

CSMR 2008

(S3^M) :
Software Maintenance Capability
Maturity Model

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École de technologie supérieure

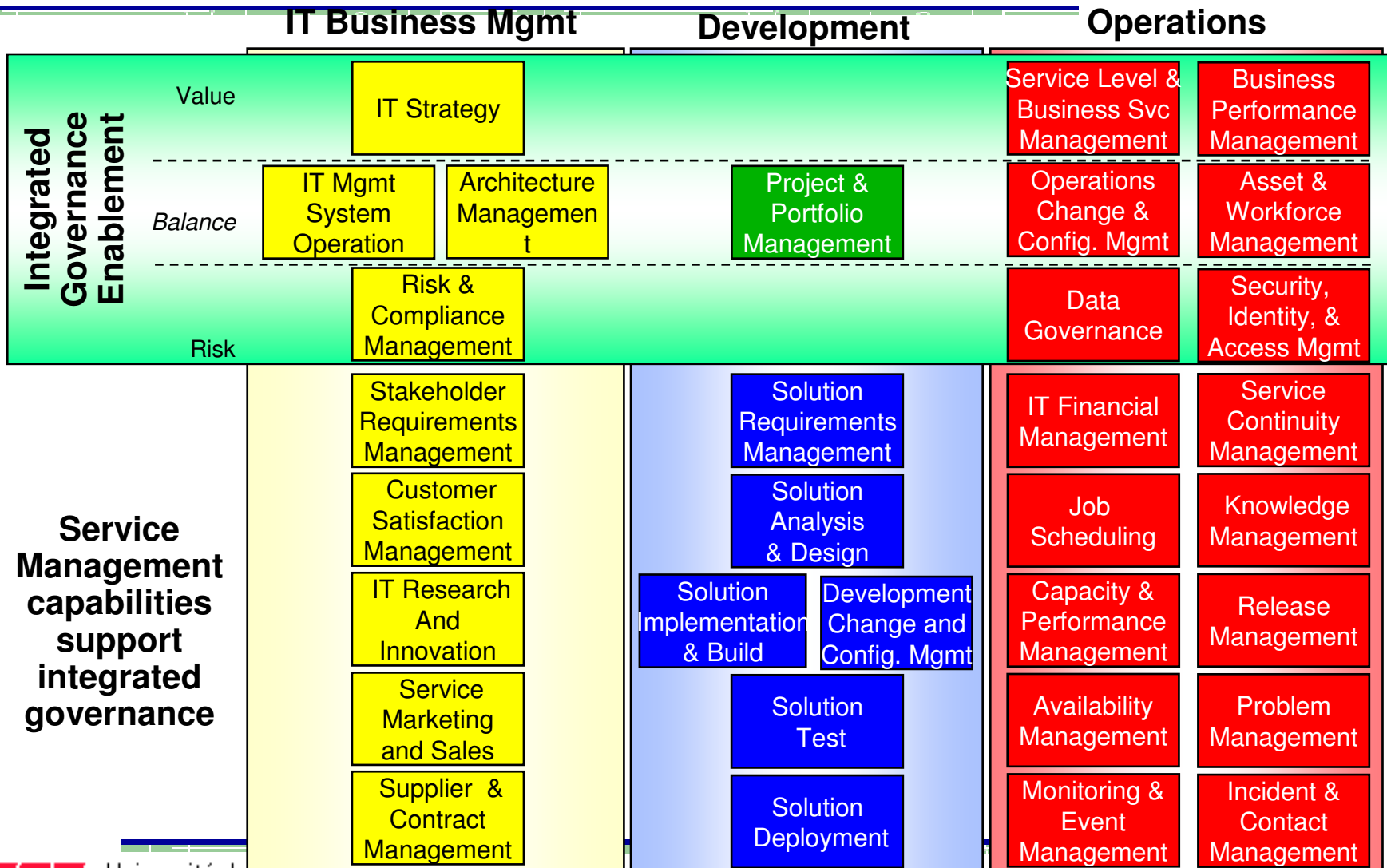
Overview



- ❖ The need for a software maintenance capability maturity model (S3^M)
- ❖ How the model was developed
- ❖ Overview of the model architecture
- ❖ Advanced Practices



