

CSMR 2004

(SM^{CMM}) :
**Software Maintenance Capability
Maturity Model**

Alain April, Alain Abran
École de Technologie Supérieure de Montréal, Canada

Reiner Dumke
Otto von Guericke University of Magdeburg, Germany



Université du Québec
École de technologie supérieure

Need for SM-CMM



- ❖ CMM and CMMi focus
 - ♦ Software Development and Maintenance **Projects**
 - ♦ Teams of developers
- ❖ Software Maintenance Specific Processes (SWEBOK) ?
 - ♦ Transition
 - ♦ Service Level Agreements
 - ♦ Acceptance/Rejection of Change and Corrective Requests
 - ♦ Planning Maintenance activities
 - ♦ Supporting operational software



Université du Québec
École de technologie supérieure

2

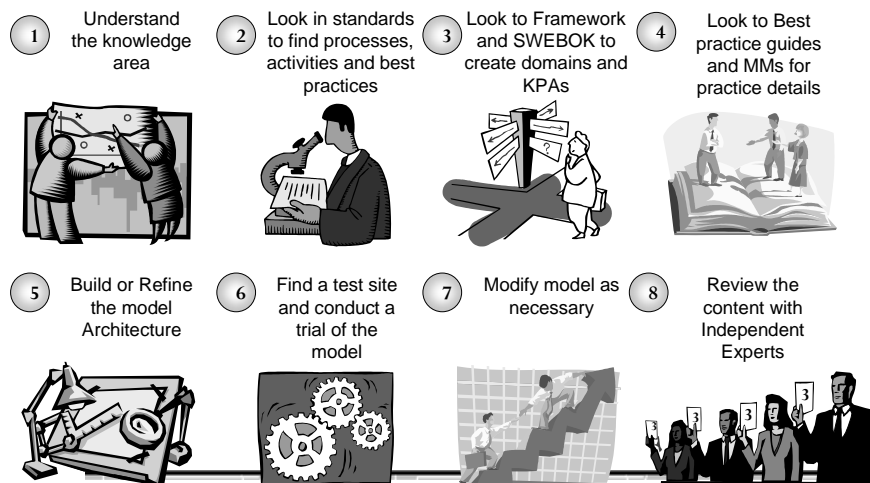
What current CMM could help?



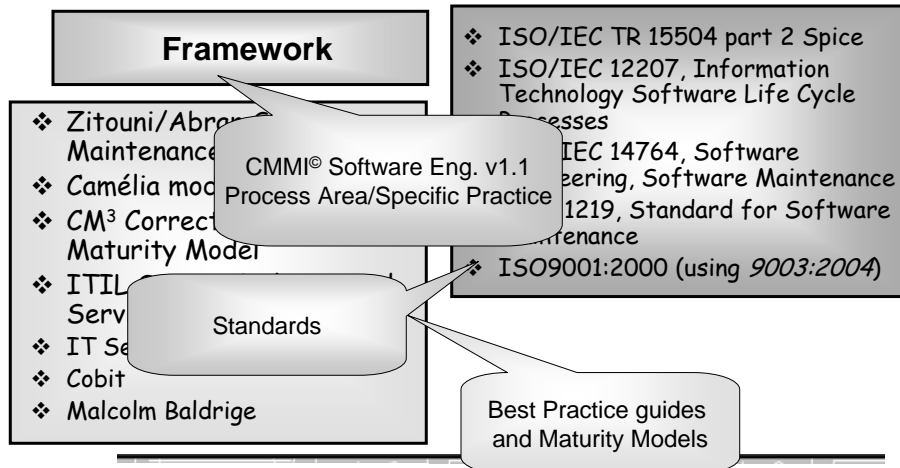
Year Software Engineering CMM proposals

1991	Bootstap
1992	Trillium
1993	CMM®
1994	Camélia , automated testing (Kra94)
1996	TMM (Bur96), Zit96 , Dov96
1997	Som97
1998	Esi98, Top98, Baj98
1999	Wit99, Vet99, Sch99
2000	Cob00 , Str00, Bev00, Lud00
2001	Kaj01d & 01e , Ray01, Sch01, Luf01, Tob01, Sri01
2002	CMMi ®, Nie02, Mul02, Vee02, Pom02, Raf02, Sch02, Ker02, Cra02

Step by step build SM-CMM



Sources to build SM-CMM:



Use of CMMi structure in SM-CMM:



- ❖ Contains the essential elements of effective processes for software related activities
- ❖ Contains a framework that provides the ability to generate multiple models and associated training and assessment materials. These models may represent:
 - ◆ software and systems engineering
 - ◆ integrated product and process development
 - ◆ new disciplines
 - ◆ combinations of disciplines
- ❖ Provides guidance to use when developing processes

Source P.Croll: 14th Annual DoD Software Technology Conference - IEEE-Sponsored Track - 1 May 2002

