

Practical Report: CMMI® Requirements Development (RD) and Requirements Management (REQM) Process Areas in an Agile Environment

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Please send to the authors if you are interested
in reading the full paper pertained to this
presentation

Feasibility of Agile and CMMI

- "The two methods are certainly compatible" Mike Konrad, Senior Member of Technical Staff Software Engineering Process Management Program
- "It was an opportunity for us at SEI to dispel some myths and 'apologize', in a sense, to some people in the Agile community" Mike Konrad
- Why Not Embrace Both technical report by SEI
- Jeff Sutherland Recommends Combining Scrum with CMMI Level 5 Jeff Sutherland is one of scrum inventors
- And Others ... ([www](#))

Feasibility of Agile and CMMI (Cont'd)

- Our Own Various Implementations verify the feasibility!

Feasibility of Agno and CIVIVI (Cont'd)

They are Synthetically welded?



Mohammad Abou-Basha

Permission of image copy is down this slide

Feasibility of Agile and CMMI (Cont'd) But, they are



Why Agile CMMI ?

- Easily understanding of model **intent**,
- Thinking in terms of **valuable** compliance instead of just compliance or filling contract requirement,
- Paying more attention to **people**,
- **Manage** the fast deliverables.

Why Agile CMMI ? (Cont'd)

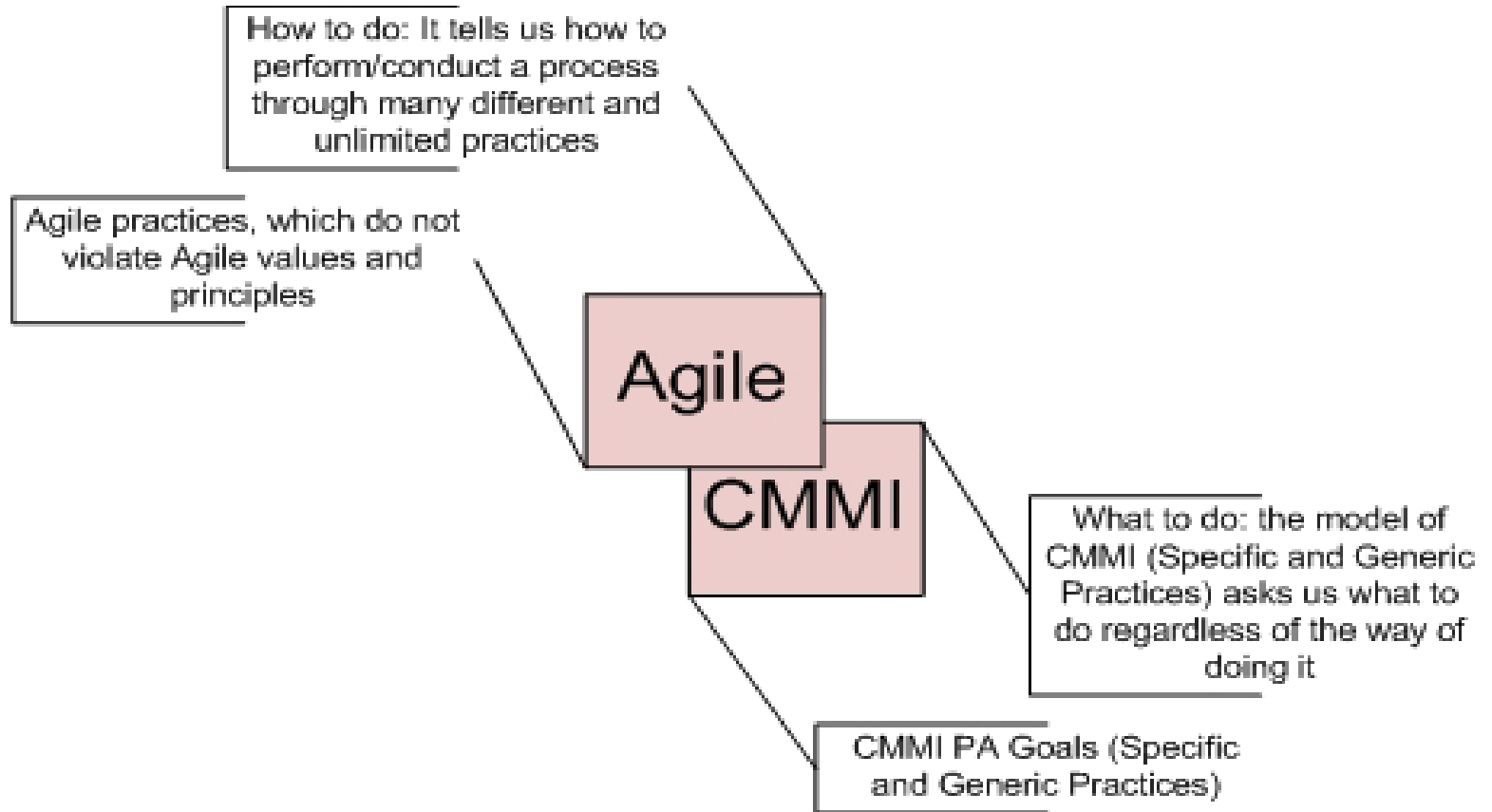
- Flow of Requirements is a value-driven to the client
- Simple Example: Conference Website
 - Elements: About us, Contact us, Status of Papers, Call for Papers, Registration, and Facilities