Need for S3^M



Need for S3^M



- ❖ Trying to assess all IT processes (for improvement)
- ❖ ISO15504 and CMMi focus
 - ◆ Software Development and Maintenance **Projects**
 - ◆ Teams of developers
- ❖ Software Maintenance Specific Processes (**SWEBOK**) ?
 - ◆ Transition
 - ◆ Part of a Service Level Agreement
 - ◆ Acceptance/Rejection of Change and Corrective Requests
 - ◆ Planning Maintenance activities
 - ◆ Supporting operational software
- ❖ In 1994 Bell Canada and NORTEL funded a master student to develop a software maintenance assessment kit to add to Trillium.



What current CMM could help?

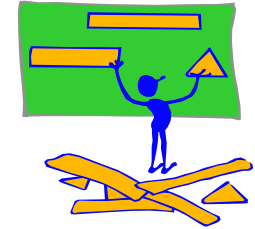


Year Software Engineering CMM proposals

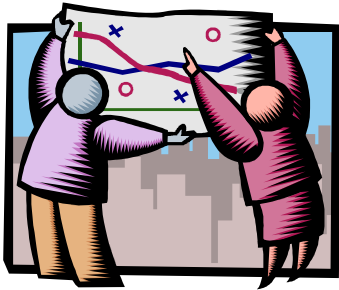
1991	Bootstap
1992	Trillium
1993	CMM [©]
1994	Camélia , automated testing (Kra94)
1996	TMM (Bur96), Zit96 , Dov96
1997	Som97
1998	Esi98, Top98, Baj98
1999	Wit99, Vet99, Sch99
2000	Cob00 , Str00, Bev00, Lud00
2001	Kaj01d & 01e , Ray01, Sch01, Luf01, Tob01, Sri01, ITIL01
2002	CMMi[©] , Nie02 , Mul02, Vee02, Pom02, Raf02, Sch02, Ker02, Cra02
	and more: CMMi for services, ASL,...



Step by step build S3^M



1 Understand the knowledge area



2 Look in standards to find processes, activities and best practices



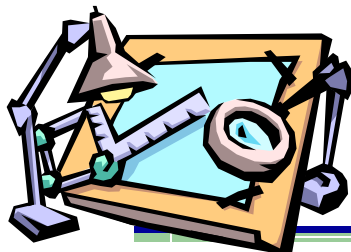
3 Look to Framework and SWEBOK to create domains and KPAs



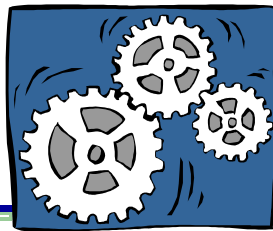
4 Look to Best practice guides and MMs for practice details



5 Build or Refine the model Architecture



6 Find a test site and conduct a trial of the model



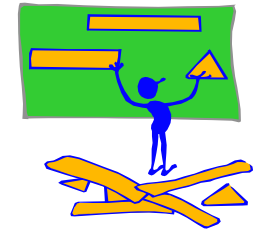
7 Modify model as necessary



8 Review the content with Independent Experts



Sources to build S3^M:



Framework

- ❖ Zitouni/Abramo
- ❖ Maintenance
- ❖ Camélia mod
- ❖ CM³ Correct
- ❖ Maturity Model
- ❖ ITIL
- ❖ IT Service C
- ❖ Cobit
- ❖ Malcolm Bald

CMMI[®] Software Eng. v1.1
Process Area/Specific Practice

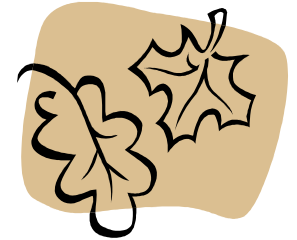
- ❖ ISO/IEC TR 15504 part 2 (Spice)
- ❖ ISO/IEC 12207, Information Technology Software Life Cycle Processes
- ❖ ISO/IEC 14764, Software Engineering, Software Maintenance
- ❖ ISO/IEC 1219, Standard for Software Maintenance
- ❖ ISO9001:2000 (using 90003:2004)

