

Issue 11, Free Digital Edition



QUALITY MATTERS



WWW.QUALITY-MATTERS.ORG

**ETHICAL
OR
PATHETIC,
HOW WILL
OUR AI LOOK
LIKE?, Part 1**

by OLIVIER DENOO

**THE ROLE OF
OBSERVABILITY IN TESTING**

by GERIE OWEN and PETER VARHOL

**CHANGES IN CMMI
2.0 AND HOW IT CAN
AFFECT TMMI, PART 1**

by KATALIN BALLA and
ERIK VAN VEENENDAAL

**SCALED AGILE, GOOD OR BAD?
OR ARE WE JUST NOT READY FOR IT?**

by PABLO GARCIA MUNOS



CHANGES IN CMMI 2.0 AND HOW IT CAN AFFECT TMMI

PART 1

By KATALIN BALLA, HUNGARY and
ERIK VAN VEENENDAAL, BONAIRE

This paper is intended to guide quality and testing professionals in becoming acquainted and understanding the changes made to the CMMI model, now called CMMI V2. In this paper both the structural and process area related changes are discussed including their business value. Within the TMMi community many organization also use CMMI. The changes made to the CMMI could well affect future developments around TMMi. The possible impact on TMMi is described in part 2 of this paper to be published in the next issue of QualityMatters. Finally, this paper is intended to support those TMMi practitioners who use TMMi in the organizational context of CMMI V2.

INTRODUCTION TO CMMI

In response to the growing demand for software quality and productivity, various initiatives, models and approaches have been presented in the software industry since 1980's. A leading example for software process improvements is the Capability Maturity Model Integration (CMMI) model. The CMMI was first released in 2000 and has since been used by a large number of software development companies. Due to changes in the organization environment and community needs, the CMMI Institute launched a project to restructure the CMMI model. The main goal was to help improve business performance of the companies using it, and to adapt the software process improvement process of these companies to the changing business needs. As a result of the project CMMI V2 for development was released.

Information made publicly available indicate that CMMI V2 is already being accepted by the software development community. At the time of writing this paper already many appraisals have been conducted using CMMI V2. This fact makes this new version of the CMMI even more interesting for the testing community, since TMMi - the by far most used test process improvement model - is positioned as a complementary



KATALIN BALLA

Budapest University of Technology and Economics, Hungary

Katalin Balla is an Associate Professor at Technical University Budapest (www.iit.bme.hu), where she developed and teaches courses in software technology, quality management and software testing. She obtained her Ph.D. in 2001 at the Technical University of Eindhoven, the Netherlands, in the field of software quality. Worked as a programmer, system engineer, quality director and as a consultant, for many years. Katalin is a certified CMMI Lead Appraiser and an Accredited TMMi Lead Assessor. She participated in many international and national research projects related to software quality and has a presence in Hungarian, international testing and quality-related events.

ERIK VAN VEENENDAAL

TMMi Foundation, Bonaire

Erik van Veenendaal (www.erikvanveenendaal.nl) is a leading international consultant and trainer, and a recognized expert in the area of software testing. He is the author of a number of books and papers within the profession, one of the core developers of the TMap testing methodology and the TMMi test improvement model, and currently the CEO of the TMMi Foundation.

Erik is a frequent keynote and tutorial speaker at international testing conferences. For his major contribution to the field of testing, Erik received the European Testing Excellence Award (2007) and the ISTQB International Testing Excellence Award (2015).



model to the CMMI (while TMMi can indeed also be used independent of the CMMI). The current version of TMMi re-uses structural elements of the "old" CMMI V1.3, while it elaborates on the testing-related activities executed in a software or system development company in much more detail than CMMI does.

MAJOR CHANGES IN CMMI V2

CMMI V2 is defined as "an integrated product suite consisting of 5 components that, when used together, provide a clear and proven path to achieving a company's business objectives".

ELEMENTS OF CMMI V2

The elements of CMMI V2 are (see figure 1): model, appraisal method, training and certifications, system and tools, adoption guidelines. It is a change in viewpoint to consider CMMI as an integrated product suite, in which the process improvement model, appraisal method, training and certification, as well as the adoption guidelines are all components, complementing each other and facilitating each other's usage.



Figure 1 : Elements of CMMI V2

The model description, its elements and structure are basic for all those using CMMI V1.3 in the context of process improvement, as well as in using the model as an input for TMMi. Therefore, we focus in this paper on the elements of the CMMI V2 model.

CMMI V2 ARCHITECTURE

The basic components of the CMMI 2.0 model are: Views (containing Capability Areas, Categories for Capability Areas), Practice Areas, Practice Groups, Practices and Informative Materials. Short descriptions and explanations of these are provided hereafter (see also figure 2 for an example).

