

Using the ISBSG Database in an Agile Project Context

Customer Orientation

Lean Six Sigma

Agile Processes

Project Estimations

Transfer Functions



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Dr. Thomas Fehlmann

- 1981: Dr. Math. ETHZ
- 1991: Six Sigma for Software Black Belt
- 1999: Euro Project Office AG, Zürich
- 2001: Akao Price 2001 for original contributions to QFD
- 2003: SwissICT Expert for Software Metrics, ICTscope.ch
- 2004: Member of the Board QFD Institute Deutschland – QFD Architect
- 2007: CMMI for Software – Level 4 & 5
- 2011: Net Promoter® Certified Associate
- 2012: Member of the DASMA Board
- 2013: Vice-President ISBSG

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Predictive Projects = Waterfall?

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- Traditional project development has become the “enemy” called

Waterfall

- The inspector stays on the bridge crossing the waterfall and assesses progress
- Who's afraid from the **Big Bad Inspector??!?**





The Wonderful New World of Agile

- **Twelve Principles of Agile Software**
 1. Our highest priority is to satisfy the customer through early and continuous delivery of valuable software.
 2. Welcome changing requirements, even late in development. Agile processes harness change for the customer's competitive advantage.
 3. Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale.
 4. Business people and developers must work together daily throughout the project.
 5. Build projects around motivated individuals. Give them the environment and support they need, and trust them to get the job done.
 6. The most efficient and effective method of conveying information to and within a development team is face-to-face conversation.
 7. Working software is the primary measure of progress.
 8. Agile processes promote sustainable development. The sponsors, developers, and users should be able to maintain a constant pace indefinitely.
 9. Continuous attention to technical excellence and good design enhances agility.
 10. Simplicity – the art of maximizing the amount of work not done – is essential.
 11. The best architectures, requirements, and designs emerge from self-organizing teams.
 12. At regular intervals, the team reflects on how to become more effective, then tunes and adjusts its behavior accordingly.

Scrum Development Cycle

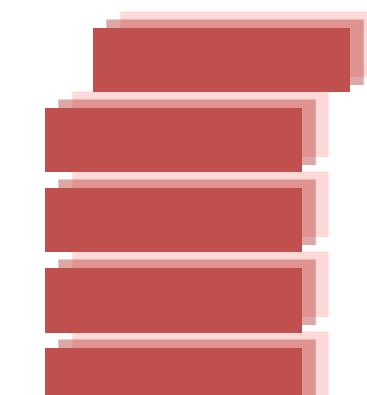
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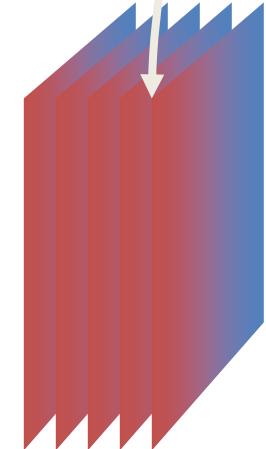
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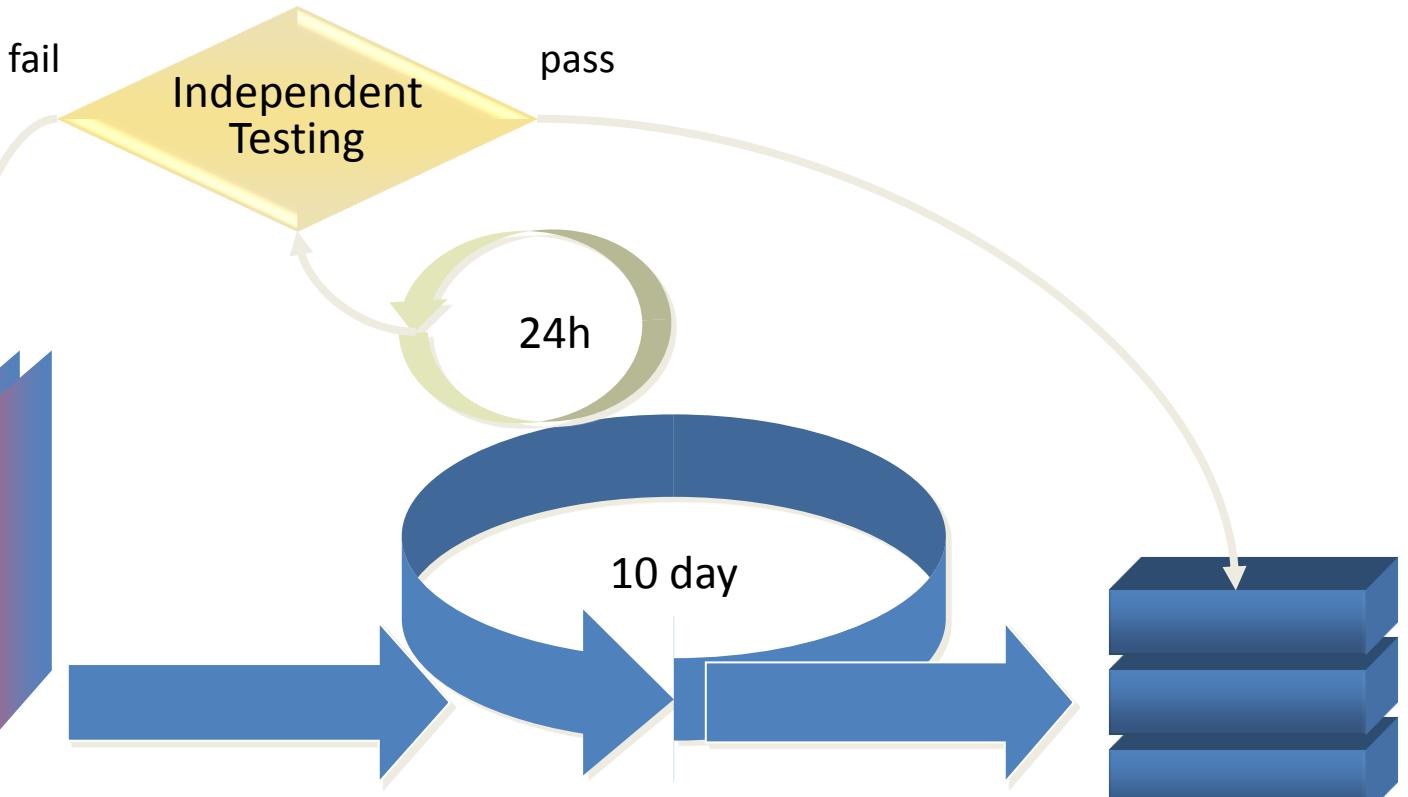
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Product Backlog
User Stories



Sprint Backlog
Work Items



Sprint

Work Increment
of finished software

Why Predictive ≠ Waterfall

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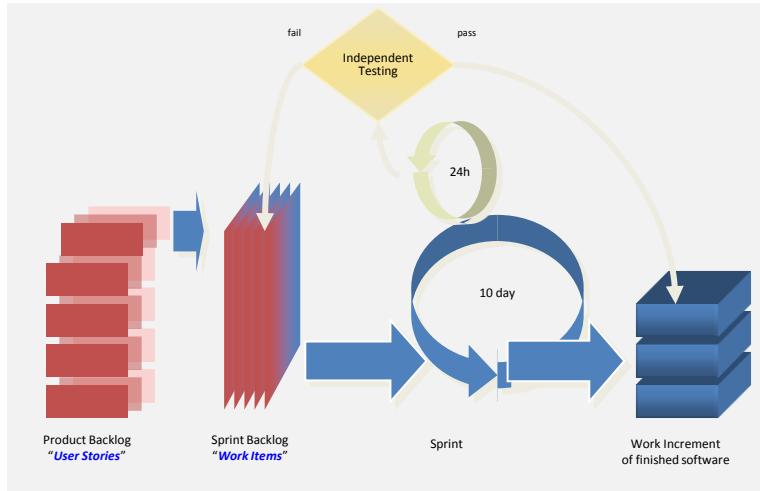
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- What do you need to predict?
 - **Functionality**? No..., it's evolving
 - **Cost**, Yes!



