

NFR
(product)

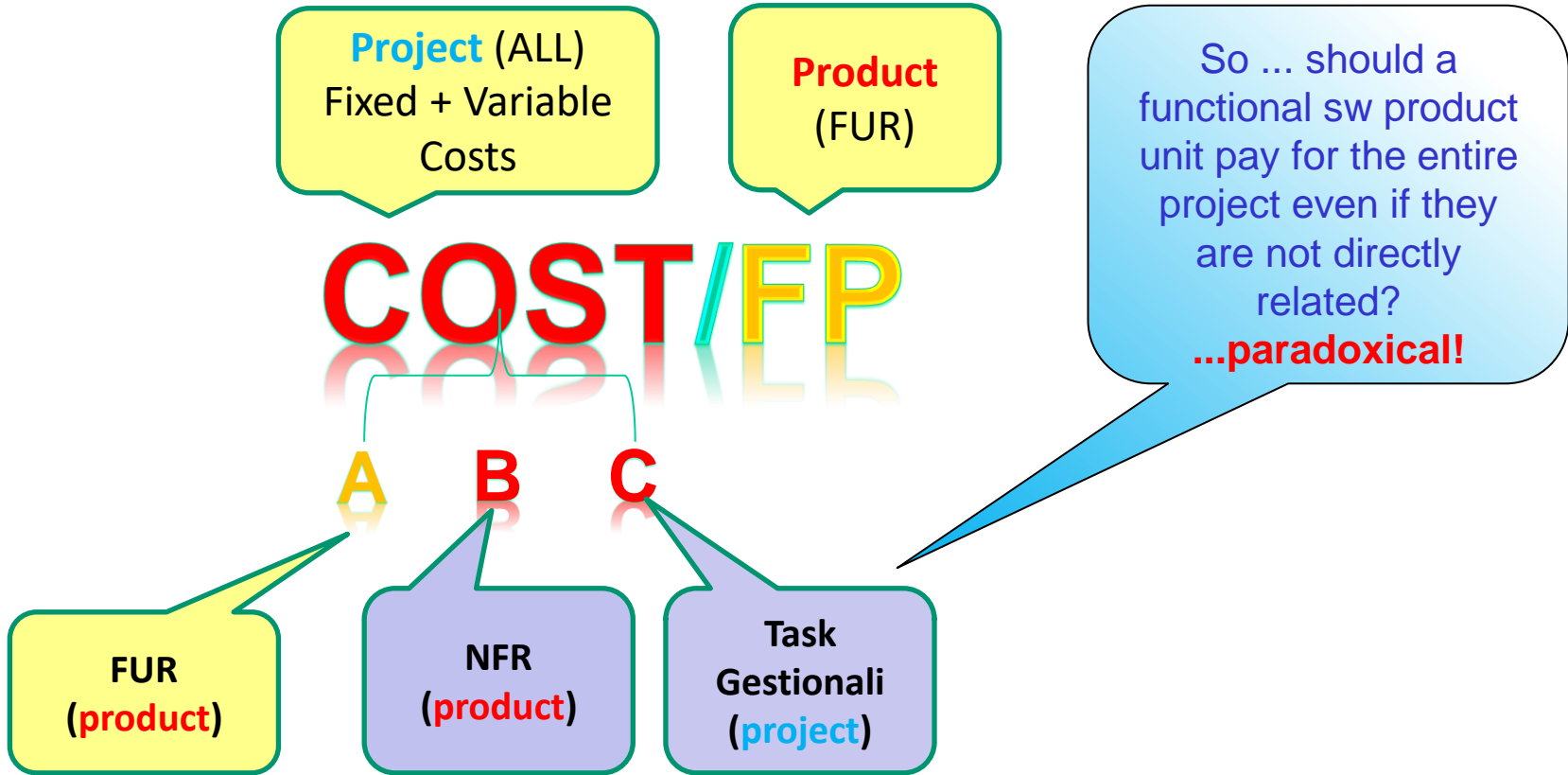
Task
Gestionali
(project)

? Which is/should be the *scope* of our interest?





