

**White Paper**  
**CMII 805C**

**CMII Versus Other  
CM Certification Programs**



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**White Paper CMII-805C  
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**Purpose of This White Paper**

Potential students often ask how CMII compares to other CM certification programs. This white paper provides a comparison and an insight that would otherwise be difficult to sift out of the various web sites.

**OUTLINE**

- **The Four Major Certification Programs**
- **Basic Similarities and Differences**
- **Traditional CM Practices Versus CMII Practices**
- **MIL-STD-973 and EIA-649A — Same Paradigm**
- **CMII: An Enterprise-Wide Approach**
- **Certification Requirements and Cost Comparisons**
- **CM Experience Issues and Paradigms**
- **Examples of CM Paradigms and Needed Shifts**
- **Conclusions and Recommendations**

## The Four Major Certification Programs

(1) Software Configuration Management (**SCM**) certification by the System Technology Institute (**STI**).

- **SCM Specialist** — initiated in 1984

(2) Configuration and Data Management (**CDM**) certification by the National Defense Industry Association (**NDIA**) — previously known as the American Defense Preparedness Association (**ADPA**).

- **CDM Manager** — initiated in 1990
- **CDM Specialist** — initiated in 1990

(3) Configuration Management (**CM**) certification by the Configuration Management Training Foundation (**CMTF**).

- **Level 1** — initiated in 1993
- **Level 2** — initiated in 199?
- **Level 3** — initiated in 2007

(4) Configuration Management II (**CMII**) certification by the Institute of Configuration Management (**ICM**), GfKM, ConfigOnline, Arizona State University, University of Tennessee and CMII Research Institute.

- **CMII Basic (CMIIB)** — initiated in 2009
- **CMII Certified (CMIIC)** — initiated in 1986
- **CMII Software (CMIIC)** — initiated in 2010
- **CMII Advanced (CMIIA)** — initiated in 2010
- **CMII Professional (CMIIP)** — initiated in 2006

## Basic Similarities and Differences

Programs (1), (2) and (3) identify CM planning, identification, change control, status accounting and audits as the major activities of CM. This traditional approach to CM has its roots in the defense environment.

Program (1) focuses on software and is government-oriented. Program (2) focuses on the defense industry and mostly a U.S. market. Program (3) is defense-oriented and covers the U.S. and international markets.

Program (4) focuses on commercial, government, hardware and software applications in all markets and is very "how-to" oriented. CM is elevated out of engineering and given an enterprise-wide perspective. The scope of CM is expanded and its emphasis is shifted.

# Traditional CM Practices Versus CMII Practices

CM was introduced in the late 1960's to solve the inability of defense contractors to build a 2nd unit identical to the 1st unit.

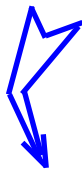
## CM Practices per Traditional CM

Resides in Engineering and Focuses on Design Requirements

Traditional CM

- CM Planning:** *Apply CM if it can be justified (often called the graded approach);*
- Configuration Identification:** *Define, document and baseline the product and its design attributes;*
- Change Control:** *Control product changes and variances and maintain consistency;*
- Status Accounting:** *Maintain current and historical versions of the product;*
- Verification and Audit:** *Verify the design and confirm that the product conforms.*

- CM's goal is to maintain consistency between the product and its design;
- Accommodating change is seen to be incompatible with maintaining consistency;
- Variances (deviations/waivers) are acceptable for maintaining consistency;
- Ensuring that designs are clear, concise and valid is not an objective;
- CM is to be tailored for each application (do only that which is affordable).



## Transition from Traditional CM to CMII The CMII Term Was Adopted in 1988



## CM Practices per CMII

Transforms CM into a Business Process Infrastructure to Manage All Requirements

CMII

- Configuration Management:** *Ensures that configurations conform to released requirements;*
- Requirements Management:** *Ensures that documented requirements are clear, concise and valid;*
- Release Management:** *Ensures that documents are authorized and released prior to use;*
- Change Management:** *Keeps released documents and data up to date;*
- Data Management:** *Ensures data bases are accurate and deliverable data is secure;*
- Records Management:** *Retains traceability of work and proof that work products conform;*
- Document & Library Control:** *Protects knowledge assets and prevents unauthorized changes;*
- Enabling Software Tools:** *Serve to enhance overall process reliability and efficiency.*

- Standardized process — does not require tailoring for each application;
- Accommodates change and keeps all requirements clear, concise and valid;
- Enables other activities to perform their tasks reliably and efficiently;
- Consistent conformance and continuous improvement are by-products.