- **How many Sprints are needed?**

Predict Cost!

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- You need to know
 - Velocity
 - Team Size
 - Sprints Needed
- In what units?
 - Functional Size per Sprint
 - Person Days per Sprint
 - Number of Sprints
- **Cost = Team Size * Sprints needed * Salaries**
- Vision & Goals?
 - When are Goals Reached?
 - How do we know the Project is Finished?



Definitions

- ISBSG = International Software Benchmarking Standards Group
- FSU = Functional Size Units (IFPUG, COSMIC, etc.)
- ➡ CFP = COSMIC Function Points
- ➡ IFP = IFPUG Function Points
- PDR = Project Delivery Rate in Hours per FSU
- StP = Story Points, as defined by the team (project-specific)
- sPDR = Story Point Delivery Rate: the number of story points per FSU
- PD = Person Days; 1 day = 8 hours
- PWE = Project Work Effort, measured in Sprints, or sometime still in PDs
 - ➡ Includes Definition, Analysis, Design, Implementation, Test and Installation as well as project management and project administration loads
- Velocity = FSU delivered per Sprint

The ISBSG Data Portal – Entrance

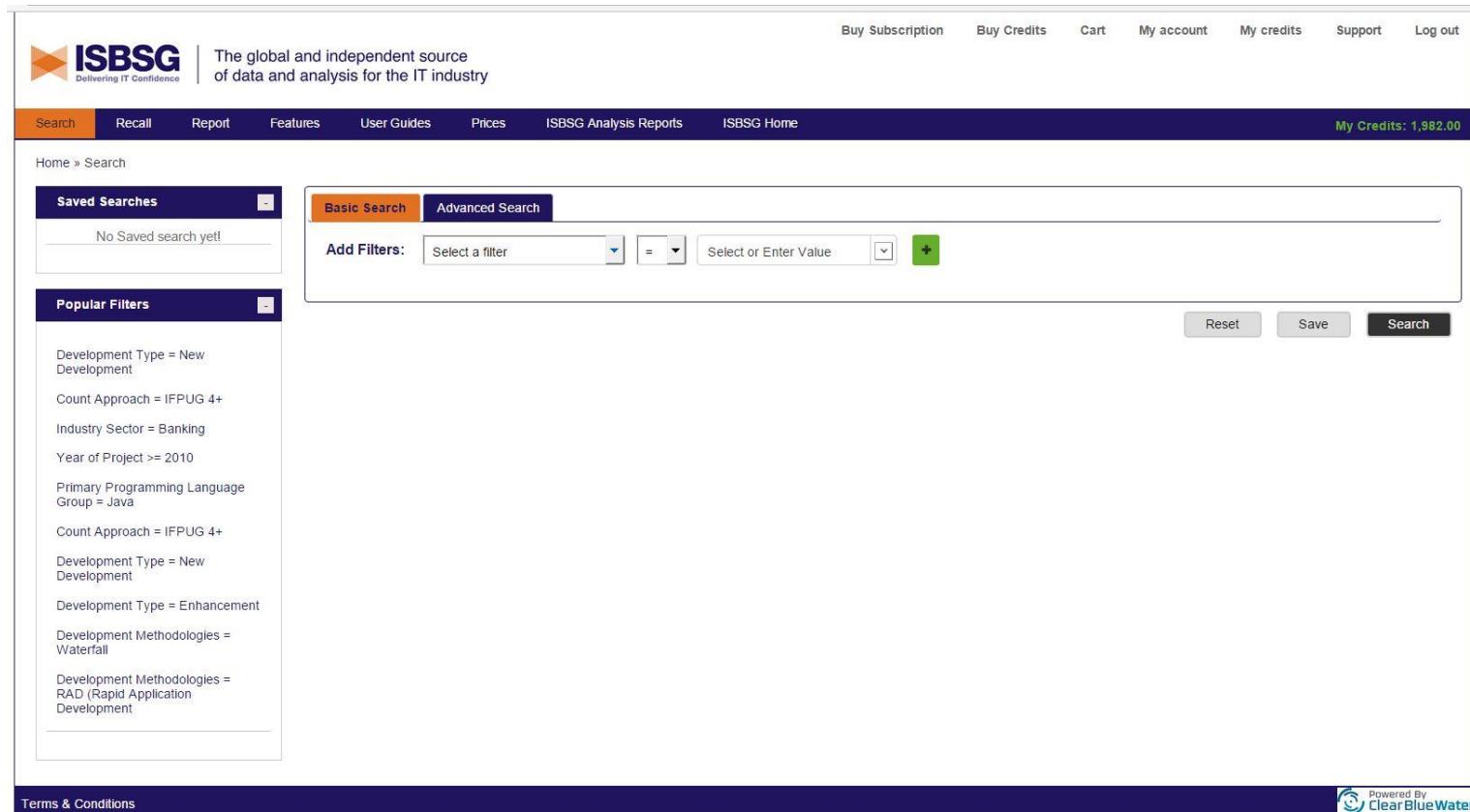
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The screenshot shows the ISBSG Data Portal search interface. At the top, there is a navigation bar with links for Buy Subscription, Buy Credits, Cart, My account, My credits, Support, and Log out. A banner at the top right displays "My Credits: 1,982.00". Below the navigation bar, there is a breadcrumb trail: Home > Search. On the left, there are two dropdown menus: "Saved Searches" (No Saved search yet!) and "Popular Filters". The "Popular Filters" menu lists various filter options such as Development Type = New Development, Count Approach = IFPUG 4+, Industry Sector = Banking, Year of Project >= 2010, Primary Programming Language Group = Java, Count Approach = IFPUG 4+, Development Type = New Development, Development Type = Enhancement, Development Methodologies = Waterfall, and Development Methodologies = RAD (Rapid Application Development). In the center, there is a search form with tabs for "Basic Search" and "Advanced Search". The "Basic Search" tab is selected, showing fields for "Add Filters:" (Select a filter, =, Select or Enter Value), a green "+" button, and buttons for "Reset", "Save", and "Search". At the bottom, there are links for "Terms & Conditions" and "Powered By ClearBlueWater".