$$C_{UNIT} = C / Q$$

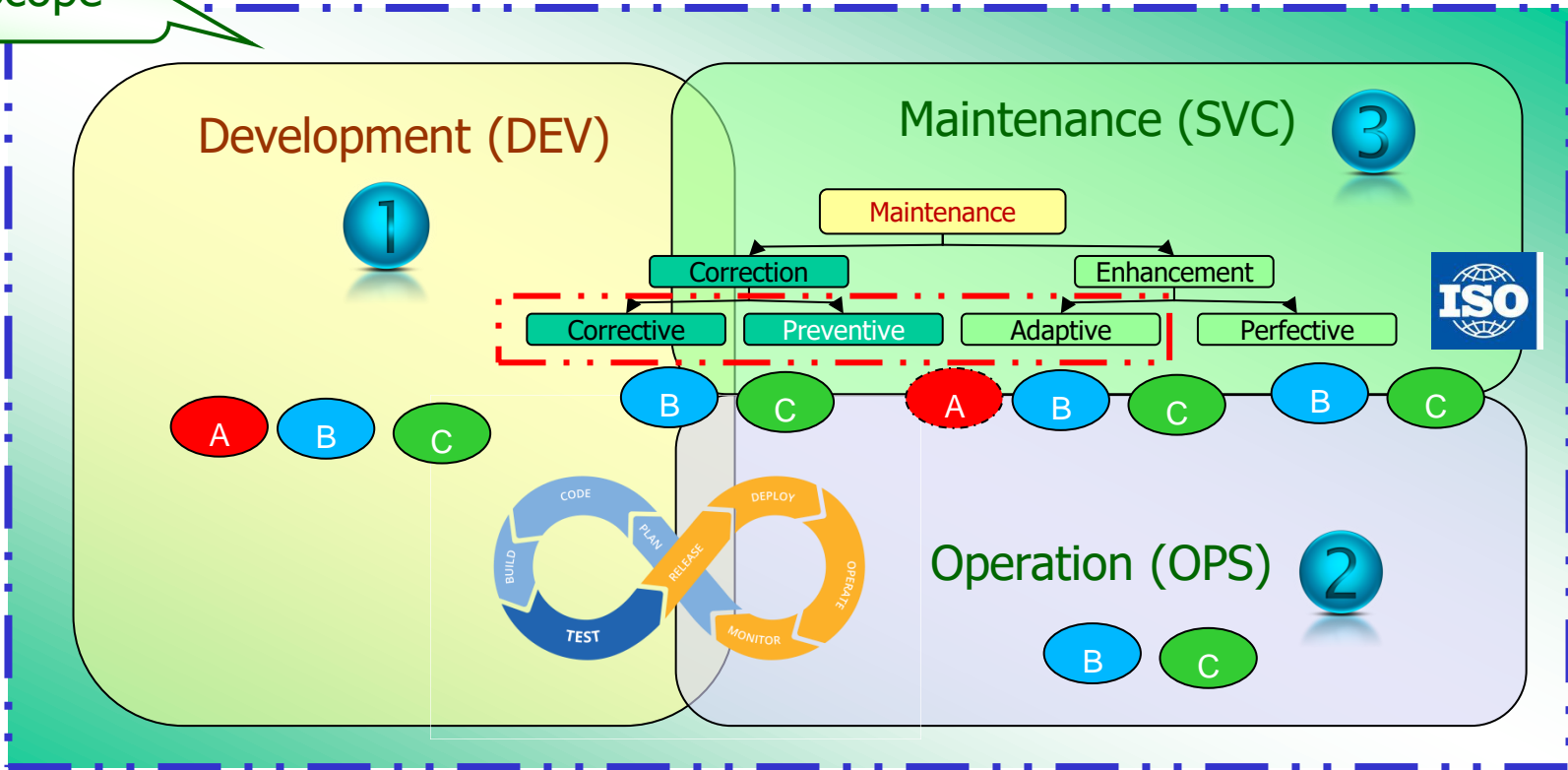


The Third Way...

«ABC» Schema + «123» Schema = **Bingo!**



'Service' Scope



SS/Strategy

SD/Design

ST/Transition

SO/Operation

CSI/Improvement

ITIL v3 – LifeCycle Phases



https://www.francoangeli.it/Riviste/Scheda_Rivista.aspx?idArticolo=60589



ISBSG IT Confidence 2021- October 8, 2021)