About Us
and Contact
Us \$

Registration
and Call for
Papers \$\$

Status of
Papers and
Facilities

Why Agile CMMI ? (Cont'd)

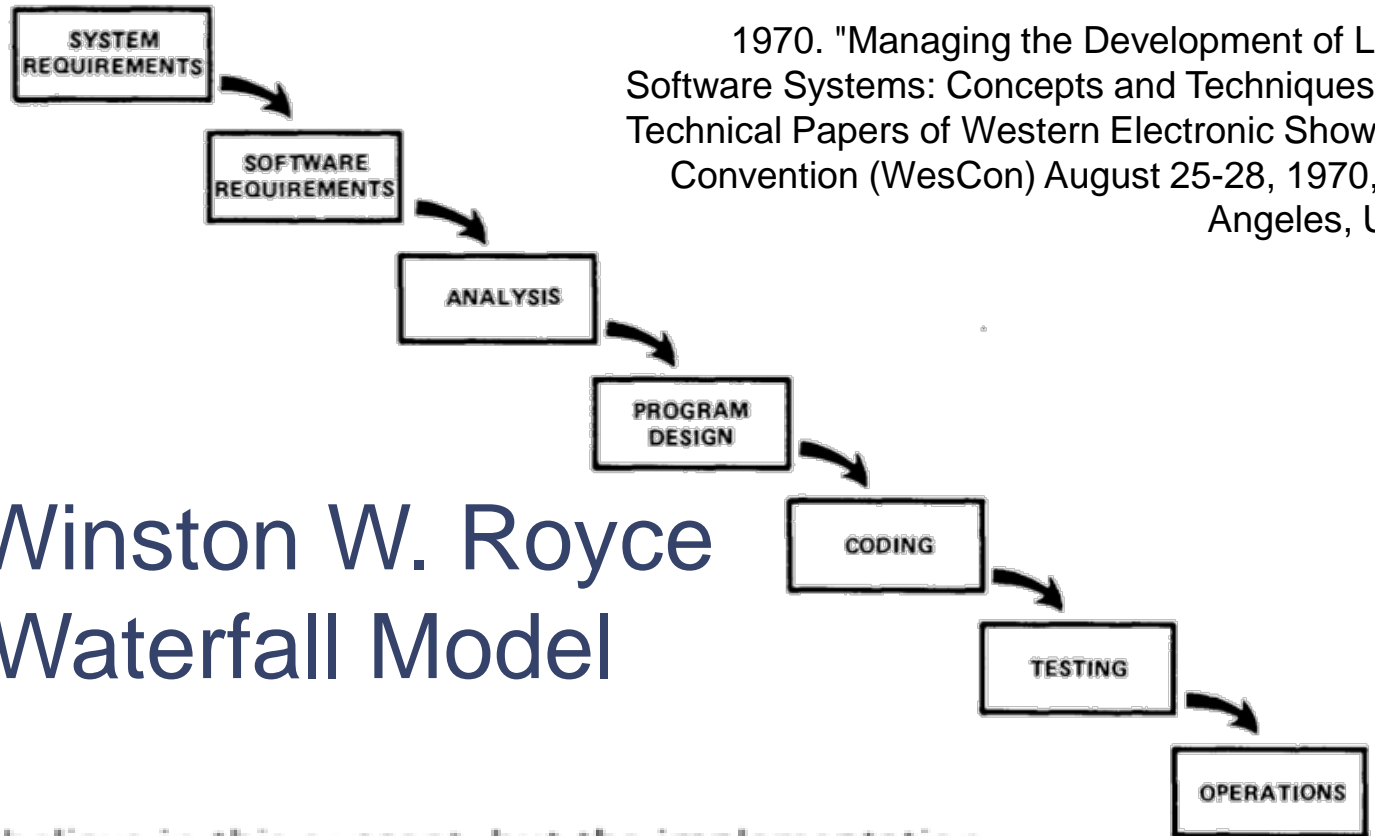


Brief Relationship between Agile and CMMI from Implementation perspective

Why Agile CMMI ? (Cont'd)

- Heavy-weight processes lead to:
 - a late delivery,