The ISBSG Data Portal – Search for Projects

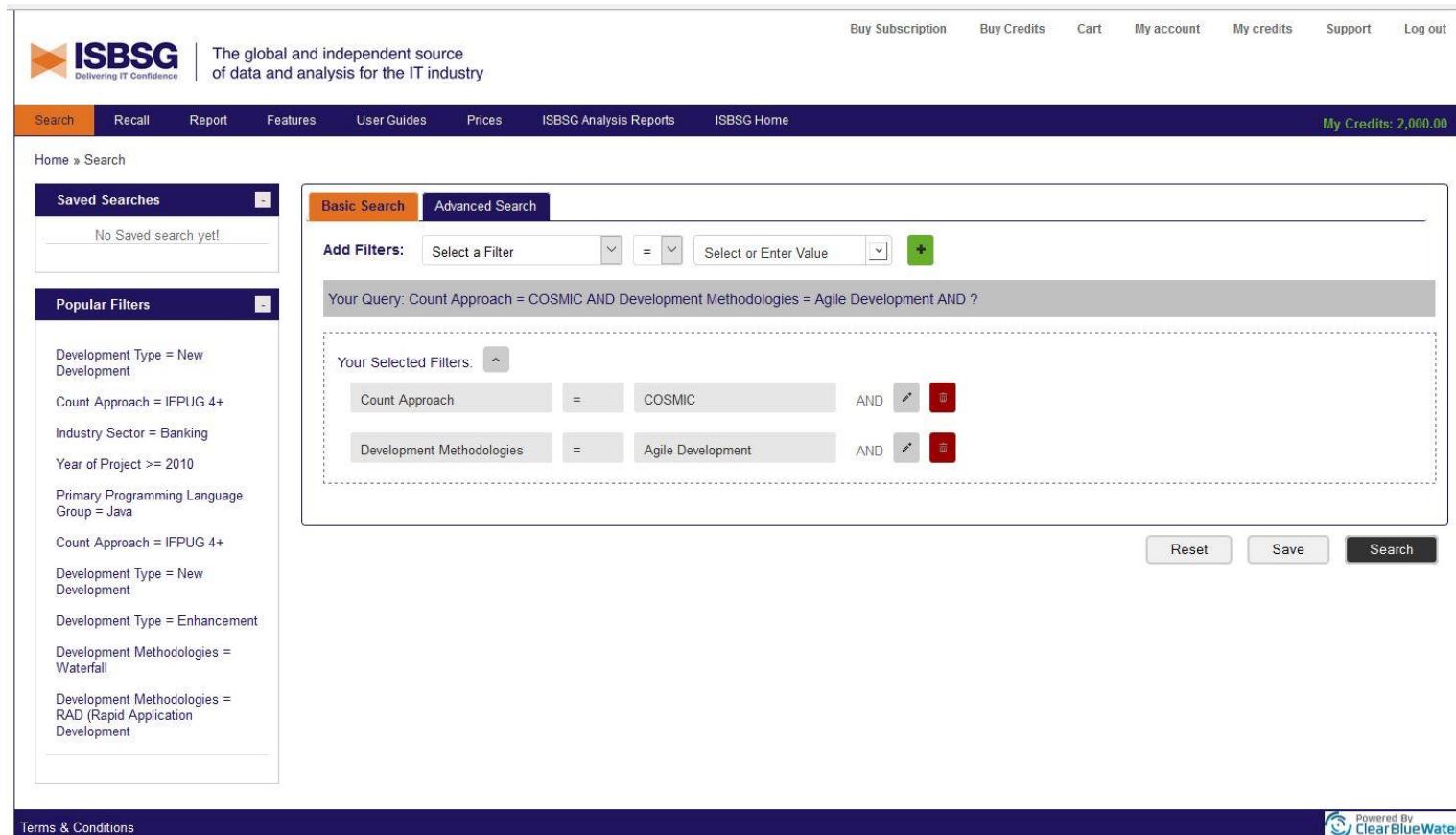
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The screenshot shows the ISBSG Data Portal search interface. At the top, there's a navigation bar with links for Buy Subscription, Buy Credits, Cart, My account, My credits, Support, and Log out. A banner at the top right says "My Credits: 2,000.00". Below the navigation, there's a breadcrumb trail: Home » Search.

On the left, there are two dropdown menus: "Saved Searches" (No Saved search yet!) and "Popular Filters". The "Popular Filters" menu lists various filter options such as Development Type = New Development, Count Approach = IFPUG 4+, Industry Sector = Banking, Year of Project >= 2010, Primary Programming Language Group = Java, etc.

The main search area has tabs for "Basic Search" and "Advanced Search". It features an "Add Filters" section with a dropdown for "Select a Filter", operators (=, AND, OR), and a value input field. Below this, a query is shown: "Your Query: Count Approach = COSMIC AND Development Methodologies = Agile Development AND ?". The "Your Selected Filters" section shows two filters applied: "Count Approach = COSMIC" and "Development Methodologies = Agile Development".

At the bottom of the search area are buttons for Reset, Save, and Search.

At the very bottom of the page, there are links for Terms & Conditions and Powered By ClearBlueWater.

The ISBSG Data Portal – Search Results

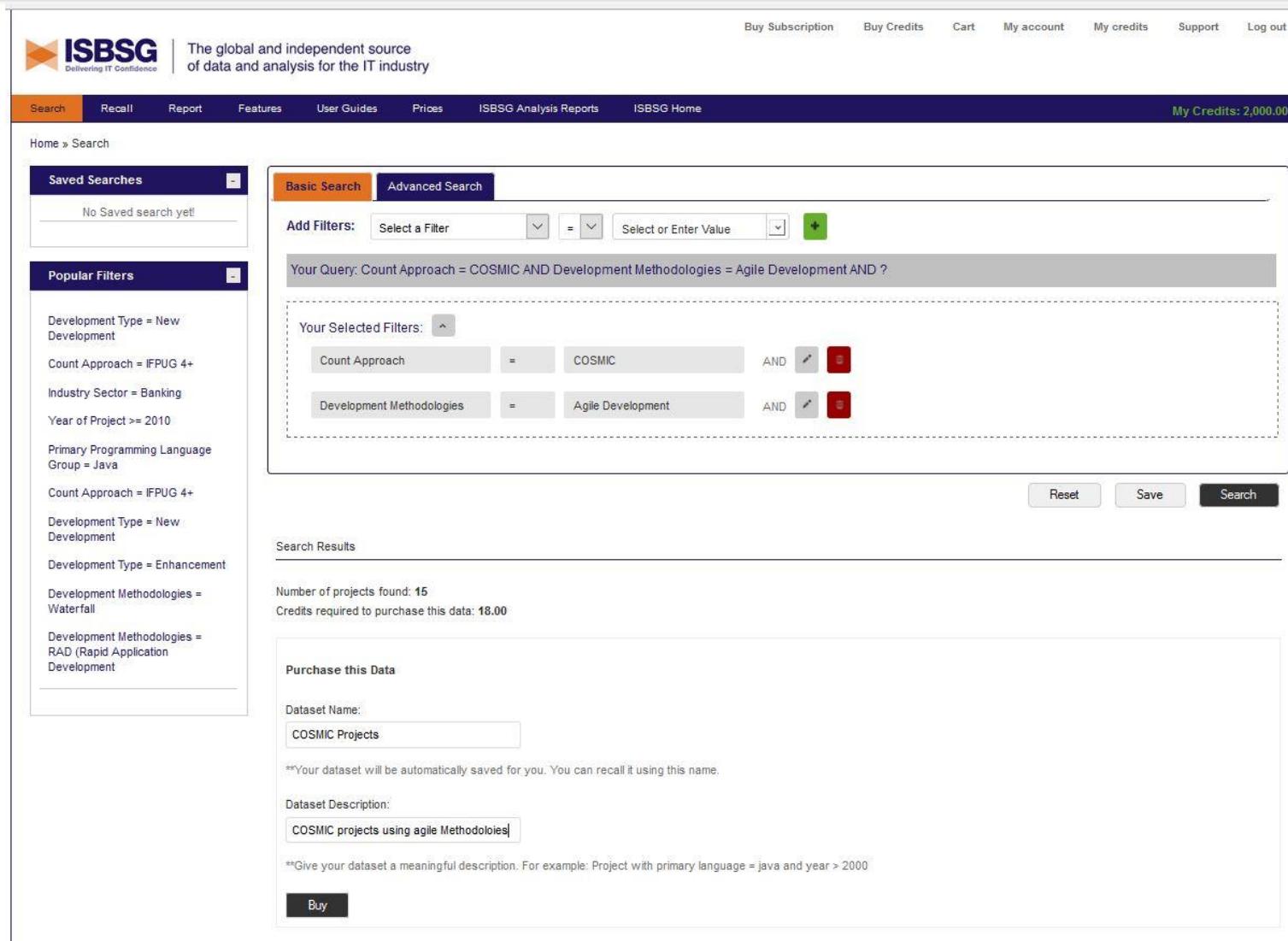
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My Credits: 2,000.00

Home » Search

Saved Searches [-] No Saved search yet!