Referenced standards in SM-CMM



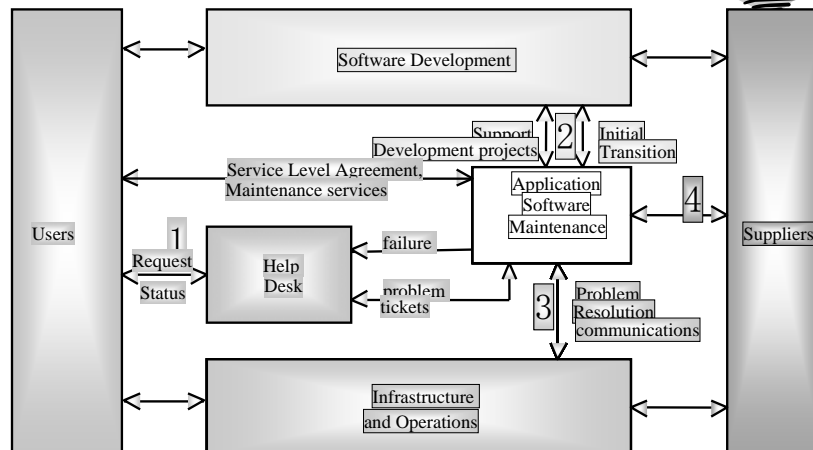
Standards, are consensus-based documents that codify best practice. Consensus-based standards have seven essential attributes that aid in process engineering. They:

- represent the collected experience of others who have been down the same road,
- tell in detail what it means to perform a certain activity,
- can be attached to or referenced by contracts,
- help to assure that two parties have the same meaning for an engineering activity,
- increase professional discipline,
- protect the business and the buyer,
- improve the product.

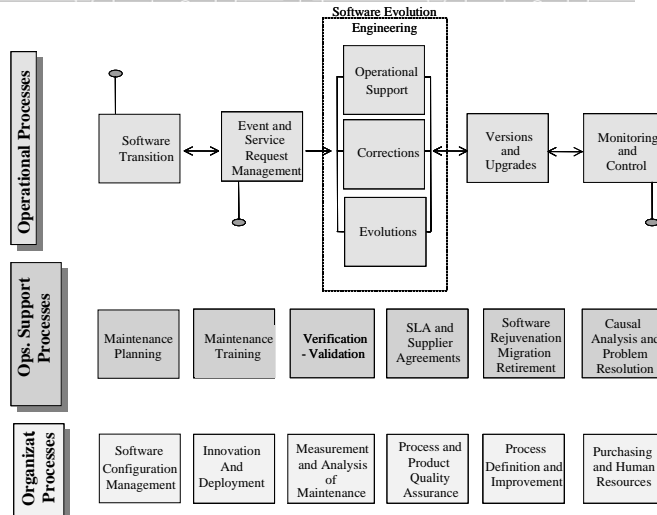
Source P.Croll: 14th Annual DoD Software Technology Conference - IEEE-Sponsored Track -1 May 2002



Model Context (Scope)



SM-CMM Process model

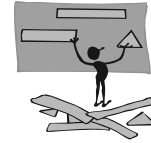


SM^{CMM} - Alignment to CMMi



CMMi Process Domains	SM ^{CMM} Process Domains
Process Management	Process Management
Project Management	Maintenance Request Management
Engineering	Evolution Engineering
Support	Support to Evolution Engineering

SM^{CMM} - Resulting KPA's



SM ^{CMM} Process Domains	Key Process Areas of Software Maintenance
Process Management	<ol style="list-style-type: none"> 1- Maintenance Process Focus 2- Maintenance Process/Service definition 3- Maintenance Training 4- Maintenance Process Performance 5- Maintenance Innovation and deployment
Maintenance Request Management	<ol style="list-style-type: none"> 1- Request & Event Management 2- Maintenance Planning 3- Monitoring & Control of maintenance requests 4- SLA & Supplier Management 5- Quantitative Maintenance Management
Evolution Engineering	<ol style="list-style-type: none"> 1- Transition 2- Operational Support 3- Evolution & Correction of software 4- Verification and Validation
Support to Evolution Engineering	<ol style="list-style-type: none"> 1- Configuration Management 2- Process and Product Quality Assurance 3- Measurement, Decision Analysis 4- Problem Management and Causal Analysis 5- Rejuvenation/Retirement Engineering



SM^{CMM} Architecture by levels

- ❖ Domains
 - ❖ Key Process Areas
 - ❖ Maturity Levels
 - ❖ Facets
 - ❖ Best Practices



SM^{CMM} - Maturity Levels



Level	Level Name	Risk	Interpretation
0	Non-existent	Highest	no sense of process
1	Initial	Very high	ad hoc maintenance process
2	Repeatable	High	basic request-based process
3	Defined	Medium	state-of-the-art process
4	Managed	Low	generally difficult to achieve now
5	Optimized	Very low	technologically challenging to attain



SM^{CMM} - Facets



Evolution Engineering

- 1- Transition
- 2- Operational Support
- 3- Revision & Correction of software
documentation and Validation

Facets describe different aspects of a KPA

- 1) Communications with the developer, the owner and the purchasing agent.
- 2) Management of the transition process.
- 3) Control of training and knowledge transfer during transition
- 4) Prepare documentation transfer (includes source code and outstanding problem reports)
- 5) Participate in user and acceptance tests



SM^{CMM} in summary



- ❖ Model in numbers
 - ◆ 4 Process Domains
 - ◆ 18 KPA's
 - ◆ 74 Facets
 - ◆ 443 Practices with supporting text and references
- ❖ Public Domain soon !



Future Work



- ❖ Release in a French Book planned 2005/6
- ❖ Evaluation tool to be built by Msc student this summer
- ❖ Knowledge Based system to support training is planned to start during 2004
- ❖ Will be posted on our WEB site progressively during 2005/6 at <http://www.lrgl.uqam.ca/>





*Thank
You*