## MIL-STD-973 and EIA-649A — Same Paradigm

MIL-STD-973 "Configuration Management," released in 1992, was a consolidation of the 480-series of CM standards originally released in the 1968-1970 timeframe. MIL-STD-973 simply locked-in the traditional CM practices as described on page 3.

The MIL-STD-973 paradigm was also the basis for:

- ISO 10007 "Guideline for CM" released in 1995;
- IEEE 828 "Software CM Plans" released in 1998.

The traditional approach to CM evolved in an environment where the government paid for the development of new weapon systems and took ownership of the designs which, in turn, were shared with other contractors. Data managers worked in conjunction with configuration managers to handle the huge volume of "deliverable data packages."

Many original problems, however, remained unresolved. As-delivered products rarely conformed to their designs. Contractors routinely changed products first and hoped the designs would catch up later. Rather than fix the slow, cumbersome and costly change process, deviations and waivers were used to record the variances.

Such ongoing problems were a major reason the Secretary of Defense issued an edict in 1994 to replace the military standards with "best commercial practices." For CM, that was interpreted to mean a "consensus standard" suitable for both commercial and defense environments.

The new standard, now known as EIA-649A "National Consensus Standard-Configuration Management," was written by the same authors.

MIL-STD-973 and EIA-649A (2004) now share the same paradigm:

- *CM resides in engineering and focuses on design definition;*
- *CM is identification/change control/status accounting/audit;*
- *CM is to be tailored for each application;*
- *CM's goal is consistency between the product and its design;*
- *Variances (deviations/waivers) are used to maintain consistency.*

From a CMII perspective, nothing has changed. The problems that the Secretary of Defense had hoped to eliminate continue to flourish.

## CMII: An Enterprise-Wide Approach

CMII expands the scope of CM to include any information that could impact safety, security, quality, schedule, cost, profit or the environment.

CMII shifts the emphasis to integrated process excellence and provides the how-to for:

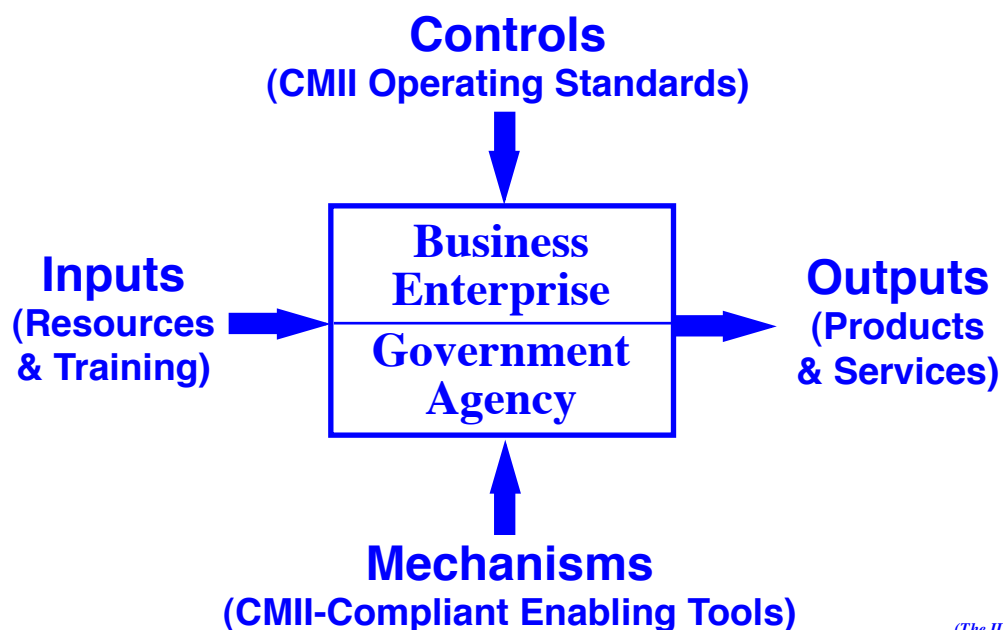
- (1) accommodating change;
- (2) optimizing the reuse of standards and best practices;
- (3) ensuring that all requirements remain clear, concise and valid;
- (4) communicating (1), (2) and (3) to users promptly and precisely;
- (5) achieving conformance to requirements in each case.