Popular Filters [-]

- Development Type = New Development
- Count Approach = IFPUG 4+
- Industry Sector = Banking
- Year of Project >= 2010
- Primary Programming Language Group = Java
- Count Approach = IFPUG 4+
- Development Type = New Development
- Development Type = Enhancement
- Development Methodologies = Waterfall
- Development Methodologies = RAD (Rapid Application Development)

Basic Search Advanced Search

Add Filters: Select a Filter = Select or Enter Value +

Your Query: Count Approach = COSMIC AND Development Methodologies = Agile Development AND ?

Your Selected Filters: ^

- Count Approach = COSMIC AND
- Development Methodologies = Agile Development AND

Reset Save Search

Search Results

Number of projects found: 15
Credits required to purchase this data: 18.00

Purchase this Data

Dataset Name: COSMIC Projects

**Your dataset will be automatically saved for you. You can recall it using this name.

Dataset Description: COSMIC projects using agile Methodologies

**Give your dataset a meaningful description. For example: Project with primary language = java and year > 2000

Buy

The ISBSG Data Portal – Project Details

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Dataset Reports » Dataset Project Details

project_id	functional_size	normalised_work...	normalised_level...	primary_program...	industry_sector	application_group	application_type	development_pla...	added_count
14335	456	5408	11.9	C#	Manufacturing	Mathematically-In...	Software develop...	PC	486
14345	114	429	3.8	Java	Education	Business Applicati...	Content manage...	PC	
14535	483	331	0.7	C#	Education	Business Applicati...	Catalogue/register...	PC	483
14621	23	248	10.8	C++	Service Industry	Business Applicati...	Financial transacti...	PC	22
18118	912	4110	4.5	C#	Financial	Business Applicati...	Customer billing/r...	PC	853
19859	82	225	2.7	C#	Service Industry	Business Applicati...	Electronic Data In...	PC	43
21719	118	489	4.1	Java	Education	Business Applicati...	Content manage...	PC	
23265	155	491	3.2	Java	Education	Business Applicati...	Content manage...	PC	
23319	113	1047	9.3	C#	Manufacturing	Real-Time applicati...	Automated Data ...	PC	113
25081	135	600	4.4	Java	Education	Business Applicati...	Content manage...	PC	
25559	45	125	2.8	C#	Service Industry	Business Applicati...	Electronic Data In...	PC	39
29310	2003	47493	23.7	Java	Medical & Health ...	Business Applicati...	Hospital Informati...	PC	1336
29471	142	669	4.7	Java	Education	Business Applicati...	Content manage...	PC	
30658	160	784	4.9	Java	Education	Business Applicati...	Content manage...	PC	
31166	422	1020	2.12.4	Oracle	Government	Data or database ...	PC	422492	

Per Page | <- Click to show/hide Olap Tool

Median figures for PDR; Manpower Delivery Rate; and Project Duration

Median	median_duration	median_speed_o...	median_pdr
Median Values	3	9.65	4.25

Per Page | PDR = 4.25

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Set Vision and Goals: Sample Helpdesk Project

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- A Transportation Company asked customers what they expect from a helpdesk
 - ➔ Net Promoter Score analysis unveiled five major business drivers responsible for attractiveness of using the helpdesk in case of any service interruption or difficulties
 - ➔ Improvements are dearly needed...
 - ➔ Involving Software as well as Services

Business Drivers

	<i>Topics</i>	<i>Attributes</i>			<i>Priority</i>
a) Helpdesk	BD1 Responsiveness	Fast Response	Few Selections	Known Issue	0.34
	BD2 Be Compelling	Able to resolve issue	Committed to help	Knowledgeable	0.44
b) Software	BD3 Friendliness	Keeps calm	Unagitated	Cool	0.41
	BD4 Personalization	Knows who's calling	Knows travel plans	Knows delays	0.64
	BD5 Competence	Can figure out solution	According my preferences		0.33

Functional User Requirements – Vision Count

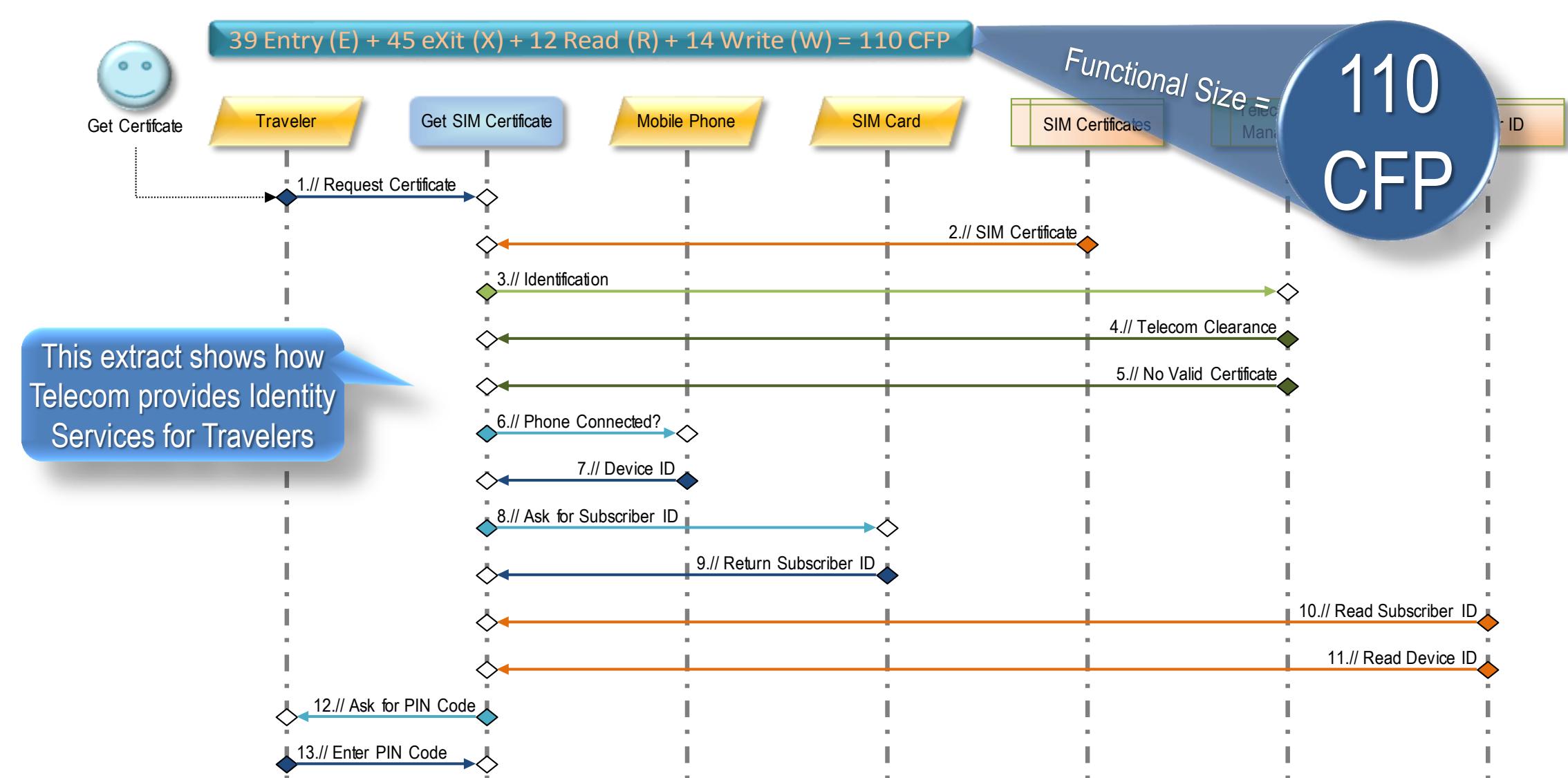
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Is that the Whole Story?