 - an inaccurate assurance of quality,
 - a misleading to the required value,
 - a more budget,
 - a lot of work around by stakeholders to survive!
- Remember, there are some competitors over there !

Why Agile CMMI ? (Cont'd)



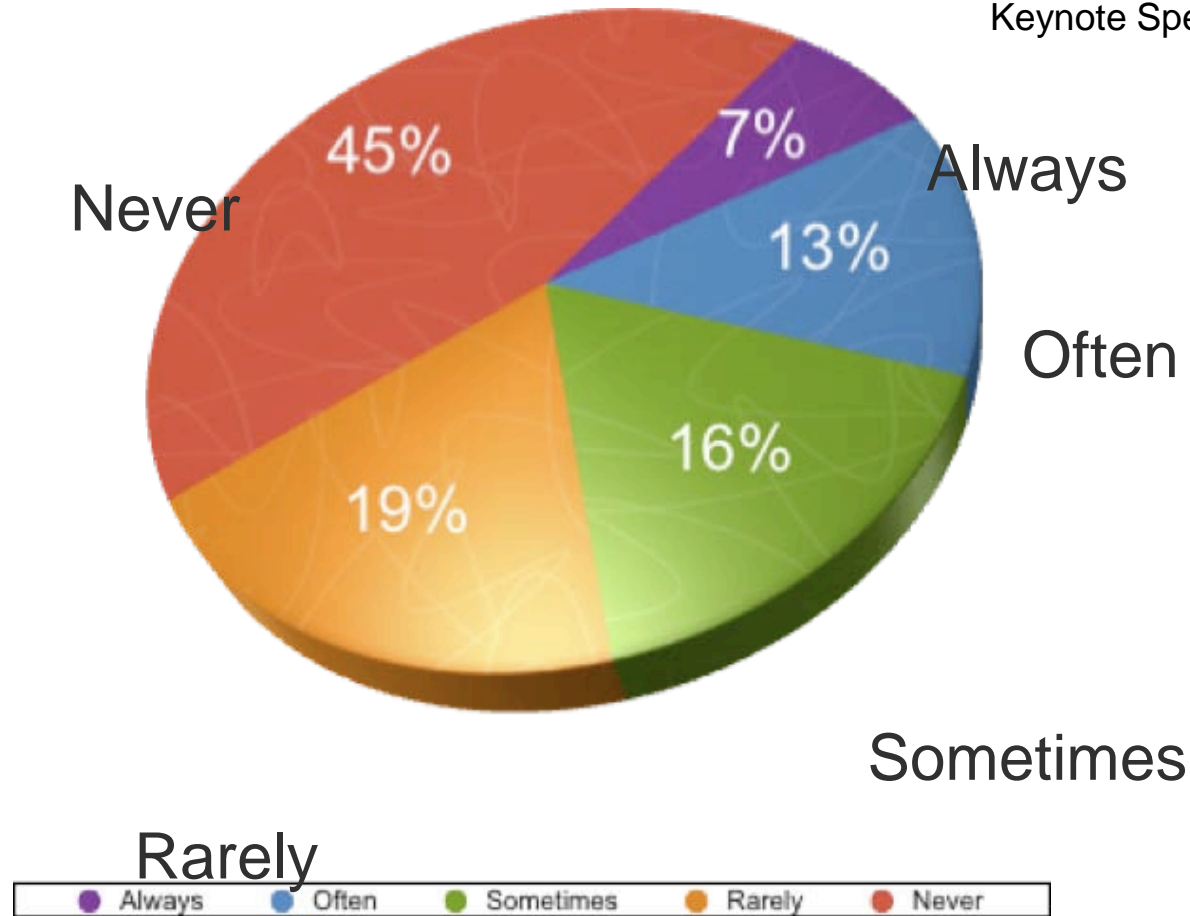
Dr. Winston W. Royce
The Waterfall Model