- **View** is a selection of a set of model components, important to and selected by an end user or predefined by the CMMI Institute. Predefined views are: CMMI Development, CMMI Services, CMMI Supplier Management. View means from the end-customer perspective means a set of important practice areas, selected by the customer based on its business needs or objectives.

- **Capability Area:** A group of related practice areas (previously called process areas) that can provide improved performance in the skills and activities of an organization or project.

- **Categories** for Capability Areas: are logical groups of related capability areas that address common problems encountered by business when producing or delivering solutions. The 4 Categories are: doing, managing, enabling and improving. As these categories emphasize some of the key relationships that exist among the practice areas, they could be regarded as a grouping similar to the engineering, support, project management and organizational process area categories in CMMI V1.3. The categories which include several capability areas, and each capability area in turn includes several practice areas, show a clearer path to capability building and improvement. The name of a capability area generally stresses solving a certain type of problem. An organization can as a result easier identify where they have performance gaps, and identify the practice areas under that capability area that they need to improve. Category and capability allow companies to fully understand their capabilities and problems, and to make choices in 10 different capability areas, to identify the scope and content of improvements.

- **Practice Area:** a collection of similar practices that together achieve the defined intent, value and required information described

in that practice area. The name process area might have caused the misunderstanding that there was a sequential relationship between process areas, but in fact this is not true. The business value here is that this change emphasizes that CMMI V2 is a collection of best (or good) practices rather than a collection of processes to be implemented. Also, it can be mentioned as an added value of the change that the term "process" is less popular in the Agile community.

- **Practice:** the practices consist of required practice information and explanatory practice Information. Note that CMMI V2 explicitly mentions that the informative explanatory material of the model cannot be ignored; it is needed to understand the meaning of the required information of the model.

- **Practice Group:** within each practice areas, the practices are organized into a set of evolutionary levels, labeled level 1, level 2, etc. (up to Level 5), which provide a path for performance improvement. Each evolutionary level builds on previous levels by adding new functionality or sophistication resulting in increased capability.

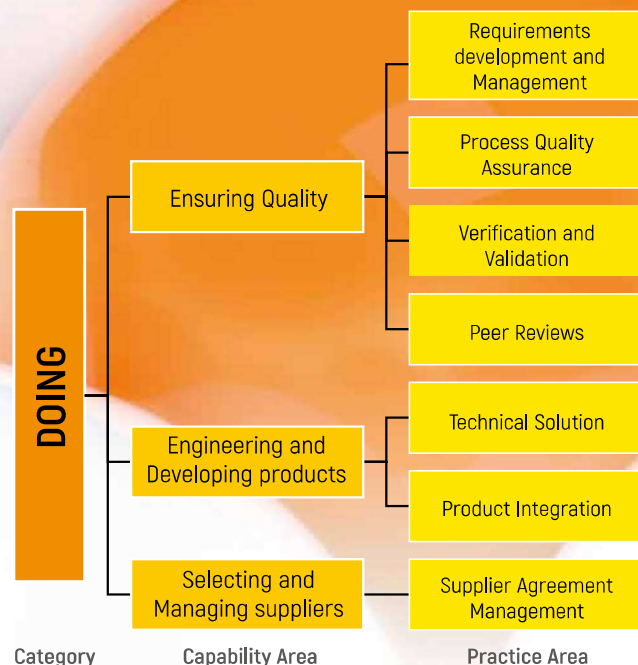


Figure 2: Example CMMI V2 architecture and practice area organization

CAPABILITY AND MATURITY LEVELS

In CMMI V2 the concept of capability and maturity level is implemented via the so-called "evolutionary level". Evolutionary level is a characteristic within one practice area. For a practice area, the practices are organized into a set of evolutionary levels, Different levels contain different maturity of the practices' sets.

According to this, at level 1 of a practice area has practices in place that ensure a simple approach to meeting intent of practice area. This is not a complete set of practices to achieve the full intent of the practice area. At level 2 a simple, but complete set of practices are in place that address the full intent of the practice area. At level 3 the practice set of a practice area is characterized by the fact that it uses organizational standards & tailoring to address work characteristics, uses organizational assets and a focus on achieving performance objectives. Etc. for levels 4 and 5. One can note that "Evolutionary level" is very similar to the CMMI V1.3 concept of capability level, that was initially associated to process areas by the continuous approach of CMMI.