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- Functional Requirements (FUR)

- Represented by initial sequence diagram – or any other kind of *Epic*s
- Cost per Function Point known
- FUR do not describe business goals in project

- Non-functional Requirements (NFR)

- NFR describe Business Goals indeed
- No Database available for Benchmarking
- Most NFR become functional over time!



Non-Functional Requirements become Functional over Time

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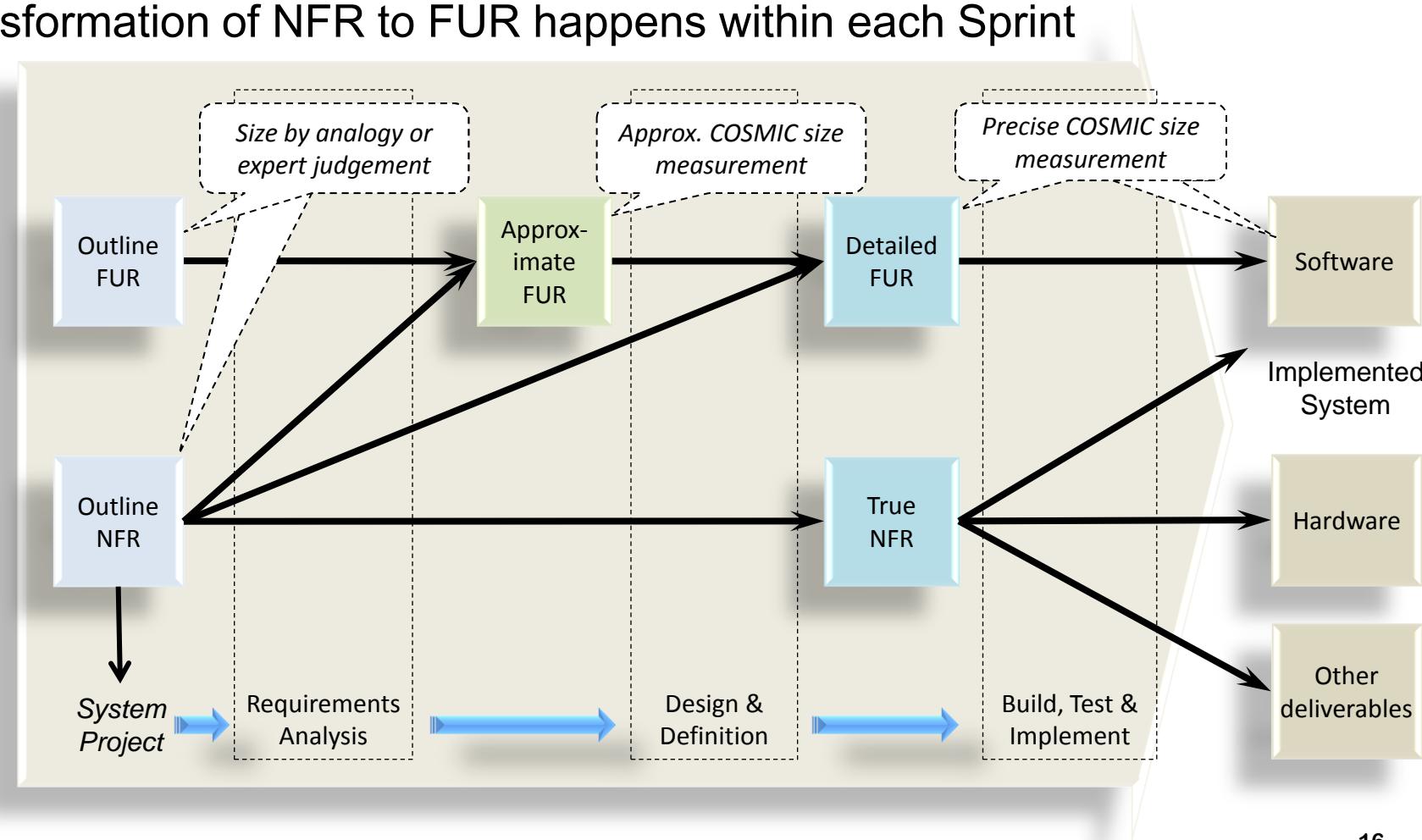
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- In Agile, the transformation of NFR to FUR happens within each Sprint
 - Functional Size growths during the Project
 - NFR can be assessed before project start
 - Initial FUR count is the project vision
 - Predictive counts require NFR!



Initial Buglione-Trudel Matrix

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Functional and Non-Functional Story Cards

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Story Card for Helpdesk Story

Q002-02F: Get Additional Information

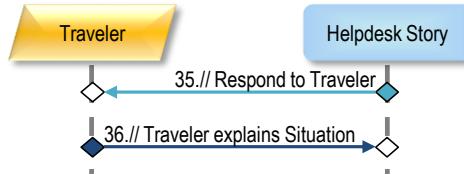
As a Helpdesk staff, I want to identify a client without having to ask for the name or get credentials, regardless whether calling by phone, sending e-mail, or when chatting, such that I can charge service fees or ticket sold according the clients' preferred payment method, so that in case of urgency I can help more customers faster and more effectively

Contact traveler and ask for additional information about his or her travel needs

 Story Points: **3** Name: **Peter** Test is Ready Draft is Ready Review Done Finalized Approved Functional

 Functional Size: **2** Sprint: **#03 - Adagio**

Business Impact:



Story Card for Helpdesk Story

Q002-09Q: Apologies

As a Helpdesk staff, I want to identify a client without having to ask for the name or get credentials, regardless whether calling by phone, sending e-mail, or when chatting, such that I can charge service fees or ticket sold according the clients' preferred payment method, so that in case of urgency I can help more customers faster and more effectively

Find a way to express apologies in a personal way

 Story Points: **8** Name: **Heidi** Test is Ready Draft is Ready Review Done Finalized Approved Functional

