



# CMMI (Capability Maturity Model Integration)

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# What is CMMI?

CMMI is a model for process improvement from which organizations will abstract and create process improvement solution that fit their unique environment to achieve specific organizational goals. CMMI is a framework of best practices. It describes the characteristics of good process and provides the guidelines for companies developing their own processes.

# History

- In the 1980s, several US military projects involving software subcontractors ran over-budget and were completed far later than planned
- On 1984, the U.S. Department of Defense elected 'Carnegie Mellon University (Pittsburgh, Pennsylvania)' as the host site of the Software Engineering Institute (SEI)
- Active development of the model began in 1986 when 'Watts Humphrey' joined the SEI after retiring from IBM.
- The CMMI is currently administered by the CMMI Institute, which was purchased by the ISACA in 2016.



**CMMI<sup>®</sup> Institute**

AN ISACA ENTERPRISE



Software Engineering Institute

# Watts Humphrey (father of software quality)

Life: 1927-2010

Career: IBM (1959-1980) and SEI (1986-1996)

Award: National Medal of Technology



1999. Introduction to the Team Software Process. Addison-Wesley, Reading, MA.

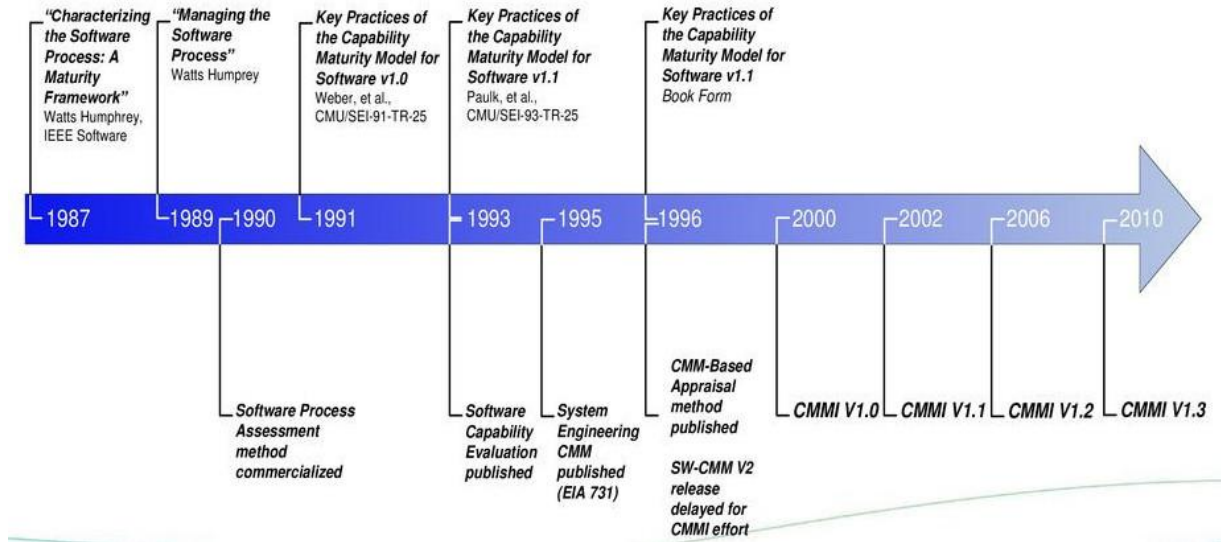
1997. Introduction to the Personal Software Process. Addison-Wesley, Reading, MA.

1996. Managing Technical People - Innovation, Teamwork and Software Process. Addison-Wesley, Reading, MA.

1995. A Discipline for Software Engineering. Addison-Wesley, Reading, MA.

1989. Managing the Software Process. Addison-Wesley, Reading, MA.

# CMMI Timeline



2010's

**2018 - Version 2.0 of CMMI Development, CMMI Services, CMMI Supplier Management released.**

2011 - Third edition of the CMMI for Development book and second editions of the CMMI for Acquisition and CMMI for Services books are released.

**2010 - Version 1.3 of CMMI for Acquisition, CMMI for Development, and CMMI for Services is released.**

2010 - First edition of the Integrating CMMI and Agile Development book is released.