Standards

Best Practice guides
and Maturity Models



Use of CMMi structure in S3^M:

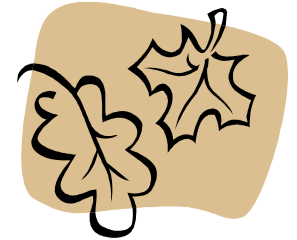


- ❖ Contains the essential elements of effective processes for software related activities
- ❖ Contains a framework that provides the ability to generate multiple models and associated training and assessment materials. These models may represent:
 - ◆ software and systems engineering
 - ◆ integrated 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 documents in S3^M



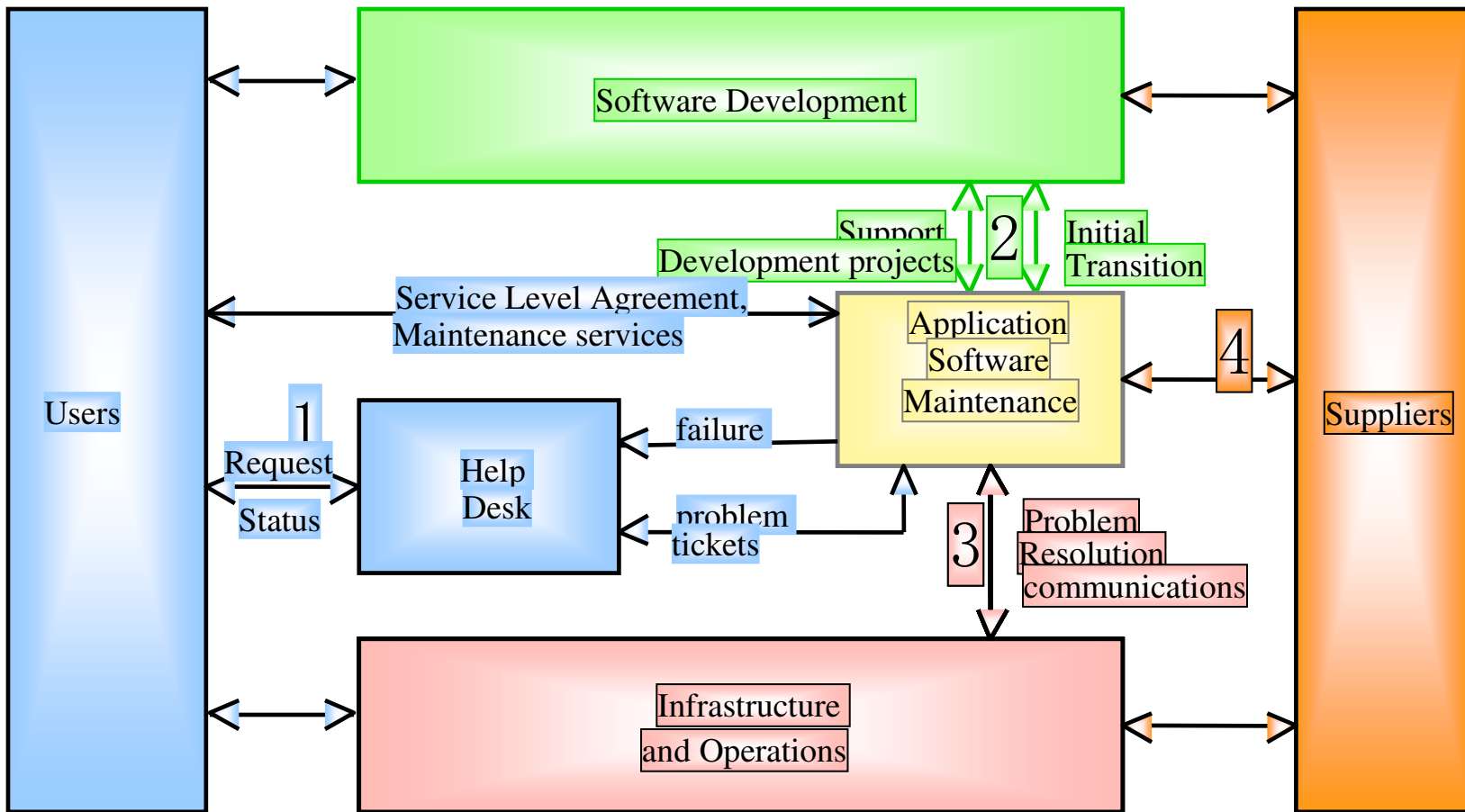
Are consensus-based documents and standards that codify best practice. These documents have seven essential attributes that aid in process engineering.