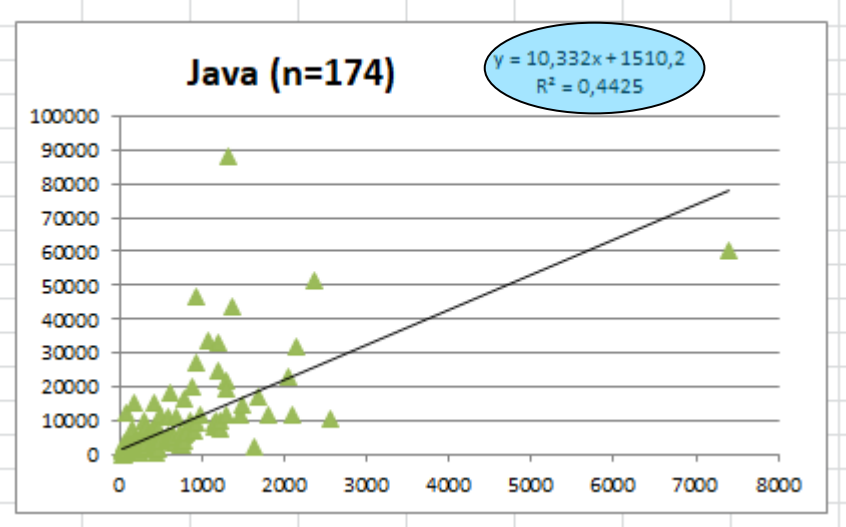
www.isbsg.org

The Third Way...

An example: ISBSG D&E 2021 – Java (Dev, IFPUG)



Id	FP	Hrs	M/d	Prod(Nom ¹)
154	1188	8161	1020,125	1,165
155	1188	24639	3079,875	0,386
156	1198	33206	4150,75	0,289
157	1211	7840	980	1,236
158	1230	10152	1269	0,969
159	1285	11949	1493,625	0,860
160	1290	22045	2755,625	0,468
161	1300	19542	2442,75	0,532
162	1306	88555	11069,38	0,118
163	1374	43946	5493,25	0,250
164	1453	11683	1460,375	0,995
165	1484	15044	1880,5	0,789
166	1630	2303	287,875	5,662
167	1689	16896	2112	0,800
168	1800	12000	1500	1,200
169	2043	23271	2908,875	0,702
170	2091	11752	1469	1,423
171	2151	32170	4021,25	0,535
172	2351	51753	6469,125	0,363
173	2559	10528	1316	1,945
174	7400	60270	7533,75	0,982
Max	7400	88555	11069	5,662
Avg	523,64	6921	865	0,910
Median	287,00	3349	419	0,836
Min	21	167	21	0,055



- ‘Nominal’ Productivity here is calculated as «FP / project Effort»
- **Currently no overall effort split into ABC effort-types (but per SLC main phases/activities)**
- Thus shall it really be this set of project low productive ($R^2=0.4425$) or would it be only for the functional
- Consider in the $y = ax+b$ formula that
 - Y = effort
 - X = FP
 - B represents the NFR/PRJ impact
- If all project would have the same characteristics and ratio between ABC efforts, $R^2 = 1$
- **The higher the «b» constant, the higher NFR/PRJ, thus 2 possibilities:**
 - a) the project **IS NOT** performant
 - b) the project **IS** performant **BUT** also on the NFR/PRJ side



The Third Way...

An analysis tool: the «Planning Game» (2017)



Productivity or PDR?

Man-Hours or man-days?

'Nominal' and/or functional productivity? Click ...

What data source for productivity?
Are all application domains the same (ISO 14143-5)?