# CMM vs CMMI

- Watts Humphrey's Capability Maturity Model (CMM) was published in 1988 and as a book in 1989, in *Managing the Software Process*.
- Organizations were originally assessed using a process maturity questionnaire and a Software Capability Evaluation method devised by Humphrey and his colleagues.
- CMM v.1.1 was being completed in 1993 and in 1995 as a book: 'The capability maturity model : guidelines for improving the software process'
- Problematic issues in the 'CMM model'. Applying multiple models that are not integrated within and across an organization could be costly in training, appraisals, and improvement activities.
- **CMMI** project was formed to sort out the problem of using multiple models for software development processes

# Structure

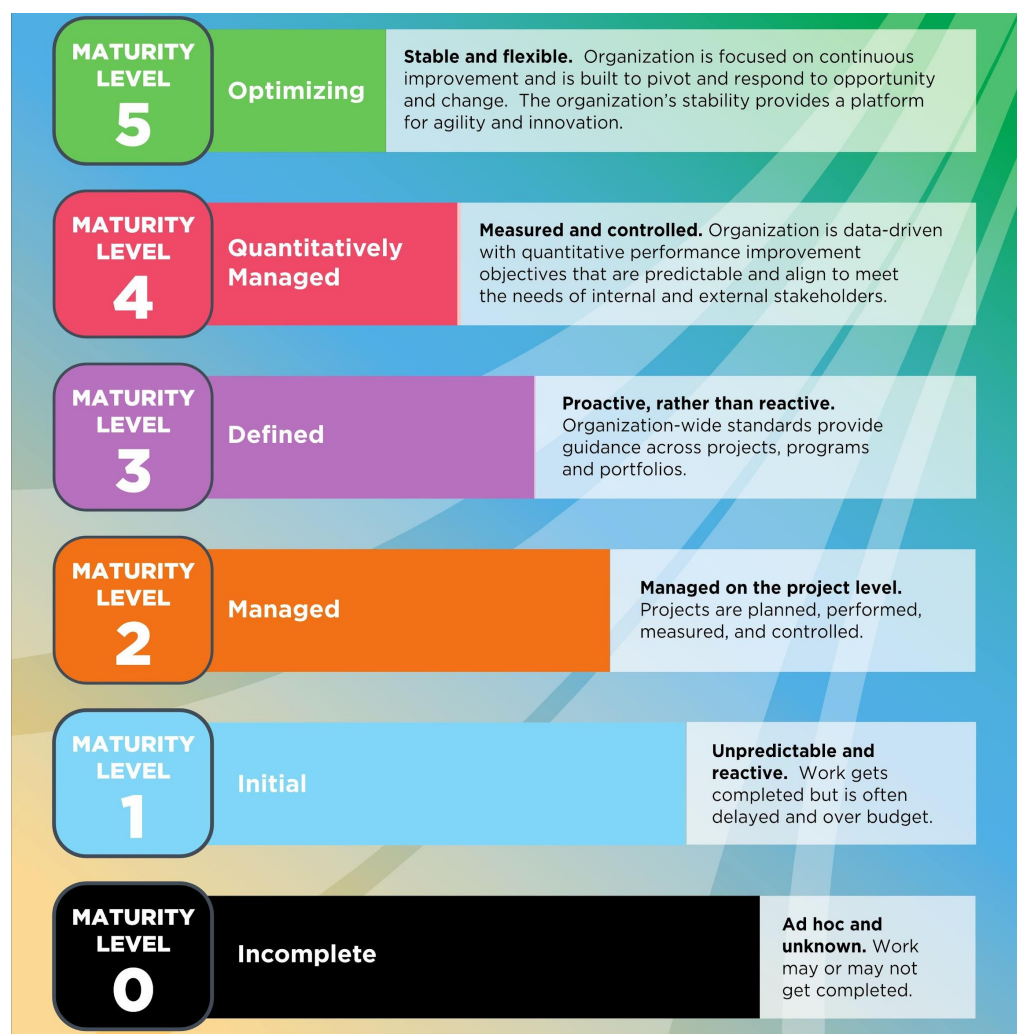
- Maturity Model: a 5-level process maturity continuum
- Key Process Areas: A KPA identify a cluster of relative activities to achieve a set of goals
- Goals: summarize the states that must exist for that key process area; they signify 'scope', 'boundaries' and 'intent' of each KPA
- Common Features: include practices that implement a KPA:
  - commitment to perform
  - ability to perform
  - activities performed
  - measurement and analysis
  - verifying implementation
- Key Practices: describe the elements of infrastructure and practice that contribute most effectively to the implementation of the KPA.

# Maturity Model

- A maturity model can be viewed as a set of structured levels that describe how well the behaviors, practices and processes of an organization can reliably and sustainably produce required outcomes
- A maturity model can be used as a benchmark for comparison.



