

Capability Maturity Models

of the



Software Engineering Institute
Carnegie Mellon

Capability Maturity Models

What led to the development?

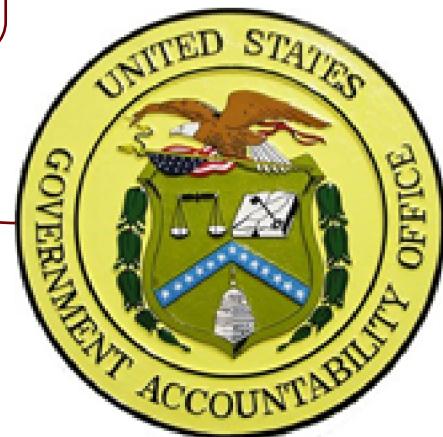


Of 17 major DoD software contractors the average 28-month schedule was missed by 20 months, and no project was completed on time.

We have repeatedly reported on cost rising by millions of dollars, schedule delays of not months but years, and multi-billion-dollar systems that don't perform as envisioned.

*I'd rather have it wrong than have it late.
We can always fix it later.*

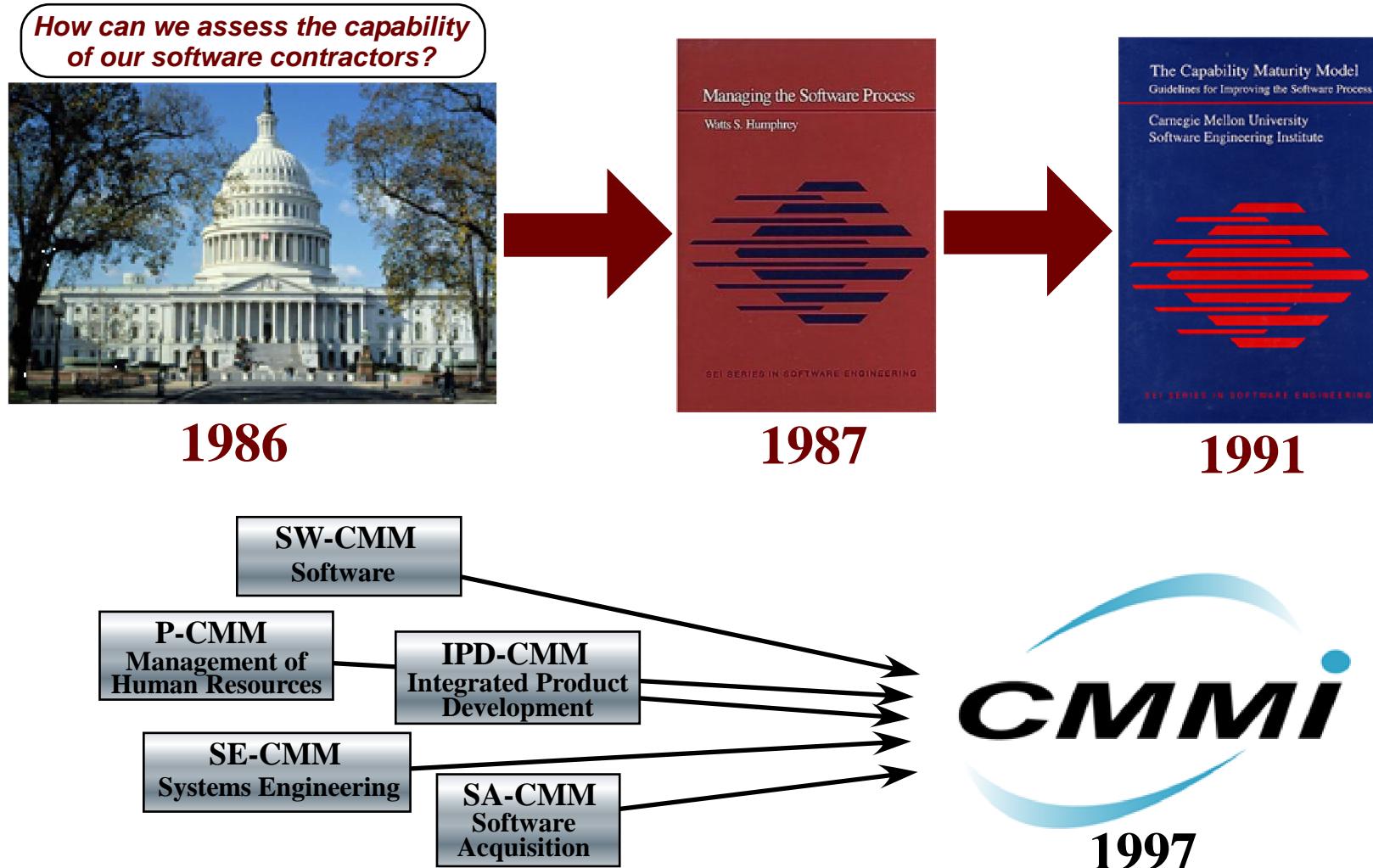
Industry



***Is there any wonder there
was such frustration?***

Capability Maturity Models

A bit of background...



See their web site at: <http://cmmiinstitute.com/>

CMMI_3

Capability Maturity Model Integrated

It's only for Mature organizations...



VS



Little League

Major League

Basic concepts used to describe mature organizations

- 1. Process**
- 2. Process Description**
- 3. Software Process**
- 4. Software Process Capability**
- 5. Software Process Performance**
- 6. Software Process Maturity**

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Underlying basis for CMMI



TQM

Total Quality Management

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Five Level of Capability



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Common Characteristics of each Level

Key Process Areas

Key Practicies

Commitment to Perform

Ability to Perform

Activities Performed

Measurement and Analysis

Verifying Implementation

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Maturity Level 1 - Initial

*Chaos theory applied
to software development.*

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Maturity Level 2 - Repeatable

Basic software project management practices are put in place.

- Requirements management
- Software project planning
- Software project tracking and oversight
- Software sub-contract management
- Software quality assurance
- Software configuration management

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Maturity Level 2 - Repeatable

Example:

- Requirements management

In each process area for each level there are a number of stated goals. Under that are one or more statements of:

- ◆ Commitment to Perform
- ◆ Ability to Perform
- ◆ Activities Performed
- ◆ Measurement and Analysis
- ◆ Verifying Implementation

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Maturity Level 2 - Repeatable

Example:  Requirements management

Commitment to Perform

The Project follows a written organizational policy for managing the system requirements allocated to software.

- a. The allocated requirements are documented.