 Functional Size: **0** Sprint: **#04 - Rondo**

 Business Impact: BD2: **1** BD4: **6**

Final Buglione-Trudel Matrix

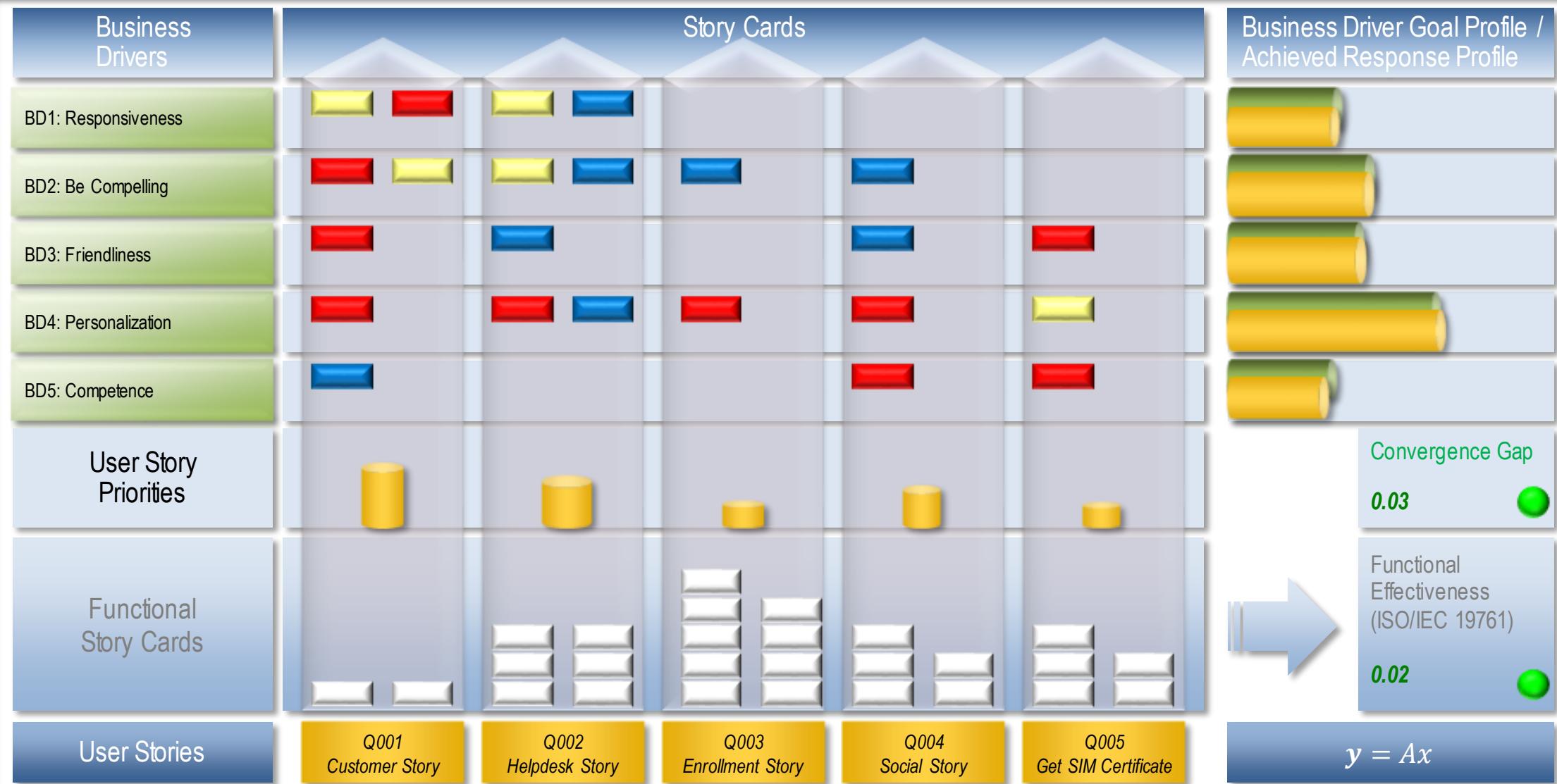
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Business Impact Cards become Functional

- Customer Orientation
- The “Apologies” Story Card becomes functional after involving the *Customer Experience* and the *Legal* department
 - Adding 9 CFP to the 110 CFP already agreed for basic functionality
 - Happens within the sprint “#04 – Rondo”
 - Unplanned, additional functionality resulting from an NFR
- Lean Six Sigma
- Agile Processes
- Project Estimations
- Transfer Functions

Story Card for Helpdesk Story		Story Points:	8	Name:	Heidi	Test is Ready	Draft is Ready	Review Done	Finalized	Approved	Functional
		Functional Size:	0	Sprint:	#04 - Rondo						
		Business Impact:		BD2: 1		BD4: 6					
Q002-09Q: Apologies		As a Helpdesk staff, I want to identify a client without having to ask for the name or get credentials, regardless whether calling by phone, sending e-mail, or when chatting, such that I can charge service fees or ticket sold according the clients' preferred payment method, so that in case of urgency I can help more customers faster and more effectively Find a way to express apologies in a personal way									

Initial and Final Metrics for Goals Reached

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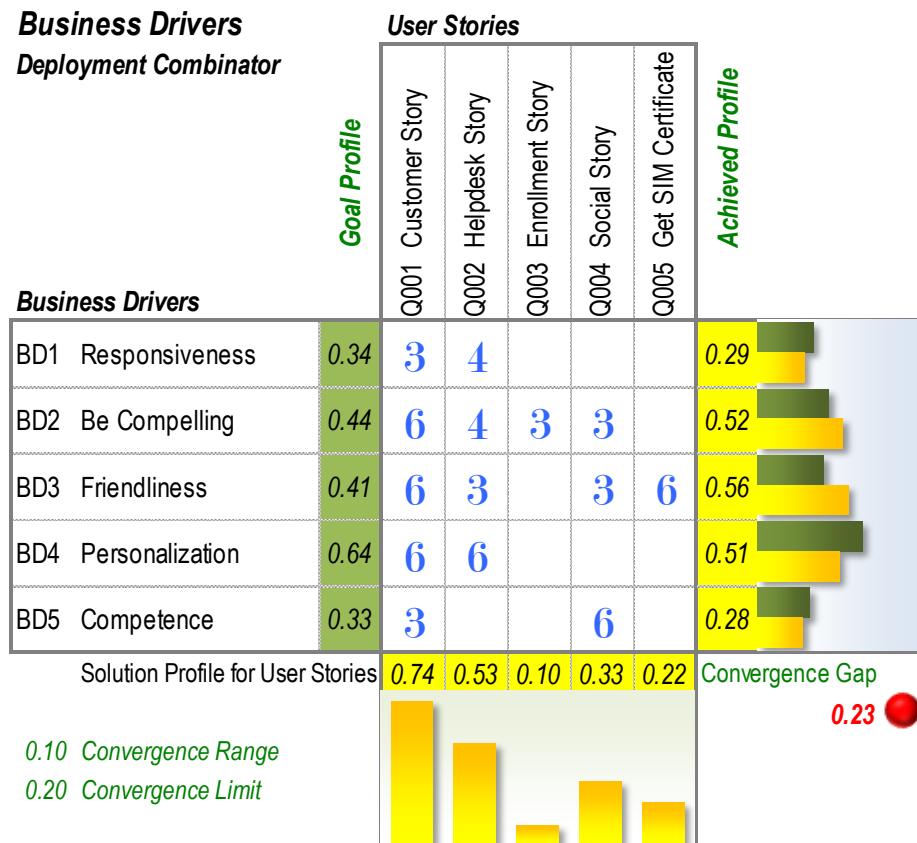
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Initial Coverage of Business Drivers



Final Coverage of Business Drivers



How predicting Cost of “Non-Functional” Requirements?