CMII also promotes continuous improvement in (1) through (5).

### The Bottom Line CM-Wise

*An organization that cannot accommodate change and keep requirements clear, concise and valid has no choice but to operate in the corrective action mode. Highly inflated costs have always been a defense industry problem. Traditional CM does not enable any entity to escape the corrective action mode.*

The best CM process is that which can best improve the ratio of output value relative to input costs.



*(The IDEF Model)*

## **Certification Requirements and Cost Comparisons**

The chart on page 7 provides a detailed comparison of the SCM, CDM, CM and CMII certification programs.

Information contained in the chart was extracted from each training and certification provider's web site, as identified in the first column.

**Column 1: Certification providers and web site addresses**

**Column 2: Required courses**

**Column 3: Required days in class**

**Column 4: Certification categories or levels**

**Column 5: Test hours**

**Column 6: Course and/or test fees (commercial and government rates)**

**Column 7: First year certifications were awarded**

**Column 8: Total number certified to date**

**Footnotes: Requirements for on-the-job experience**

## **CM Experience Issues and Paradigms**

Students registering for the CMII courses range from the rawest of rookies to the most seasoned old-pro's. Those with the most experience in traditional CM environments are typically most stuck in those paradigms. CMII instructors excel in helping them shift out of those paradigms. Examples of required paradigm shifts are provided on page 9.

As students move through the courses required for certification, ingrained habits begin to surface and paradigms begin to shift. Once the shift is complete, they can't wait to get back to work and apply the principles.

## **The Best Option**

CMII provides the business process infrastructure that has been missing. It is an excellent enabler to further enhance other best practices such as ISO 9000, CMMI, Six Sigma, PMI and so on.

Any process wherein consistent conformance and continuous improvement are by-products, has universal application. CMII is the best option.

## (1) Comparison of SCM, CDM, CM and CMI Certification Programs (2) (3) (4) (5) (6) (7) (8)

SCM, CDM, CM & CMI Certification Providers	Required Courses (or Available)	Days in Class	Certification Categories and/or Levels	Test Hours	Course and/or Test Fees		First Year	Number Certified to date
					Comm.	Gov't.		
STI (SCM) www.sti.com	SCM Impl. of SCM	4 4	SCM Specialist <sup>(1)</sup>	(take home)	\$ 2,449 + 2,824	\$ 2,265 + 2,640	1984	~ ?,000
NDIA (CDM) www.ndia.org	Prep course (if desired)	2	CDM Manager <sup>(2)</sup> CDM Specialist <sup>(3)</sup>	8 8	245 250 250	245	1990 1990	both categories ~ 2,000
CMTF (CM) www.cmtf.com	Basic CM Advanced CM Software CM Enterprise CM	2 2 2 2	Level 1 Cert. Level 2 Cert. Level 3 Cert. <sup>(4)</sup>	3 2 1	1,295 + 1,415 + 1,415 + 1,415	1,195 + 1,295 + 1,295 + 1,295	1993 199? 2007	levels 1 & 2 ~ 3,500 ?
ICM (CMI) www.icmhq.com www.gfkm.de www.configonline.co.za www.cmiiresearch.com www.pea.au.	Courses I - IV Courses V-VI Courses VII-VIII Course XIII Course XVI Course IX	8 4 4 4 4 3	CMIIB (basics) CMIIC (certified) CMIIA (advanced) CMIIS (software) CMIIP (professional) to retain CMIIP status	4 (included) 2 (included) 2 (included) 1 (included) 1 (included) 0	4,000 + 2,000 + 2,000 + 2,000 + 2,000 1,000	3,600 + 1,800 + 1,800 + 1,800 + 1,800 900	1987 1987 2010 2010 2006 2004	~ 6,600 ~ 6,600 0 0 ~ 200

(1) SCM Specialist certification requires 4 consecutive years of SCM experience.