- b. The allocated requirements are reviewed by:
 1. The software managers
 2. Other affected groups (SW engineers, SW testers, QA personnel, CM personnel, documentation support, i.e. publications dept)
- c. The software plans, work products, and activities are changed to be consistent with changes to the allocated requirements.

Ability to Perform

For each project, responsibility is established for analyzing the system requirements and allocating them to hardware, software, and other system components.

The allocated requirements are documented.

Adequate resources and funding are provided for managing the allocated requirements.

Members of the software engineering group and other software-related groups are trained to perform their requirements management activities.

Activities Performed

The software engineering group reviews the allocated requirements before they are incorporated into the software project.

The software engineering group uses the allocated requirements as the basis for software plans, work products, and activities.

Changes to the allocated requirements are reviewed and incorporated into the software project.

Measurement and Analysis

Measurements are made and used to determine the status of the activities for managing the allocated requirements.

Verifying Implementation

The activities for managing the allocated requirements are reviewed with senior management on a periodic basis.

The activities for managing the allocated requirements are reviewed with the project manager on both a periodic and event-driven basis

The software quality assurance group reviews and/or audits the activities and work products for managing the allocated requirements and reports the results.

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Maturity Level 3 - Defined

Each process has defined for it:

- Readiness Criteria
- Inputs
- Standards and procedures for performing the work
- Verification Mechanisms
- Outputs
- Completion Criteria

Key Process Areas for Level 3

- Organization Process Focus
- Organization Process Definition
- Training Program
- Integrated Software Management
- Software Product Engineering
- Intergroup Coordination
- Peer Reviews

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Maturity Level 4 - Managed

The organization sets quantitative, quality and productivity goals for both products and processes.

Key Process Areas for Level 4

- Qualitative Process Management
- Software Quality Management

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Maturity Level 5 - Optimizing

*The aim in this level is
continuous process improvement.*

Key Process Areas for Level 5

- Defect Prevention
- Technology Change Management
- Process Change Management