# CMMI v.1.3 Maturity Levels



# CMMI Variation



Capability Maturity Model  
Integration (CMMI)<sup>®</sup>



CMMI<sup>®</sup> Development



CMMI<sup>®</sup> Services



CMMI<sup>®</sup> Supplier Management



People Capability Maturity  
Model (PCMM)<sup>®</sup>



CMMI<sup>®</sup> Cybermaturity Platform



Data Management Maturity  
(DMM)<sup>SM</sup>

# CMMI Development

CMMI Development is an integrated set of best practices that improves performance and key capabilities for organizations that develop products, components, and services.

- a. **Improve Time-to-Market** — ensure products and services are delivered quickly and efficiently with little to no re-work.
- b. **Increase Quality** — improve product development quality and consistency to reduce defects.
- c. **Reduce Cost** — lower costs through improved planning, scheduling, and budgeting processes.
- d. **Improve Product Lifecycle Management** — meet customer expectations across the entire product lifecycle from delivery to maintenance and operations.
- e. **Gain Organizational Agility** — leverage revenue-enhancing and cost-cutting opportunities to deliver products and services quickly, effectively, and consistently.

<https://cmminstitute.com/cmми/dev>

<https://cmminstitute.com/resource-files/public/marketing/document/cmm-development-v1-3-quick-reference-guide>

# CMMI (for) Services

CMMI Services is an integrated set of best practices that improves performance and key capabilities for organizations that provide services, including B2B, B2C, standalone services, and those that are part of a product offering.

# CMMI Supplier Management

Formally known as CMMI for Acquisition

CMMI Supplier Management is an integrated set of best practices that improves performance and key capabilities for organizations that acquire components, goods, or services from another company.

# People Capability Maturity Model (PCMM)

PCMM is an integrated set of best practices that improves performance and key capabilities for organizations that want to improve their critical people management processes.

# SCAMPI (Standard CMMI Appraisal Method for Process Improvement)

SCAMPI is the official appraisal method used by the CMMI institute. It is outlined in the SCAMPI Method Definition Document, which is included in the CMMI appraisal reference documents. There are three appraisal classes: Class A, B and C.

- **SCAMPI A:** The most rigorous appraisal method, SCAMPI A is most useful after multiple processes have been implemented. It provides a benchmark for businesses and is the only level that results in an official rating. It must be performed by a certified lead appraiser, who is part of the on-site appraisal team.
- **SCAMPI B:** This appraisal is less formal than SCAMPI A; it helps find a target CMMI maturity level, predict success for evaluated practices and give the business a better idea of where they stand in the maturity process.
- **SCAMPI C:** This appraisal method is shorter, more flexible and less expensive than Class A or B. It's designed to quickly assess a business's established practices and how those will integrate or align with CMMI practices. It can be used at a high-level or micro-level, to address organizational issues or smaller process or departmental issues. It involves more risk than Class A or B, but it's more cost-effective.

# Introducing CMMI V2.0 in 2018

The core of CMMI V2.0 is a proven set of global best practices organized by critical business capabilities which improve business performance. These critical capabilities address the biggest challenges common to any organization, including:

**Ensuring Quality**

**Engineering & Developing Products**

**Delivering & Managing Services**

**Selecting & Managing Suppliers**

**Planning & Managing Work**

**Managing Business Resilience**

**Managing the Workforce**

**Supporting Implementation**

**Sustaining Habit & Persistence**

**Improving Performance**



# Disadvantage of CMMI Model

- May require additional resources and knowledge in smaller organizations to initiate CMMI based process improvement.
- May require considerable amount of time
- Required knowledge and effort for implementation

# Official Books by Addison-Wesley

CMMI for Development: Guidelines for Process Integration and Product Improvement, 3rd Edition

CMMI for Services: Guidelines for Superior Service, 2nd Edition

CMMI for Acquisition: Guidelines for Improving the Acquisition of Products and Services, 2nd Edition

Integrating CMMI and Agile Development: Case Studies and Proven Techniques for Faster Performance Improvement

People CMM, The: A Framework for Human Capital Management, 2nd Edition

<http://www.informit.com/search/index.aspx?query=cmm>

# Resources and links

CMMI for Development (v.1.3) by Addison-Wesley

CMMI Implementation Guide ( A Practitioner's Perspective)

How to Spell CMMI

<https://cmmiinstitute.com/resources>

<https://www.sei.cmu.edu>

<https://resources.sei.cmu.edu/library/results.cfm#stq=%20&stp=1>