They:

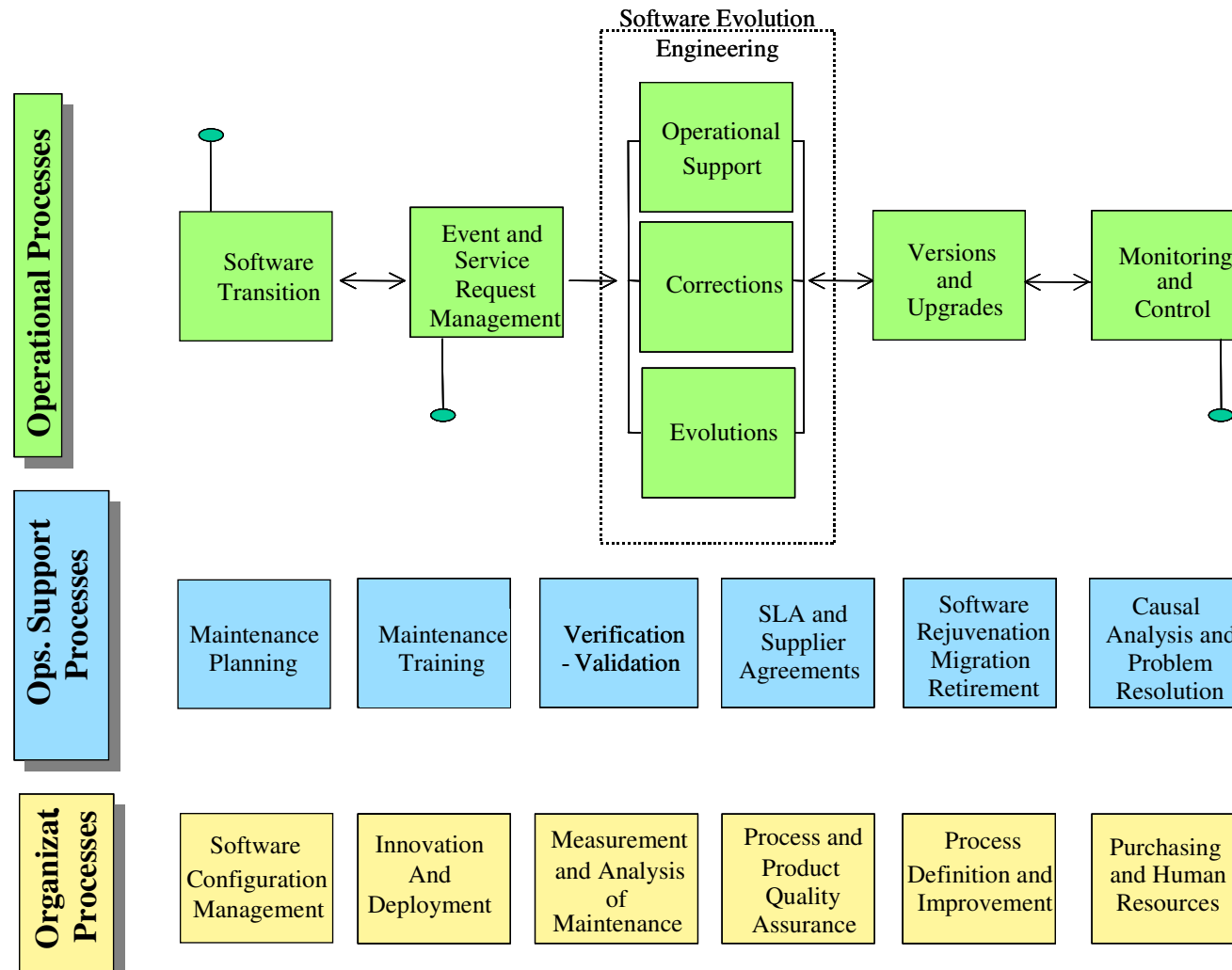
- represent the collected experience of others who have been down the same road;
- tell in detail what it means to perform a certain activity;
- can be attached to or referenced by S3^M;
- help to assure that software engineers have the same meaning for a software maintenance activity;
- increase professional discipline;
- protect the business, client and the buyer,
- Aim to improve the software maintenance products.