“ I believe in this concept, but the implementation described above is risky and invites failure. ”

Why Agile CMMI ? (Cont'd)

Feature Usage

Source: Jim Johnson of
the Standish Group,
Keynote Speech XP 2002



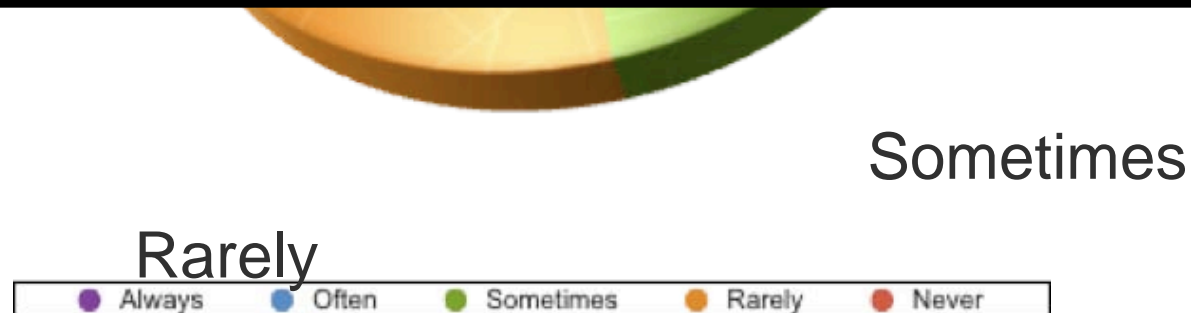
Why Agile CMMI ? (Cont'd)

Feature Usage

Source: Jim Johnson of
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Keynote Speech XP 2002



- We need to focus more of prioritizing features and delivering value quicker than focusing on implementing all the features
- We need to focus on the ROI of each feature for your customer with the help of customer
- We need to focus on the ROI of each feature as a product manager



Why Agile CMMI ? (Cont'd)

Challenged Projects

USA : \$80-145 billion per year is spent on failed and cancelled projects

UK : 12 out of 18 Large IT projects have failed



Standish Report - 2006

Dr. Sidky: Introduction to Agile

Why Agile CMMI ? (Cont'd)

However,...

Market value of publicly traded shares:

\$NA (31 December 2009 est.)

country comparison for the world

\$34.95 trillion (31 December 2008)

\$64.56 trillion (31 December 2007 est.)

Industries:

dominated by the onrush of technology, especially in computers, robotics, telecommunications, and medicines and medical equipment; most of these advances take place in OECD nations; only a small portion of non-OECD countries have succeeded in rapidly adjusting to these technological forces; the accelerated development of new industrial (and agricultural) technology is complicating already grim environmental problem

Industrial production growth rate:

CIA World Factbook- 2010

Dr. Sidky: Introduction to Agile

Why Agile CMMI ? (Cont'd)

However,...

Market value of publicly traded shares:

\$NA (31 December 2009 est.)

country comparison for the world

- What if we increased our IT profits to both vendor and client ?
- What if we eliminated (or decreased) the challenged , failed and canceled projects?

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Dr. Sidky: Introduction to Agile

What is “Agile CMMI Practice” or ACP?