What impact on costs, revenues and margins? **Only 64.7% is about FP...**

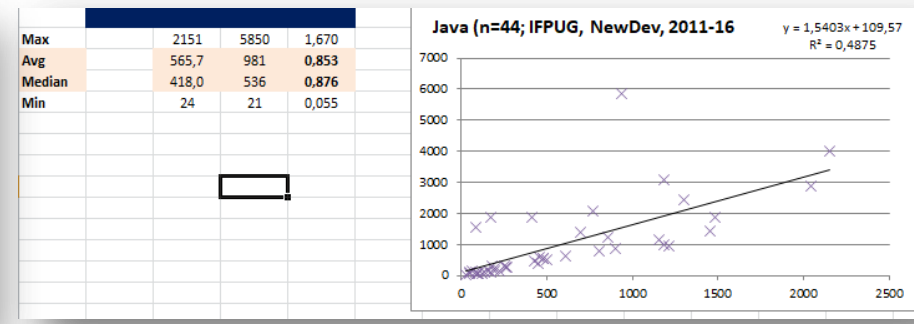
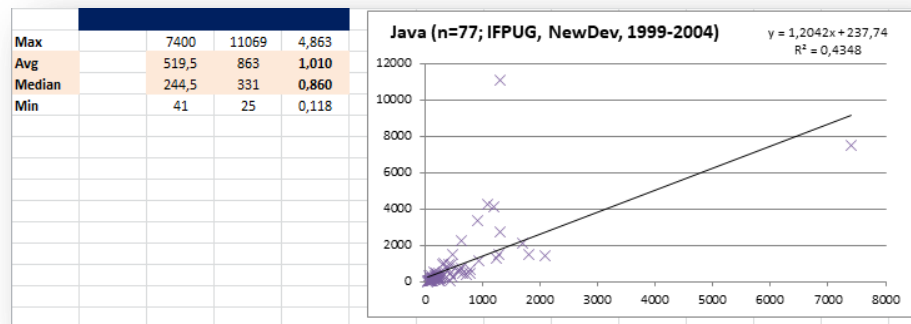
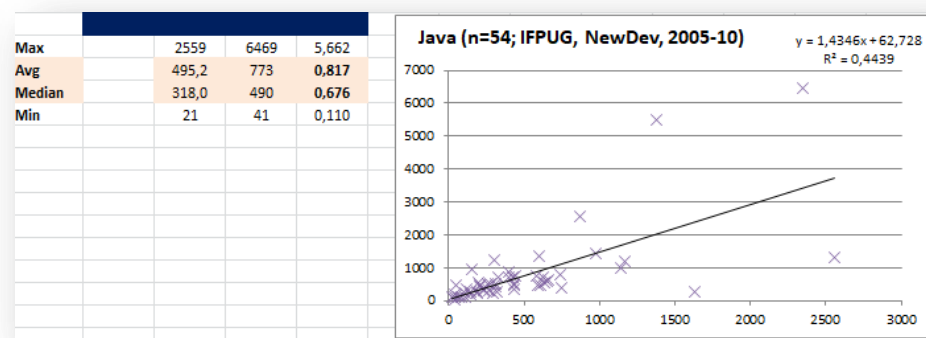
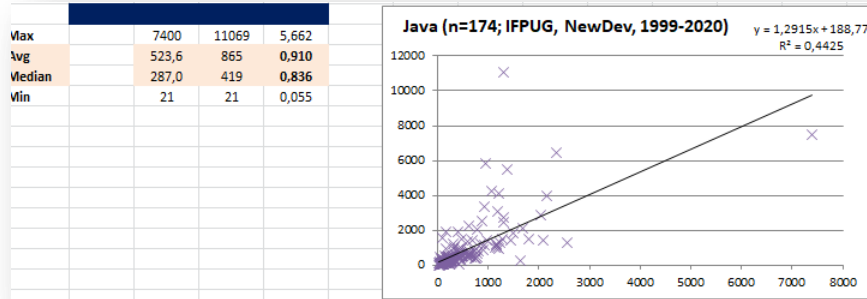
				P=Q/T					
				T=Q/p					
				P(n)	2	FP/gg-uu (java)		P(f)	3,09
				FP*	517				
				Effort*	259	gg/uu			
				Effort*	2068	hrs/uu	Start		
					0		Backlog		
				Duration					
	PM	QA	MiS	A/D	C	T	Release	Tot	%
A_FUR				313	810	215		1338	64,7%
B_NFR				160	98	180		438	21,2%
C_Proj	200	60	20				12	292	14,1%
Tot	200	60	20	473	908	395	12	2068	
%	9,7%	2,9%	1,0%	22,9%	43,9%	19,1%	0,6%	100%	

Right ABC% distribution?



The Third Way...

Some D&E 2021 extractions



- **Java, NewDev, IFPUG, Period 1999-2016 → R² [0.44 – 0.48]**
- No outliers initially kept out
- Nominal productivities (FP/m-d) was **reducing** in the last observed period (2011-2016)
- A Data Analyst should investigate about the **reasons** for this (apparent) reduced nominal productivity
- Anyway, the «fork» between Avg and Median value is (quite) always close to 1FP/m-d (Java is PL with a quite stable productivity level), not higher (as e.g. stated in the Italian bid dated 2018, asking for a «mixed/generic» productivity)