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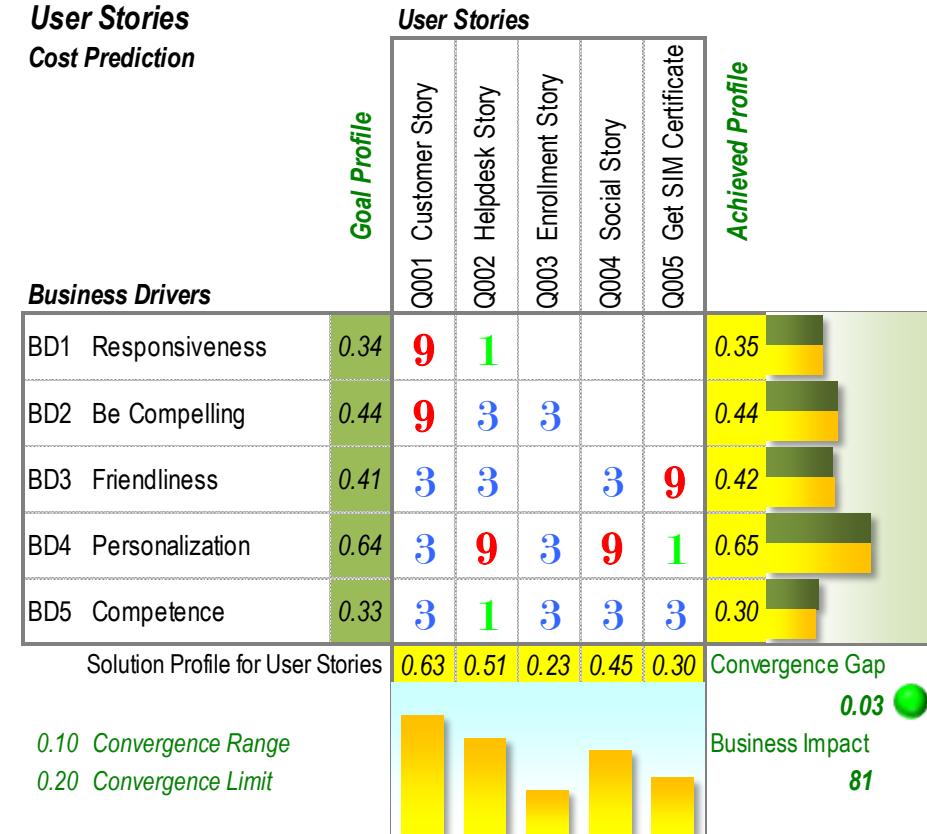
Agile Processes

Project Estimations

Transfer Functions

- QFD Workshop
 - ▶ Find a QFD Moderator
 - ▶ Get the Business Driver's Goal Profile
 - Ideally by Net Promoter Score
 - ▶ Collect the Experts
 - Business
 - Developers
 - ▶ Agree on a value 1 – 3 – 9 for each cell indicating how much the User Story impacts the respective Business Driver
 - ▶ Make sure the Convergence Gap closes

User Stories
Cost Prediction



Early Estimation by a QFD Workshop

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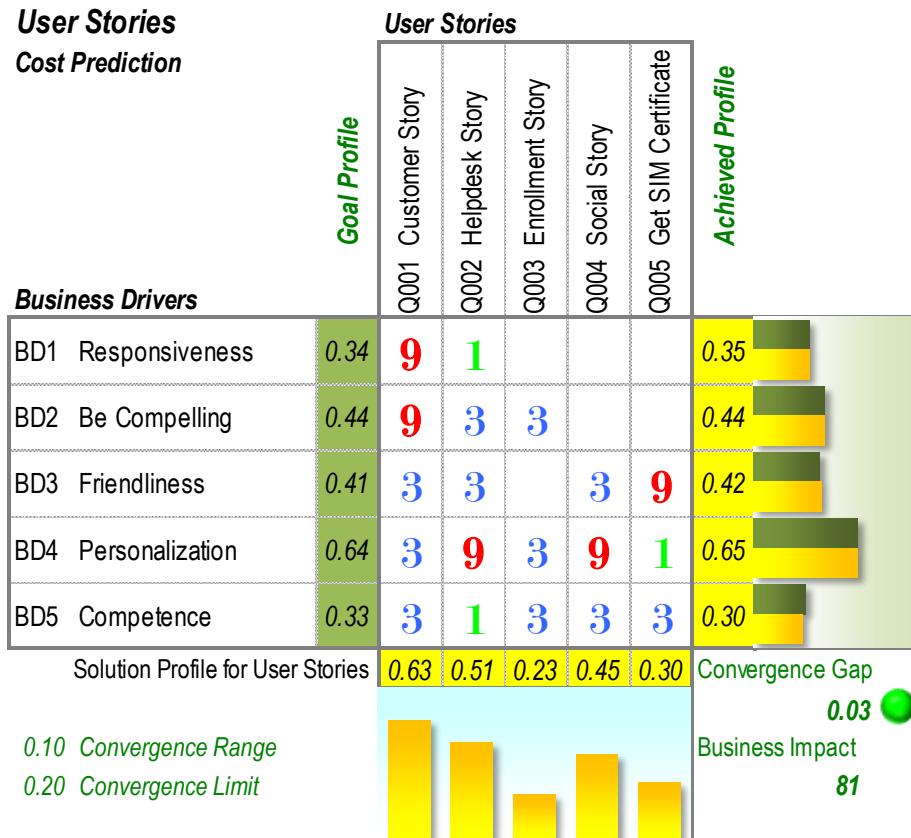
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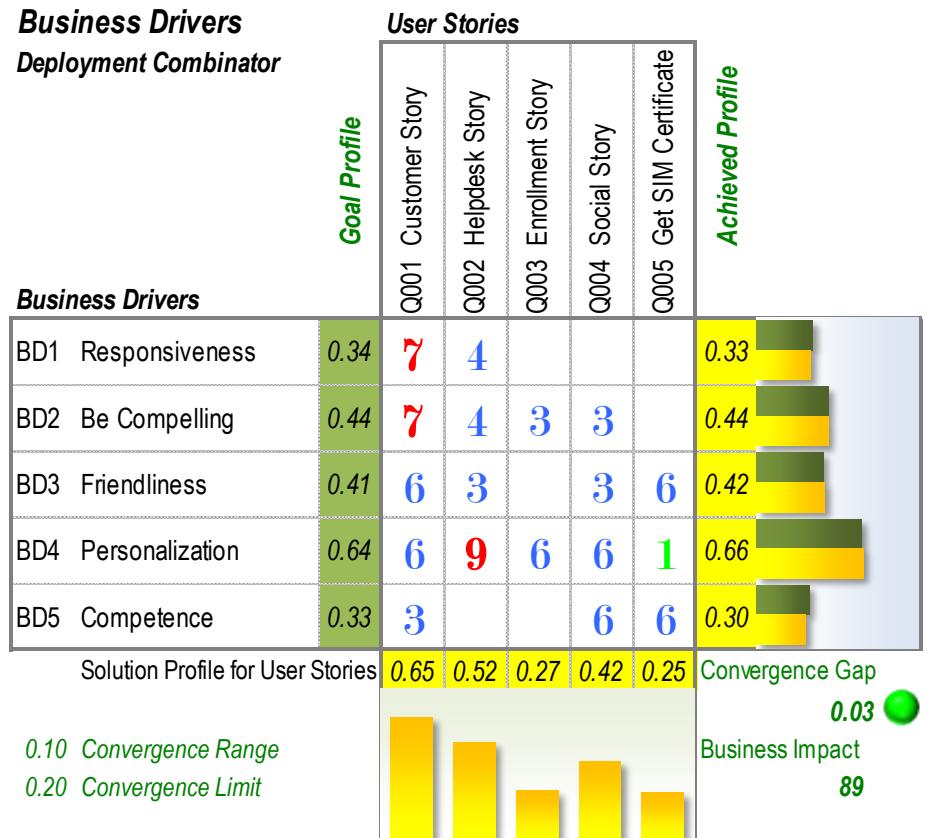
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Result of QFD Workshop