- Agile Practice is not only Scrum or XP practice!
- Agile CMMI Practice (ACP) is the practice (or way of doing an activity) that achieves the Specific Practice (SP) in CMMI Model if and only if this practice achieves at least one of Agile Values and Principles without violating any of them.

In 7 Steps, how do you achieve ACP?

1. Make sure of your senior management adoption,
2. Discuss the policy and process improvement project vision by reaching consensus with all stakeholders about the vision and goals of this project,
3. Specify the process areas in scope (i.e. what?),
4. Meet the users (actual implementers) of each practice in the selected process areas,
5. Explore ,with the implementers, all possible valuable ways of doing these practices which do not violate any of Agile Values and Principles,
6. Consolidate the output from users to reach the way of implementing the selected process areas and implicitly its practices (i.e. how?)
7. Inspect and adapt (i.e. process improvement cycle is always active)

Difference Between “Convey” and “Preserve” Information

	“Convey” Information	“Preserve” Information
Why?	Transfer information within your team members for alignment and having the same understanding of this information.	Store information for further references, reviews, reuses and organization history.
How?	It depends on the case you have, that’s why Agile is human-centric, you choose the best way for conveying information in your case. And do not forget that one of Agile principles is “the most efficient and effective method of conveying information to and within a development team is face-to-face conversation”, however, if there are rigid constraints in achieving this way, move to the next communication way which invites interaction within team members. This encourages you to achieve the first step of SAMI (Sidky Agile Measurement Index), it is a 5-step value-based roadmap to agility and designed to help guide organizations seeking to become more agile. Each of SAMI’s 5 steps (Collaborative, Evolutionary, Integrated, Adaptive and Encompassing) aims to instill a new value in teams and organizations.	Also, it depends on the case. Usually, people prefer using different types of documentations project management tools, document management systems and we prefer using a system that supports your files’ configurations such as version history details.
When?	In every time the team members communicate any information regarding the project	In all legal and formal communications. And when you want to ensure commitment and understanding of any information or responsibilities with either the customer or project team members.

Assumption

The remaining part of this presentation mainly assumes that:

- you know and understand Agile scrum and XP practices,
- you understand REQM and RD Specific Practices,
- a project/task management tool is (or will be) used in your organization,
- you perform User Acceptance Testing (UAT) at the end of your release,
- if you do not apply Test Automation or Test Driven Development (TDD), there is a release stabilization to perform system and regression testing,
- user story, beside its being a valuable feature to the customer, it can be a non-functional requirement ,
- and all requirements are represented in user stories.

Requirements Development – RD (1/3)

The purpose of Requirements Development (RD) is to produce and analyze customer, product, and product component requirements.

SP#	CMMI Specific Practice	Agile CMMI Practice (ACP)
1.1	Elicit stakeholder needs, expectations, constraints, and interfaces for all phases of the product lifecycle.	All customer meetings for gathering requirements: Gathering of High level stories, External Chartering (sometimes called “Customer/project Kickoff”), Scope of Work, Release and Iteration stories. External Chartering: or customer/project kickoff is to make both service provider and customer aligned with the same vision, goals and its measure of success, project plan, stakeholder’s roles and responsibilities.
1.2	Transform stakeholder needs, expectations, constraints, and interfaces into customer requirements.	All customer meetings for gathering the requirements: Gathering of High level stories, External Chartering (sometimes called “Customer/project Kickoff”), Scope of Work, Release and Iteration (or Sprint) stories
2.1	Establish and maintain product and product component requirements, which are based on the customer requirements.	Scope of Work, Release and Iteration stories
2.2	Allocate the requirements for each product component.	Release/Iteration Planning and Stories; by grouping the related stories for each product component.