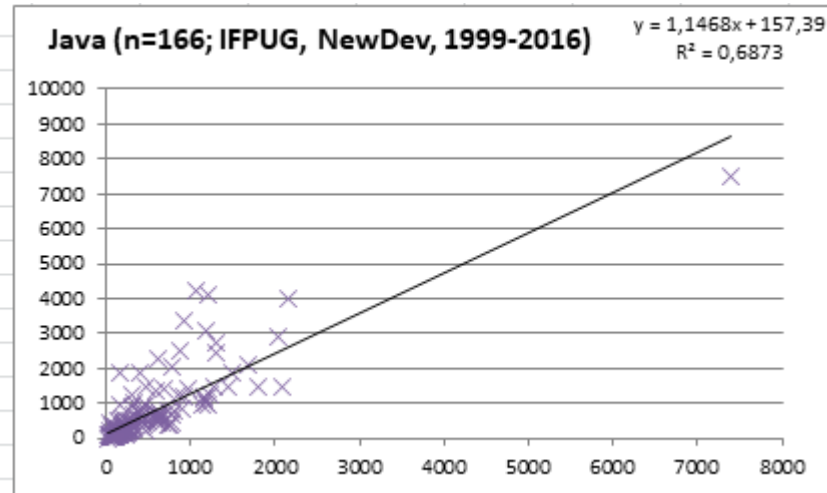


The Third Way...

Some D&E 2021 extractions



	166		
Max	7400	7534	2,652
Avg	523,6	713	0,873
Median	287,0	394	0,849
Min	21	21	0,092

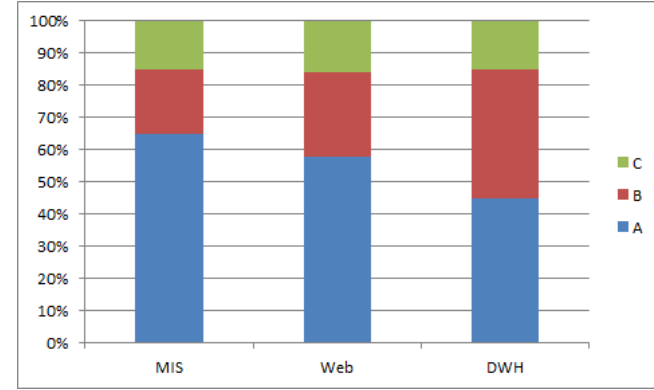
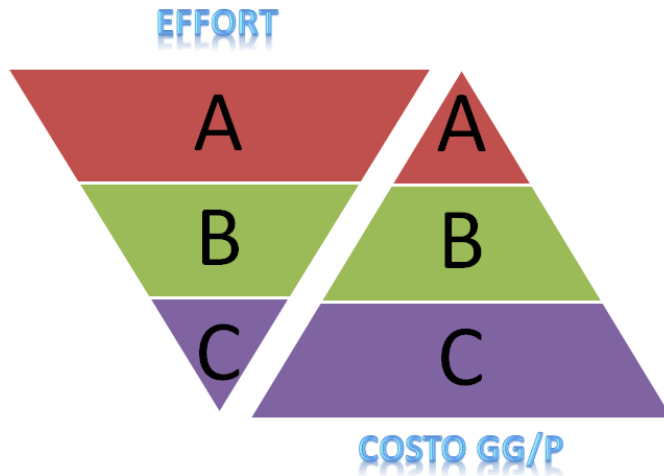
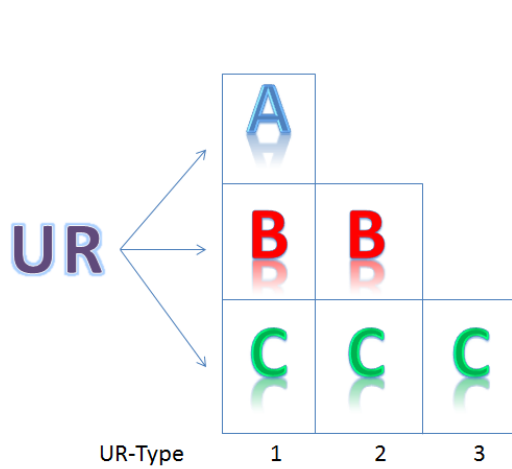


- **Java, NewDev, IFPUG, Period 1999-2016**
- Also keeping out a few outliers (n=166), the «fork» between Avg and Median value still remain close to 1FP/m-d, now with a **$R^2=0.6873$**
- ...and the exercise could go on, improving a bit results, but not more than a certain productivity level
- ...but e.g. how could a contract/bid affirm that estimations must be done considering an «average productivity» for any context (dev, enh, re-dev, ...) with any technology?
- ...and after this pandemic period, there could be a way to «isolate» projects that could have suffered the COVID-19 side-effects?



The Third Way...

Q → T → C: how determine costs/prices?



