

# Software Process Improvement and CMM

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# Topics

This overview covers the following topics:

- Common Process Problems
- Process Improvement Basics
- Maturity Models
- The CMMI Concept
- **The Benefits of Using CMMI**
- More About CMMI
- CMMI Adoption
- The Bottom Line



# CMMI Expected Business Benefits

Substantial reduction in systems integration and test time with greater probability of success

Cause integration of, and interaction among, the various engineering functions

Extend SW-CMM benefits to the total project & organization

Employ systems engineering principles in software development

Increase & improve SE content in programs

Leverage previous process improvement investments



# CMMI Expected Technical Benefits

Increased focus and consistency in

- requirements development and management
- systems design and development
- systems integration
- risk management
- measurement & analysis
- other engineering-related activities





# Enterprise-Wide Improvement

Organizations that want to pursue process improvement in multiple functional areas can use CMMI to do so with less additional investment for each additional function.

- CMMI enables process integration and product improvement.
- CMMI integrates multiple disciplines.
- CMMI provides a framework for integrating new disciplines as needs arise.

For detailed information about CMMI benefits, see the Performance Results Web page,

<http://www.sei.cmu.edu/cmmi/results.html>.



# Real World Benefits: Lockheed Martin M&DS

SW CMM ML2 (1993) to ML 3 (1996) to CMMI ML5 (2002)

## Results

- captured a greater percentage of available award fees; now receiving 55 percent more compared to the baseline that remained unrealized at SW-CMM level 2

1996 - 2002

- increased software productivity by 30%
- decreased unit software cost by 20%
- decreased defect find and fix costs by 15%

(From proprietary sources with permission; August 2003.)

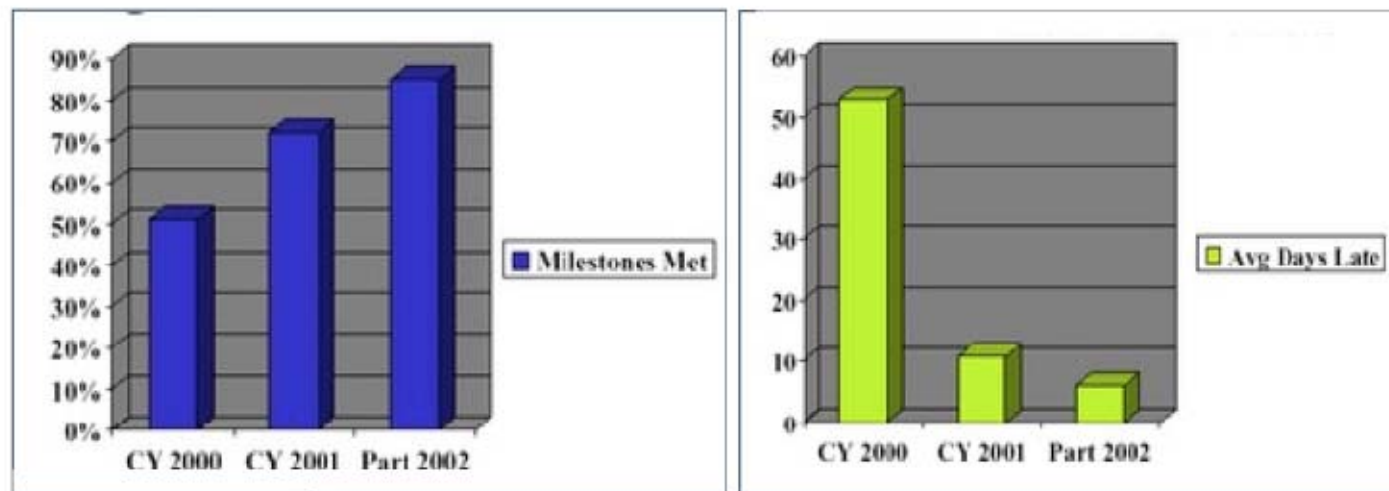


# Real World Benefits: General Motors Corporation

## CMMI Focus 2001

Goal is Integration of Supplier Work and GM Project Execution

**Results:** Improved schedule—projects met milestones and were fewer days late



(From *Camping on a Seesaw: GM's IS&S Process Improvement Approach*. Hoffman, Moore & Schatz, SEPG 2003.)