Requirements Development – RD

(2/3)

SP#	CMMI Specific Practice	Agile CMMI Practice (ACP)
2.3	Interfaces between functions (or between objects) are identified.	Project release stories.
3.1	Establish and maintain operational concepts and associated scenarios.	Project team discusses the user stories and its business acceptance tests (sometimes called “Business Acceptance Criteria”) with the business analyst and/or the customer directly (if business analyst only, the business analyst has to discuss and confirm these user stories and acceptance tests).
3.2	Establish and maintain a definition of required functionality.	After reaching consensus and alignment with the customer regarding the user stories (project features and non-functional requirements), communicate them to the team, and preserve them in a maintainable documentation.
3.3	Analyze requirements to ensure that they are necessary and sufficient.	Each user story includes business acceptance tests which are subjected to testing during the iteration, the comments of your customer in iteration demo if possible, and UAT feedback. These check-points of requirements’ sufficiency, significantly, decrease the uncertainty of the target value to the customer (i.e. reaching what the customer needs more than what the customer “wants”). From high level view: the kickoff meetings that include the main goals of the project support this practice.

Requirements Development – RD

(3/3)

SP#	CMMI Specific Practice	Agile CMMI Practice (ACP)
3.4	Analyze requirements to balance stakeholder needs and constraints.	Each user story includes business acceptance tests which are subjected to testing during the iteration, the comments of your customer in iteration demo if possible, and UAT feedback. Meeting the stakeholders in kickoffs, demos, planning and status review meetings help you balance the needs and constraints.
3.5	Validate requirements to ensure the resulting product will perform as intended in the user's environment.	Each user story includes business acceptance tests which are subjected to testing during the iteration, the comments of your customer in iteration demo if possible, and UAT feedback. Meeting the stakeholders in kickoffs, demos, planning and status review meetings help you validate your customer requirements (i.e. make sure that the requirements you are developing are your actual customer needs, and accordingly, the project meets your customer expectation. One of the four agile values [2] is “Customer Collaboration over Contract Negotiation” which means collaboration in understanding the requirements as well.

Requirements Management – REQMM

(1/3)

SP#	CMMI Specific Practice	Agile CMMI Practice (ACP)
1.1	Develop an understanding with the requirements providers on the meaning of the requirements.	All planning meetings (Project, Release, Iteration and even daily standup meetings), and we prefer that the business analyst role (or customer representative) should be involved in such meetings at least on iteration level; this ensures that the team members have the same understanding of requirements as the customer does. Moreover, iteration demos are key practice for understanding customer requirements.
1.2	Obtain commitment to the requirements from the project participants.	We encourage agile practitioners to pay more attention to this practice. And as we used to say, do your way of taking commitment from both customer and project team members but make sure that this way is effective when the situation goes to any kind of conflict. One of the ways is using formal emails or even audio/video recording with your customer, and for project team members the way should be more smooth such as project/task management tool, standup meetings, iteration plans...etc.

Requirements Management – REQM (2/3)

SP#	CMMI Specific Practice	Agile CMMI Practice (ACP)
1.3	Manage changes to the requirements as they evolve during the project.	In your project/task management tools, differentiate between the first (original) requirements and other further changes even by labeling them. Try to make the view easy to be tracked (i.e. building a reportable system; for example, in anytime after one year of production in a project, you can know what the changes are, their status, their relationships with each other and with the first requirements)
1.4	Maintain bidirectional traceability among the requirements and work products.	Without this practice, most probably you will fail in managing your software projects especially medium/ large projects. Your requirements should be in one body with all other elements (test cases, architecture, tasks...etc), and make sure that user stories, architecture, business acceptance tests, test cases, technical tasks, bugs, and project plans are all traceable and connected. An easy way to do that is using any agile project/task management tool (there are a lot of open source and commercial products that will serve you).

Requirements Management – REQM (3/3)

SP#	CMMI Specific Practice	Agile CMMI Practice (ACP)
1.5	Identify inconsistencies between the project plans and work products and the requirements.	In one body of requirements, you can easily identify the inconsistencies (usually, a tracking tool is used)



Requirements Traceability Body in Agile (RTBA)

