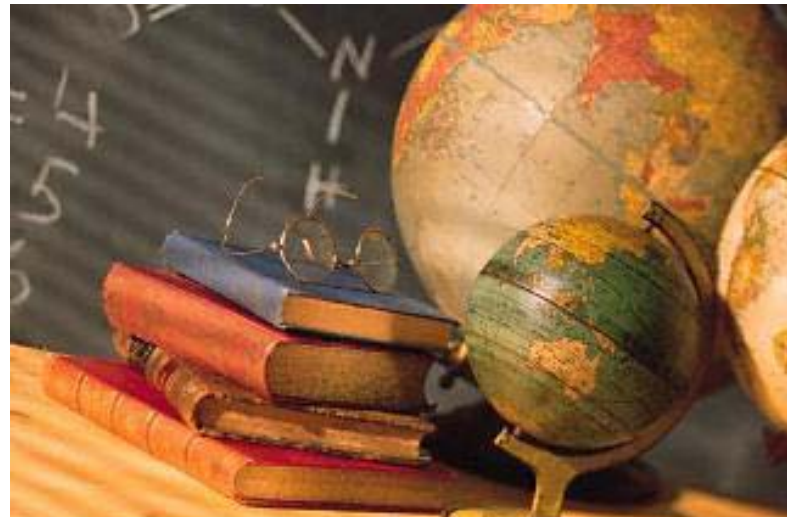# Assessment Results using the Software Maintenance Maturity Model (S^{3m})

David-Alexandre Paquette, Alain April & Alain Abran

List of topics

1) Overview of the S^{3m} model
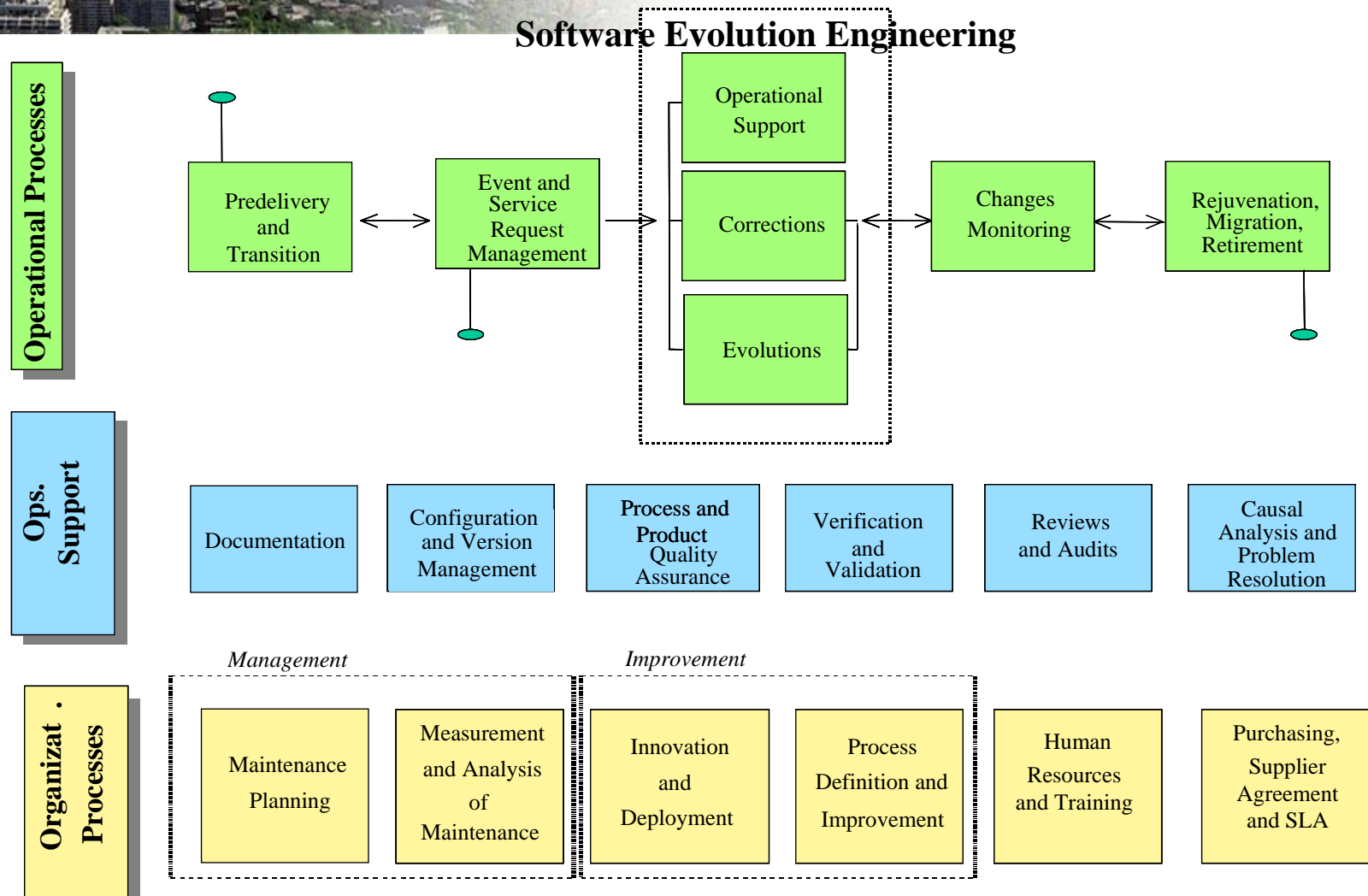
2) Context of the assessment