# Real World Benefits: Thales ATM

**CMMI** Level 4 helps THALES meet their business objectives:

- Ability to see into the future with a known level of confidence
- Increasing number of processes under statistical control
- Measurement-based process improvement
- **Return on investment due to**
  - earlier defect detection
  - improved risk management
  - better control of projects

(From CMMI Level 4 Preparation: The Story of the Chicken and the Egg. Anne De Goeyse and Anne Sophie Luce, Thales ATM; and Annie Kuntzmann-Combelles, Q-Labs France, ESEPG 2003.)





# Real World Benefits: Bosch Gasoline Systems

## CMM-based improvements

- **Predictability** – internal on-time delivery improved by 15%
- **Less Rework** – first pass yield improved by 10%
- **Product Quality** – reduction in error cases in the factory by one order of magnitude

## Next Steps include

- move to CMMI and applying it to software, system, and hardware
- expand process improvement program to include sales, hardware, and component development

(From Critical success factors for improvement in a large embedded systems organisation. Wolfgang Stolz, Robert Bosch GmbH Gasoline Systems GS-EC/ESP and Hans-Jürgen Kugler, Q-Labs Software Engineering, ESEPG 2003.)



# Real World Benefits: J.P. Morgan Chase & Co.

1<sup>st</sup> CMM success 2001 – today, 28 teams at CMM Level 2

CMMI success – 1<sup>st</sup> team ML3 in 2003

Investment in Process Improvement = \$4 million

## Results

- Improved predictability of delivery schedule
- Reduction of post-release defects
- Reduced severity of post-release defects

And, from CMMI specifically

- Increased throughput = more releases per year

Goal to achieve CMMI throughout organization

(With permission from presentation to the SEI, September 2003.)



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# Organizations Using CMMI

Accenture	Bank of America	BMW
Boeing	Bosch	Ericsson
DynCorp	EDS	Fujitsu
FAA	Fannie Mae	Hitachi
General Dynamics	General Motors	Infosys
Honeywell	IBM Global Services	KPMG
Intel	J. P. Morgan	Motorola
L3 Communications	Lockheed Martin	NEC
NASA	NDIA	NRO
Nokia	Northrop Grumman	Polaris
NTT Data	OUS (AT&T)	SAIC
Raytheon	Reuters	TRW
Samsung	Social Security Administration	U.S. Navy
U.S. Air Force	U.S. Army	Zurich Financial Services
U.S. Treasury Department	Wipro	



# CMMI Products Available

Version 1.1 of the CMMI Product Suite was released in December, 2001.

The disciplines available in CMMI models include systems engineering, software engineering, integrated product and process development, and supplier sourcing.

The SCAMPI appraisal method combines internal assessment and external evaluation methods into one.

An implementation guide for government evaluation was published in April, 2002.

A module for interpreting CMMI for acquisition organizations was published in February 2004.



# CMMI Acquisition Module

Provides concise guidance for establishing and strengthening acquisition practices

- Not another model—used in conjunction with CMMI
- Excerpts from CMMI with additions and amplifications pertinent to an acquisition environment

Helps to establish a common language and framework for process improvement across the supply chain

Can be used on less formal appraisals for gap analysis; identification of strengths, weaknesses, and risks; and identification of improvement opportunities

Cannot be used for formal appraisals yielding maturity level ratings





## CMMI Service Providers (as of 2/28/05)

SEI Partners are consultants licensed by the SEI to provide appraisal services and/or training services.

- There are 134 SEI Partners that can offer the *Introduction to CMMI* training course.
- There are 179 SEI Partners that can offer SCAMPI appraisal services.

Instructors and appraisers are authorized by the SEI. There are currently 253 SEI-authorized *Introduction to CMMI* V1.1 Instructors and 364 SEI-authorized Lead Appraisers.

Since the release of CMMI in 2000, there have been many people trained in CMMI:

- *Introduction to CMMI*: 30,009
- *CMMI Instructor Training*: 318



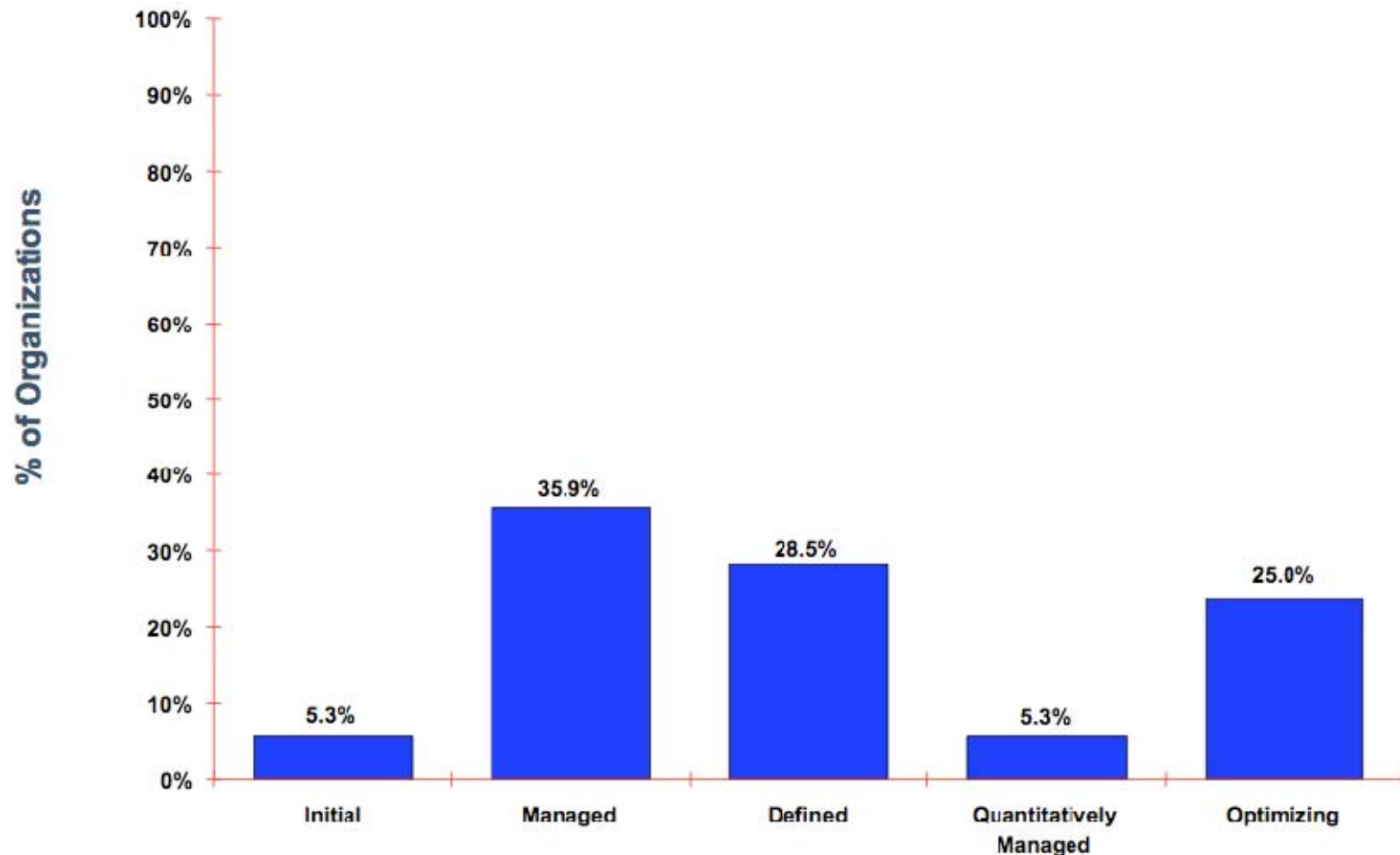
# CMMI Appraisals

The following data shows the number of SCAMPI V1.1 Class A appraisals that were conducted since the April 2002 release through August 2004 and reported to the SEI by September 2004:

424	appraisals
385	organizations
206	participating companies
33	reappraised organizations
1,704	projects
50.6%	non-USA organizations