Final Convergence Gap after a few sprints



Predict Total Functionality Needed and thus Effort

- The Idea:
 - ➡ Do a QFD Workshop and count the total amount of correlation values in the matrix

- FUR count yields 110 CFP
 - ➡ Assume **4.25** PDR (h/CFP)
 - ➡ $110 * 4.25 = 468 \text{ h}$

- 1 CFP = **2.0** Story Points
- 1 Story Point = 1 Impact
- NFR total for **81** Impacts
 - ➡ Therefore NFR add
 - $81 * 2.0 = 162 \text{ CFP}$
 - ➡ This yields
 - $4.25 * 162 \approx 689 \text{ h}$

- **Total $468 \text{ h} + 689 \text{ h} = 1156 \text{ h}$**

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 Story Point
Delivery Rate

240 h/Sprint → 5 Sprints

Predict Total Functionality Needed and thus Cost

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- The Idea:

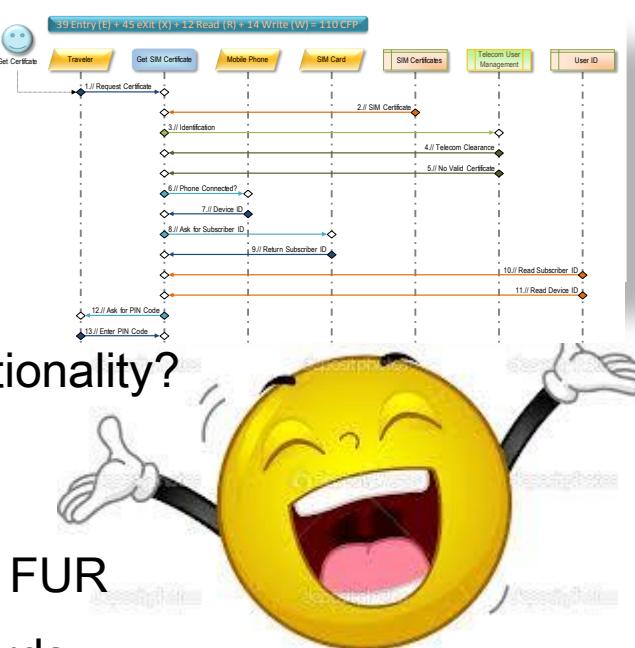
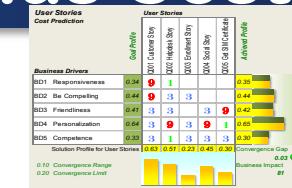
- ➔ Do a QFD Workshop and count the total amount of correlation values in the matrix
- ➔ Somehow, they will correlate to the amount of functionality added by tasks imposed by customer's needs, to satisfy the business driver's goal profile
- ➔ Basic Functionality is counted the usual way using a standard Functional Sizing Method

- The Problem:

- ➔ How does work for business impact compare with PDR for functionality?

- The Solution:

- ➔ Use the Team's Story Points to "translate" Business Impact into FUR
- ➔ Calibrate pure functional Story Cards with pure Impact Story Cards



Calibrating with Story Points

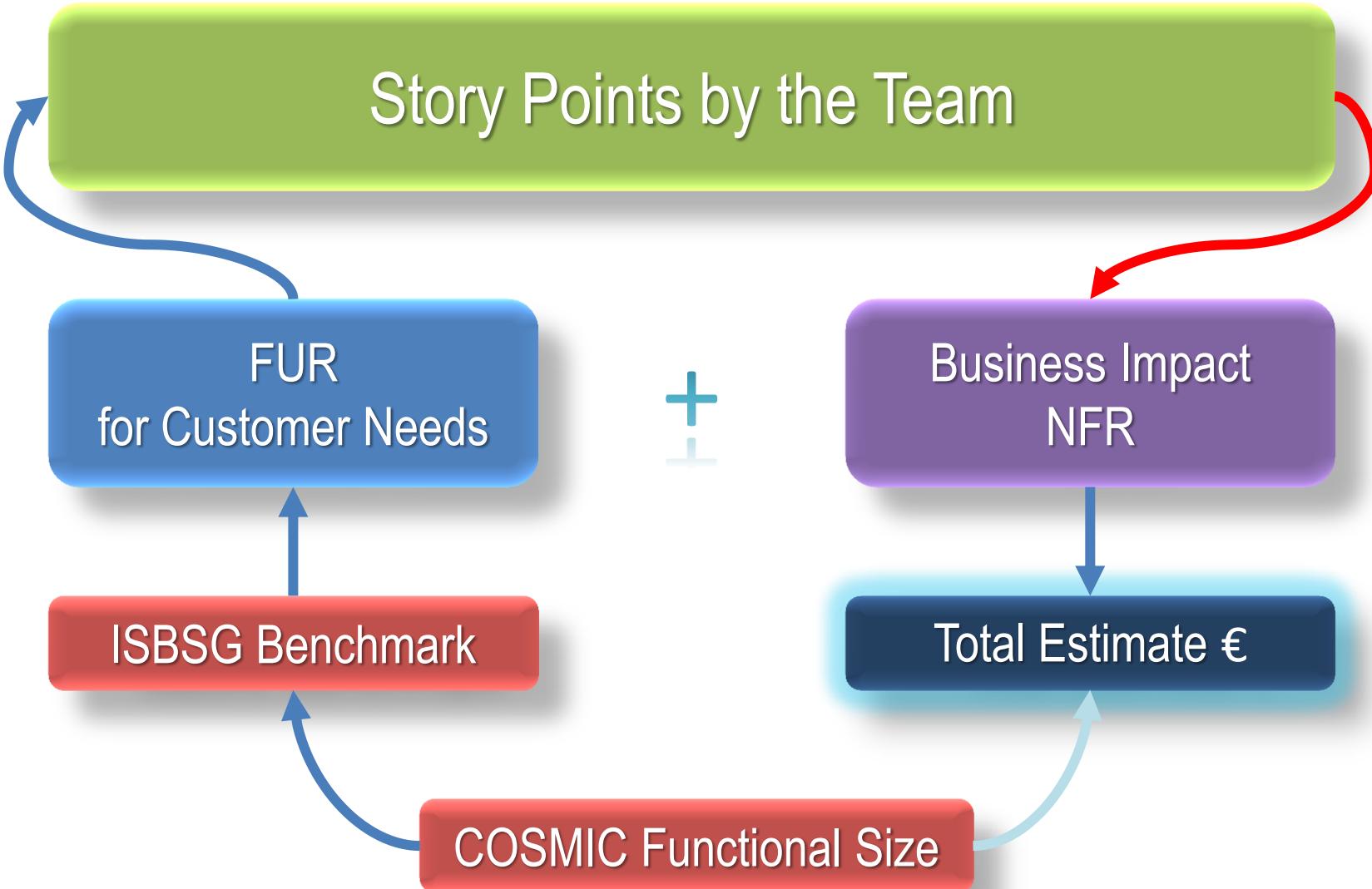
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Conclusion

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- Effort Estimation without knowing the Customer's Needs is only incidentally correct
 - ➔ Simply because all "Change Requests" originate from customer's need and the product's business drivers
- Embracing Agile seriously allows predicting project cost much better and simpler than traditional cost estimation techniques
 - ➔ By predicting the agile software development process
 - ➔ Not the product!
- It's still benchmarking but at much better granularity, taking the team and the environment into account

Questions?

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Controlling Variations

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Non-Functional

Functional