- Each project has a **different** ABC-effort distribution
 - *cfr. ISO/IEC 14143-5:2004 ([Functional Domains](#))*
- The number of man-hours and cost/person-day **differ** per req-type and skill/competence
 - *cfr. professional tariffs, internal costs, ...*
 - *Cfr. [ECF](#), [SFIA](#), ...*
 - *An analyst-programmer (A) DOESN'T cost as a product specialist (B) that DOESN'T cost as a project manager or measurement expert (C)...*
- **Don't forget «our» projects are (often) «pure craftsmanship» – even if using Software Engineering techniques and it's not possible to apply a «standard» daily cost**

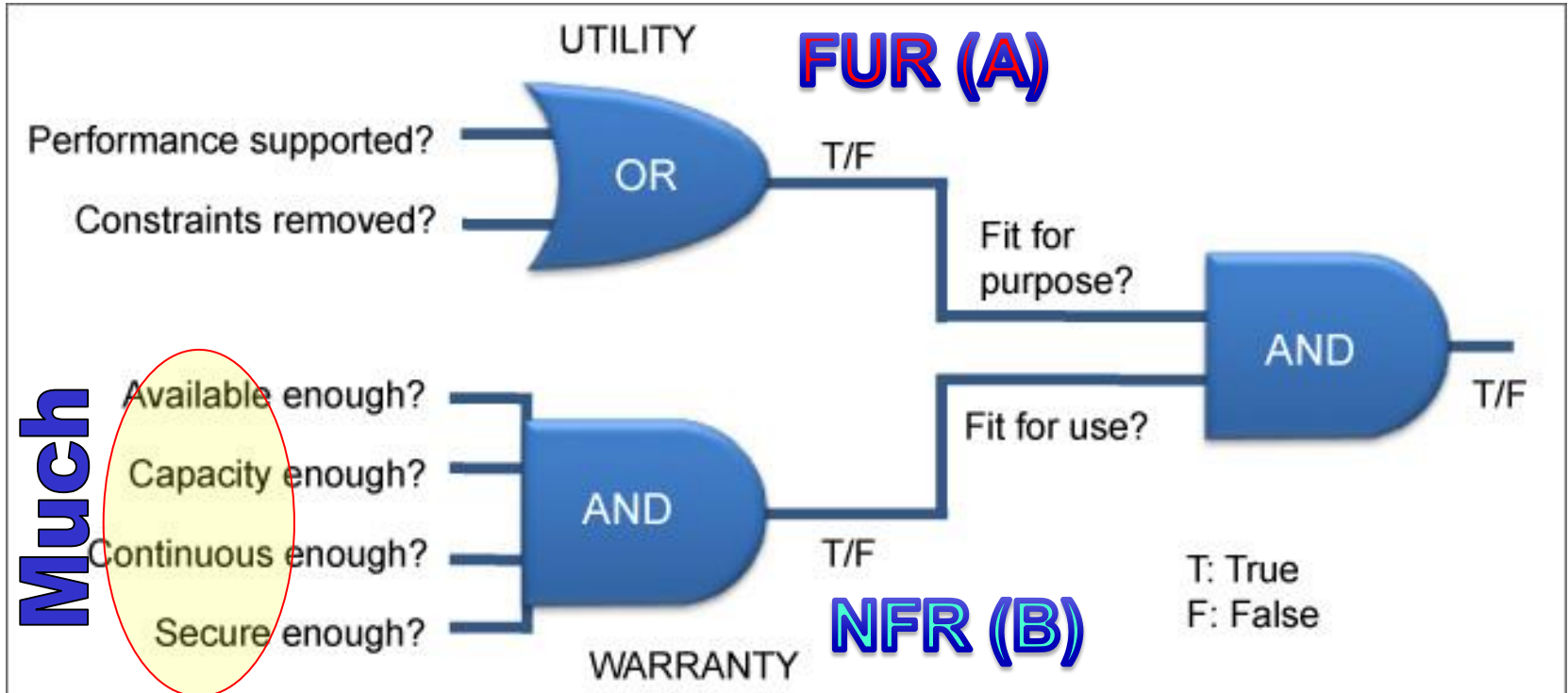


- Value = Utility + Warranty

What

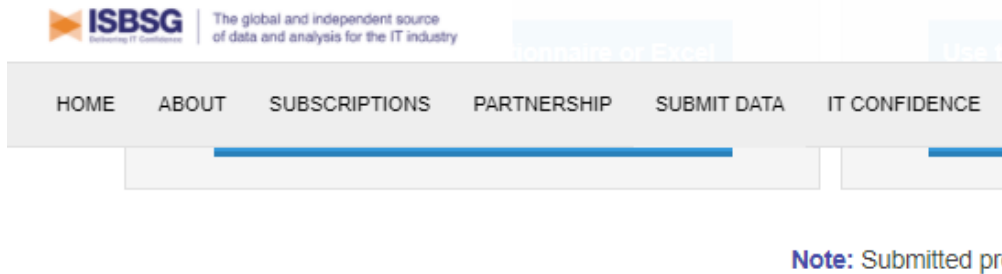
How

Much



- Service** is...a means to enable the co-creation of value by enabling the achievement of the results that customers want to achieve without having to manage specific costs and risks (*ITIL4, Glossary*)

- Another important issue: ISBSG yet consider a possible data gathering for IFPUG SNAP
- <https://www.isbsg.org/submit-data/>
- IFPUG SNAP is now the [ISO/IEC/IEEE 32430:2021](#) standard



... as done for the FPA (IFPUG / COSMIC / ...), it takes time to collect the data and then disseminate them, but productivity is calculated (quantity / effort), then applied at full capacity to estimate the next efforts (quantity / productivity)

What data does ISBSG collect?

Refer to the ISBSG Data Collection Questionnaires below, to see the data we collect.

- IFPUG / NESMA Questionnaire
- [IFPUG / NESMA with SNAP Questionnaire](#)
- COSMIC Questionnaire
- Mark II Questionnaire
- Non-functional sized projects Questionnaire
- Agile Data Collection Questionnaire

... but if we never start measuring the NFRs, the time to reach a greater maturity in the estimation and measurement processes will be longer ... Enough... **just a snap of your fingers («SNAP») is enough!**