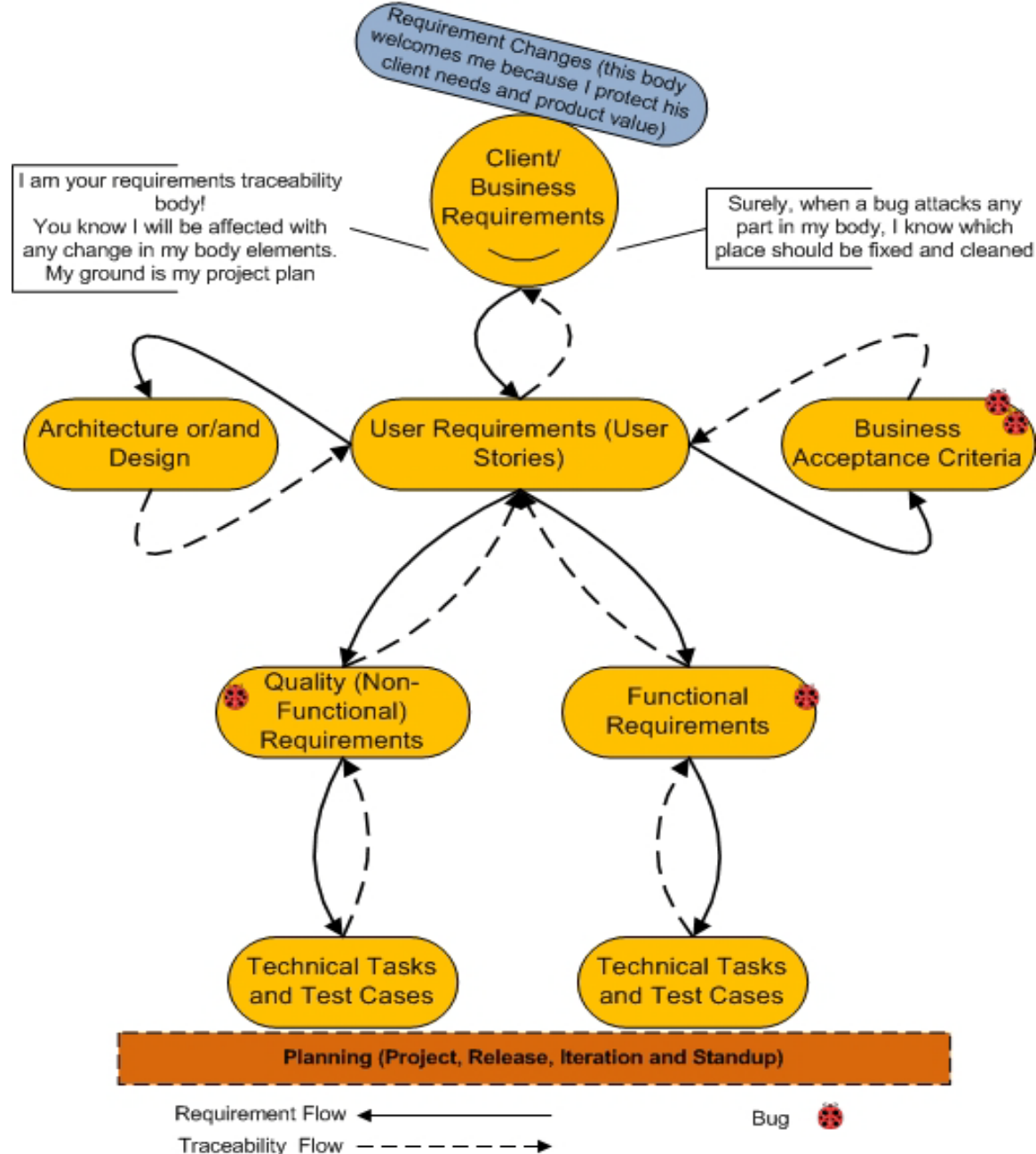


Figure 2: Requirements traceability is a human body, his land is the planning, and the hat of changes come to protect the body from the deviation in his way to make his product more valuable to his client

Important! Conclusion

It is not only possible to embrace both agile and CMMI, but also it is **easier and proven practically**. The presentation is not supposed to show the best practices for your organization, the fore mentioned practices may not work in your organization.

However, **inspect and adapt** to reach the most appropriate practice that adds the **best possible value** to your organization **and** your customer. Also, because agile mindset supports CMMI model intent, we found a light-weight implementation that we cannot work without.



Thank You!

Further Questions ?