# Maturity Levels by Reporting Organizations (9/28/04)

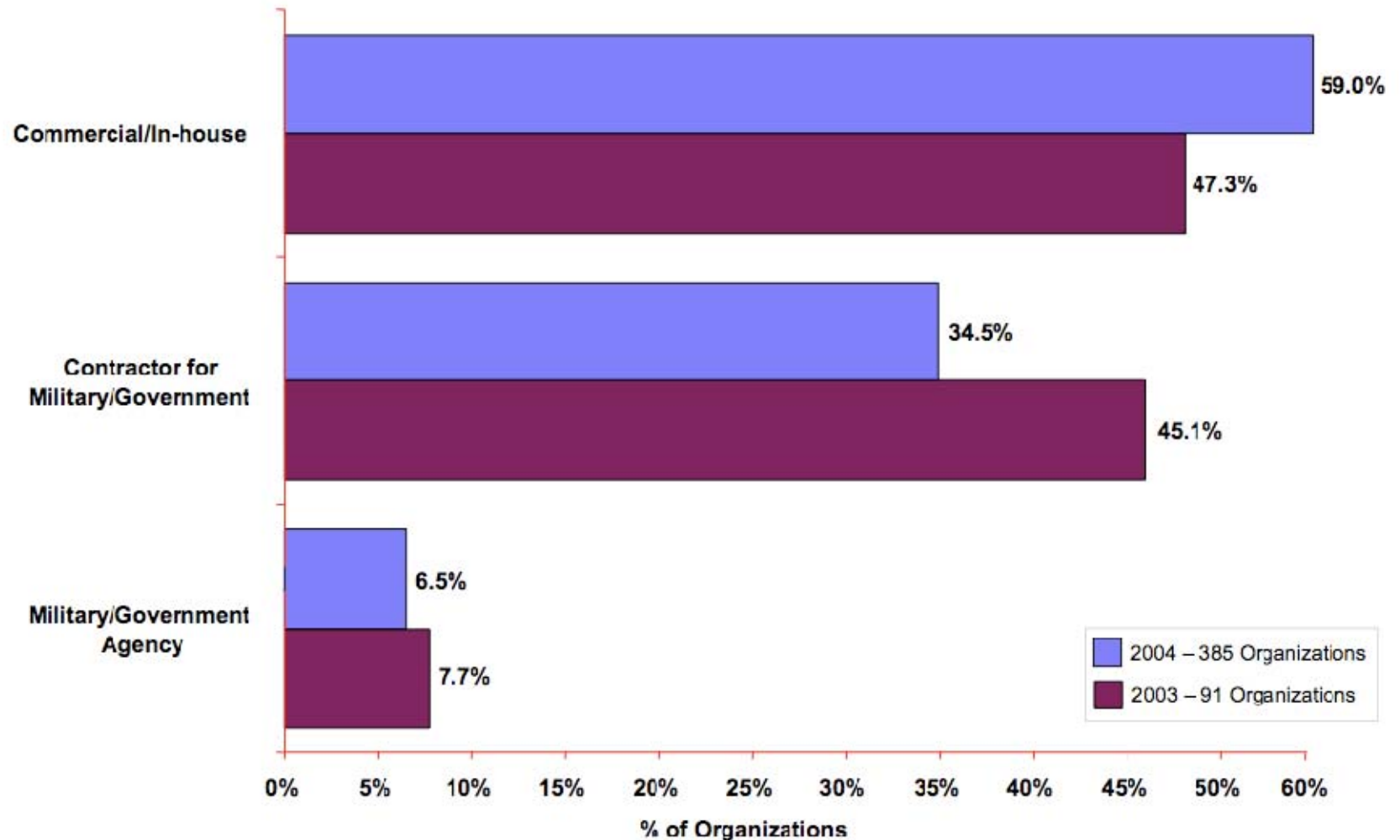


Based on most recent appraisal of 340 organizations reporting a maturity level rating.





# Categories of Reporting Organizations (9/28/04)





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# The Bottom Line

Process improvement  
should be done  
to help the business—  
not for its own sake.



“In God we trust,  
all others bring data.”

- *W. Edwards Deming*





# CMMI Can Benefit You

CMMI provides

- a common, integrated vision of improvement for all elements of an organization
- efficient, effective improvement and appraisal across multiple disciplines
- improvements to best practices incorporated from the Software CMM, EIA 731, IPD-CMM and others
- a means of representing new discipline-specific information in a standard, proven process-improvement context



# CMMI Benefits

CMMI-based process improvement benefits include

- improved schedule and budget predictability
- improved cycle time
- increased productivity
- improved quality (as measured by defects)
- increased customer satisfaction
- improved employee morale
- increased return on investment
- decreased cost of quality



# Improve Your Bottom Line

Improvement means different things to different organizations.

- What are your business goals?
- How do you measure progress?

Improvement is a long-term, strategic effort.

- What is the expected impact on the bottom line?
- How will impact be measured?





# **For More Information About CMMI**

Go to CMMI Web site:

<http://www.sei.cmu.edu/cmmi>

<http://seir.sei.cmu.edu>

Contact SEI Customer Relations:

Customer Relations

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