- **Split the overall project effort using the «ABC schema»**
 - Not all the effort is related to «functional size units»: in this way it'll be also possible to determine a strict functional productivity (FP/FUR-related effort) as well as a non-functional productivity (SP/NFR-related effort) in case of «zero-FP enhancements» (see [ISO/IEC 14764:2006](https://www.iso.org/standard/54542.html) taxonomy for maintenance types)
- **Analyze past projects applying ABC effort % typical to that kind of project according to your own data**
 - «Apples vs Oranges» is a common-sense rule to be always applied!
 - Typical filters will be the functional domain, organization type, programming language, etc ...last but not least
 - the **year of the project** is another very important filter to apply...
 - a 1996 Java project shouldn't have the same productivity than in 2020 using Eclipse, Junit and many other plug-ins reducing the production time
 - A 2020/21 project under the Pandemic period probably will suffer of a lower productivity, as initially discussed (to be verified with the next D&E repository data)
 - The **Development type**
 - A Development project has typically a higher nominal productivity than an Enhancement one → reason: the unchanged elements don't enter in the ENH count but produce effort for analyzing the changes (e.g. an elementary process can be counted as CHGA also when changing its processing logic without any impact on the related logical files)
- **Play at the «Planning Game» for simulating your optimal effort (and cost) distribution**
 - Q → T → C is the logical flow to follow
 - A proper distribution of ABC-related effort can help in determining also the right duration and costs for your next project, but you need to start from a productivity value and ISBSG repositories can help!

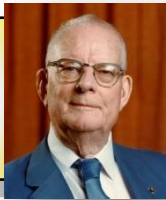




The Third Way...