Maturity levels refer to the evolutionary levels within the organization. There are practice areas associated with each maturity level (see figure 3 for an example). An important change is that already at level 1 all practice areas are present. The difference among the different levels (of maturity) is not any more in the practice areas required on that level, but in the practices of each practice area needed at that level. Thinking of CMMI V1.3, this would be somehow similar to the idea that a process area has different specific practices associated to different maturity levels, while all process areas would have a set of practices required already in the beginning. For example, Risk Management (a level 3 process area of CMMI V1.3) would already be required already at maturity level 2 having some basic practices already in place, while more sophisticated practices would be added at higher maturity level. Business value of this change lies in bringing clearer and a more methodical path for building capability and improving. Although it is not explicitly stated, CMMI V2 is much more a continuous model than a staged one. In summary, with CMMI V1.3 the maturity level was defined by compliance with a limited set of process areas, with CMMI V2 the maturity level is defined by compliance with the level specific practices of all practice areas.

Category	Capability Area	Practice Area	L1	L2	L3	L4	L5
Enabling	Supporting Implementation	Causal Analysis & Resolution	X	X	X	X	X
		Decision analysis & Resolution	X	X	X		
		Configuration Management	X	X			

Figure 3: Example practices areas and their associated levels to which they have practices

As a result of the above a maturity level 0 (see figure 4) named Incomplete has been introduced, where the company is characterized by an unknown and ad-hoc way of doing things, when the work may or may not get done. Note that while all practice areas have practices associated to level 1 and level 2, only some practice areas have practices associated to level 3, level 4 and level 5.

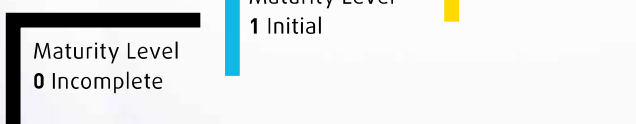


Figure 4: CMMI V2 Maturity Levels

NO MORE GENERIC GOALS AND GENERIC PRACTICES

A change that is highly noticeable is the fact that generic goals and practices have disappeared from CMMI V2. In the CMMI V2, the term „persistent and habitual“ describes now the routine way of doing business and following and improving processes that an organization uses. These terms came to replace the notion of “institutionalization”.

The category improving has been introduced with the new capability area Sustaining Habit & Persistence. This capability area contains the practice areas Governance and Implementation Infrastructure

to replace the generic goals and generic practices from CMMI V1.3. Governance contains practices to be performed by the senior management in order to promote business-oriented strategy, processes defined accordingly, and the uniform way of working. The Implementation Infrastructure practice area describes the infrastructure needed to build, follow, sustain and improve processes over time. The infrastructure includes process descriptions, resource availability, funding, training and objective process evaluation.

Having no generic goals and generic practices any more, made it useless to keep the notions on specific goals and specific practices. Therefore in CMMI V2 only the notion of practices exists. This change reduces the complexity of the model and make CMMI V2 easier to understand and implement.

When thinking about the business value of having Sustaining Habit & Persistence versus generic goals and generic practices, one must understand that generic goals and generic practices in CMMI 1.3 were necessary but were often not given sufficient attention in implementation. Generic goals and generic practices in CMMI 2.0 become Practice areas, which avoids duplication and emphasizes the meaning of the processes in the organization. This has a huge impact on the evaluation scores of the organization being appraised, so its importance is enhanced. Generic goals and generic practices were the basis for an organization to implement CMMI, and now their importance increases, having two new practice areas replacing them. This will force the organizations to re-examine their infrastructures, which can help CMMI to be better integrated into the organization.

OBTAINED VALUE STRONGLY EMPHASIZED

In CMMI V1.3, only on higher maturity levels process improvement is explicitly driven by business objectives. In CMMI 2.0 in each practice area a new element is added, called “Value”, which describes the value of that practice. This change reflects the business objective driven improvements. For example, in capability area ensuring quality, the

Peer Review there is the statement of Value: “To identify problems or defects as earlier as possible, reducing cost and re-work”.

Although “value” was mentioned in CMMI V1.3, it was largely submerged in the hundreds of pages of model description. This change is a landmark improvement of CMMI 2.0, as it not only enables enterprises to understand the practical value of the model, but also makes it clear that this is the goal that the organization should pursue. It comprehensively emphasizes the intent and value of the model content at all levels.

Get involved in the growing
TMMi® Professional scheme,
by becoming a...

TMMi®

RECOGNIZED TRAINING PROVIDER

The TMMi career path has strong link to the ISTQB® scheme,
this may be the opportunity to enhance your training portfolio.

A recognized TMMi Professional training provider:

- offers TMMi training to individual professionals looking to grow the overall knowledge within their organisation.
- promotes the knowledge that surrounds the TMMi model and greater implementation of continuous improvement.
- prepares individuals for the TMMi Professional exam that is administered by the recognised TMMi exam providers.
- shares their practical experiences about applying TMMi in the field.
- is listed on the TMMi website.