(2) CDM Manager certification requires 10 years of CDM experience.

(3) CDM Specialist certification requires 5 years of CDM experience.

(4) Level 3 certification requires Level 1 and Level 2 certifications plus 4 years of CM experience or 3 years with academic credit.

~ NOTE: Totals, in some cases, were missing, unclear or confidential.

## Examples of CM Paradigms and Needed Shifts

<i>CM PARADIGMS</i>	<i>CMII PRINCIPLES</i>
<i>Assuming life cycles begin and end with physical items.</i>	<i>Knowing life cycles begin and end with documented requirements.</i>
<i>Assuming the primary product of engineering is a prototype.</i>	<i>Knowing the primary product of engineering is documentation.</i>
<i>Assuming the purpose of a prototype is to prove the design works.</i>	<i>Knowing the purpose of a prototype is to validate the documentation.</i>
<i>Assuming changes to documentation are too slow and physical items must be changed first.</i>	<i>Knowing documentation must lead and physical items must conform. A document that is not released may not be used.</i>
<i>Assuming a few errors in each data set is insignificant and the effort to prevent such errors would not be cost effective.</i>	<i>Knowing decreasing accuracy in data sets used in-series causes the need for intervention resources to increase exponentially.</i>
<i>Assuming continuous corrective action is continuous improvement.</i>	<i>Knowing corrective actions are reactions to nonconformances.</i>
<i>Assuming the elimination of defects (and the need for waivers) is not economically feasible.</i>	<i>Knowing defects are caused by the process and defects can be eliminated by fixing the process.</i>
<i>Assuming the validity of any document is enhanced with each additional signature.</i>	<i>Knowing the integrity of lower level documents decreases as the number of signatures go beyond two.</i>
<i>Assuming computerization will solve most deficiencies in the document and change management process.</i>	<i>Knowing the process must be right before significant benefits from computerization can be realized.</i>
<i>Assuming each change will be the last change; any effort to improve the change process would be a waste.</i>	<i>Knowing an organization that continually "changes faster and documents better" will eventually win.</i>
<i>Assuming that the ability to accommodate change compromises the ability to maintain consistency between an as-built product and its design definition.</i>	<i>Knowing that the ability to accommodate change is a prerequisite for keeping requirements (including design definition) clear, concise and valid.</i>

## Conclusions

Traditional CM evolved in the defense environment wherein the government paid for product development and took ownership of the design. Class I changes (those that impacted the contract) had to be approved by the government. Each change request was accompanied by Notice of Revisions which described how each impacted document was impacted by the change. The process for preparing each change request was very expensive and the review and approval process was also very slow.

The cumbersome nature of this process was somewhat alleviated in 1994 when the Secretary of Defense issued an edict to replace the military standards with best commercial practices. The government stopped taking ownership of the design definition. Defense contractors were given greater responsibility for design definition and changes. Actual CM practices however, changed very little.

By comparison, CMII evolved in an environment where the goal was to improve overall process reliability and efficiency for the entire organization. The entire organization suffers when documentation is not clear, concise and valid and when data is not accurate. The entire organization suffers when the change process is slow and cumbersome. The needed improvements, in both cases, reside in the CM domain. To improve organizational performance, it is necessary to improve the CM process.

The first group of CMII grads began shifting the CM paradigm within their respective organizations when they were first certified in 1987. Today, over 6,500 CMII grads are continuing to work their way up the ranks and their influence is continuing to grow. The number of success stories and the magnitude of the resulting benefits are also continuing to grow.

Those seeking certification in the discipline of CM have a choice. Some say CM is CM and there is little difference in the various certifications. That is simply not true. This white paper has hopefully clarified how they differ and why one is far superior to the others.

## Recommendations

For CM certification, there are two choices, traditional CM or CMII. Several provide certification in traditional CM. Only one provides CMII certification. If still undecided, start with CMII Course I and then decide. You will know precisely what you need to do.