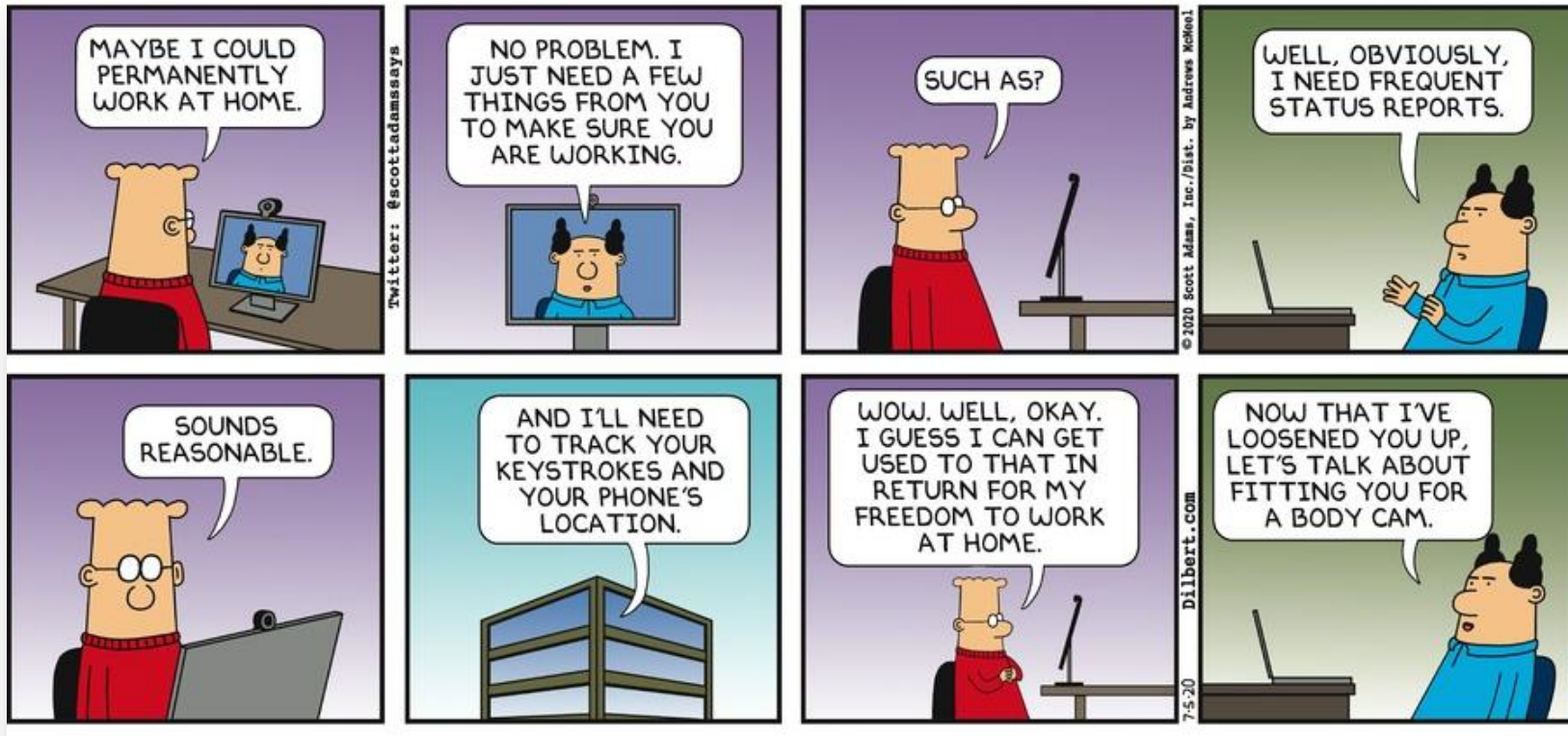
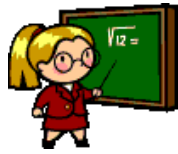
Some conclusions (?)...

- ✓ Refine the «productivity» definition
 - ✓ Not a single definition but at least three different ones
 - ✓ Not all the projects deliver ONLY functionalities, see e.g. adaptive maintenance projects, mostly based on NFR/PRJ requirements (e.g. User Satisfaction for a better User Interface cannot be functionally sized but has a NFR-value!)
- ✓ PDR is not Productivity!
 - ✓ Project Delivery Rate (PDR) is the opposite formula than Productivity
 - ✓ Important to specify formulas in contracts/bids in order to avoid mistakes with absolute values (e.g. a COBOL 0.5FP/m-d productivity would be have a PDR of 2m-d/FP or 16m-hrs/FP..)
- ✓ Be sure about the effort unit of measure...
 - ✓ Better to count work-hours than man-days → you can work a different number of man-hours per day in a project, strongly impacting on productivity analysis
 - ✓ In this COVID-19 period, it's fundamental to consider the amount of (eventual) extra-work per day for better benchmarking and estimation analysis
- ✓ (New) drivers/criteria for proper benchmarking analysis
 - ✓ The **year of the project** can tell you many information more than thought...typically, the closer the years, the more productive a certain programming language should be or isolate particular periods, as done e.g. in Problem Management for determining possible causes in a certain moments in time
 - ✓ The effort split also by the **ABC schema**, allowing to play the **Planning Game**



"If you don't know how to ask a question, you discover nothing" (W.E. Deming)





www.dilbert.com



Thanks for your attention!



Luigi Buglione

ISBSG / IFPUG / GUFPI-ISMA/Engineering Ing. Inf

luigi.buglione@eng.it

@lbu_measure