3) Assessment results

☞ *CMM and CMMi focus*

- *Software Development and Maintenance* **Projects**
- *Teams of developers*

☞ *Software Maintenance Processes (*SWEBOK*) ?*

- *Transition, Service Level Agreements, Acceptance/Rejection of Change and Corrective Requests, Planning Maintenance activities, Supporting operational software*

S³ᵐ Process Model

Software Evolution Engineering

Operational Processes

- Predelivery and Transition
- Event and Service Request Management
- Operational Support
- Corrections
- Evolutions
- Changes Monitoring
- Rejuvenation, Migration, Retirement

Ops. Support

- Documentation
- Configuration and Version Management
- **Process and Product** Quality Assurance
- Verification and Validation
- Reviews and Audits
- Causal Analysis and Problem Resolution

Organizat. Processes

Management

Improvement

- Maintenance Planning
- Measurement and Analysis of Maintenance
- Innovation and Deployment
- Process Definition and Improvement
- Human Resources and Training
- Purchasing, Supplier Agreement and SLA

16th International Workshop on Software Measurement (IWSM-Metrikom), Postdam (Germany), Nov. 2-3, 2006

Architecture 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

S^{3m} – Resulting KPA's

SM^{CMM} Process Domains	Key Process Areas of Software Maintenance
Process Management	1- Maintenance Process Focus 2- Maintenance Process/Service definition 3- Maintenance Training 4- Maintenance Process Performance 5- Maintenance Innovation and deployment
Maintenance Request Management	1- Request & Event Management 2- Maintenance Planning 3- Monitoring & Control of maintenance requests 4- SLA & Supplier Management 5- Quantitative Maintenance Management
Evolution Engineering	1- Transition 2- Operational Support 3- Evolution & Correction of software 4- Verification and Validation
Support to Evolution Engineering	1- Configuration Management 2- Process and Product Quality Assurance 3- Measurement, Decision Analysis 4- Problem Management and Causal Analysis 5- Rejuvenation/Retirement Engineering

List of topics

1) Overview of the S^{3m} model

2) **Context of the assessment**

3) Assessment results

☞ A single software application:

– Invoicing software with Billing inacuracies

– Audit requested

    ☞ Confirmed a list of deficiencies

    ☞ Functions added in two versions

    ☞ Staff turnover

    ☞ Users: Lack of confidence

– A single maintainer:

    ☞ Crisis context – fire extinguishing

List of topics

1) Overview of the S^{3m} model

2) Context of the assessment

3) Assessment results

Process Domain	Process Area	Level 0 Question	Rating	% Completed
Process management	Maintenance process focus	1.0.1	Yes	0%
	Maintenance process/service definition	2.0.1	Yes	0%
	Maintenance training	3.0.1	Yes	0%
	Maintenance process performance	4.0.1	Yes	0%
	Maintenance innovation and deployment	5.0.1	Yes	0%
		5.0.2	No	100%
		5.0.3	No	100%
Total				29%
Event/request management	Event/request management	1.0.1	Yes	0%
	Maintenance planning	2.0.1	Yes	0%
	Requests/software monitoring and control	3.0.1	Yes	0%
	SLA and supplier agreements management	4.0.1	Yes	0%
Total				0%
Evolution Engineering	Predelivery and transition services	1.0.1	No	100%
	Operational support services	2.0.1	No	100%
	Software evolution and correction services	3.0.1	No	100%
	Verification and validation	4.0.1	No	100%
Total				100%
Support to Evolution Engineering	Configuration and version management	1.0.1	No	100%
	Process, service and software quality assurance	2.0.1	Yes	0%
	Maintenance measurement and analysis	3.0.1	Yes	0%
	Causal analysis and problem resolution	4.0.1	Yes	0%
	Software rejuvenation, migration and retirement	5.0.1	Yes	0%
Total				20%
Level 0 Rating:				37%

Process Domain	Process Area	Level 1 Question	Rating	% Completed
Process management	Maintenance process focus	1.1.1	L: Largely Achieved	68%
		1.1.2	F: Fully Achieved	93%
	Maintenance process/service definition	2.1.1	L: Largely Achieved	68%
		2.1.2	L: Largely Achieved	68%
	Maintenance innovation and deployment	5.1.2	L: Largely Achieved	68%
		5.1.3	L: Largely Achieved	68%
Total				36%
Evolution Engineering	Pre-delivery and transition services	1.1.1	F: Fully Achieved	93%
	Operational support services	2.1.1	F: Fully Achieved	93%
	Software evolution and correction services	3.1.1	F: Fully Achieved	93%
	Verification and validation	4.1.1	F: Fully Achieved	93%
Total				93%
Support to Evolution Engineering	Configuration and version management	1.1.1	F: Fully Achieved	93%
Total				15,5%
Level 2 Rating:				36%

Process Domain	Process Area	Roadmap	Level 2 Question	Rating	% Completed
Evolution Engineering	Operational support services	Ad hoc requests/reports/services	2.2.6	L: Largely Achieved	68%
	Software evolution and correction services	Evolution/Correction	3.2.5	F: Fully Achieved	93%

Impact of assessment results:

☞ *Raised management awareness of the process problems*

☞ *An improvement requires both resources & funding*

☞ *Documentation & prioritization of maintenance requests*

References

☞ April, A.; Hayes, J. Huffman; Abran, A.; Dumke, R., **Software Maintenance Maturity Model (SMmm):The software maintenance process model**, Journal of Software Maintenance and Evolution: Research and Practice ,vol. 17(3), 2005, pp. 197-223.

☞ April, A.; Abran, A.; Dumke, R., **SMcmm Model to Evaluate and Improve the Quality of Software Maintenance Process: Overview of the model**, SPICE 2004 Conference on Process Assessment and Improvement, Critical Software SA, Lisbon (Portugal), The Spice User Group, 2004, pp. 19-32.

Http://www.gelog.etsmtl.ca/publications/pdf/812.pdf

☞ April, Alain; Abran, Alain; Reiner R, Dumke, **Software Maintenance Capability Maturity Model (SMCMM): Process Performance Measurement**, International Workshop on Software Measurement (IWSM), Montreal, Shaker-Verlag 2003, pp. 16.
Http://www.gelog.estmtl.ca/publications/pdf/781.pdf

Thank You !

alain.abran@etsmtl.ca