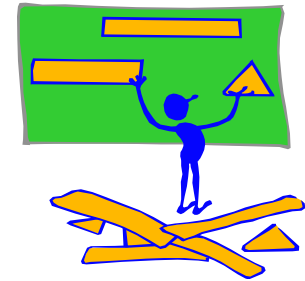
Model Context (Scope)



S3^M Process model



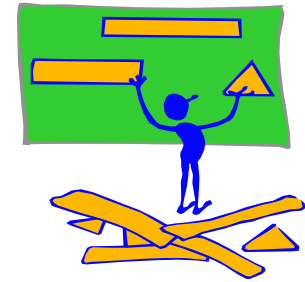
S3^M - Alignment to CMMi



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



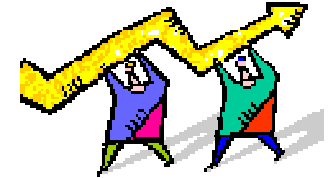
S3^M - Resulting KPA's



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



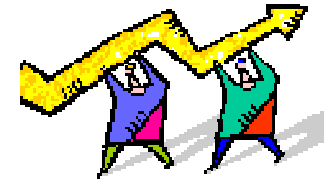
S3^M Architecture by levels



- ❖ Domain
 - ❖ Key Process Area
 - ❖ Maturity Level
 - ❖ Roadmap
 - ❖ Recommended Practice



S3^M - 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



S3^M - Roadmap



Evolution Engineering

- 1- Transition
- 2- Operational Support
- 3- Transition & 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



S3^M in summary



- ❖ Model in numbers
 - ◆ 4 Process Domains
 - ◆ 18 KPA's
 - ◆ 74 Roadmaps
 - ◆ 443 Practices with supporting text and references
- ❖ French book released in 2006, English book will be released next month (Wiley-IEEE)



Current and planned work



- ❖ Agreements with CETIC and SMLab
- ❖ New Gold partnerships with Freescale and IBM Australia finalized;
- ❖ Release of the English Book and S3M website;
- ❖ TRAC+S3M (with SOX compliant process) version release May 2008;
- ❖ ARIS and TIBCO based S3M processes version release in 2008;
- ❖ Training & certification material 2008;
- ❖ Next version underway V3 aligns:
 - ◆ ASL framework discussions considered
 - ◆ CMMI for Services (v0.5) trials finished integration underway
 - ◆ ISO-JTC1-SC7 proposal for S3M process model as part of ISO-15504
 - ◆ Lean & Kaizen for manufacturing trials



S3^M toolset - SM^{assess}



Phase de réponse: choisir les réponses appropriées

D1_K1 | D1_K2 | D1_K3 | D1_K4 | D1_K5 | Analyse | 1

2

Niveau 0	Niveau 2	Niveau 3	Niveau 4
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3

Pratiques: 1.1.0.1

Description: EST-CE QUE LA DÉCLARATION SUIVANTE DÉCRIT VOTRE SITUATION DE TRAVAIL: L'UNITÉ ORGANISATIONNELLE DE MAINTENANCE DU LOGICIEL NE FAIT PAS D'ACTIVITÉ D'AMÉLIORATIONS STRUCTURÉES DES PROCESSUS MENANT À DES AMÉLIORATIONS DE PROCESSUS PERSISTANTES ET CONTRÔLÉES; L'organisation n'a pas de processus de planification et d'amélioration de la qualité et une méthodologie de cycle de vie de la maintenance du logiciel. La direction des technologies de l'information ainsi que les dirigeants de la maintenance du logiciel ne reconnaissent pas qu'il

4

Commentaire de l'évaluateur

OK Abbrécher Observer Hile



S3^M - Toolset- SM^xpert



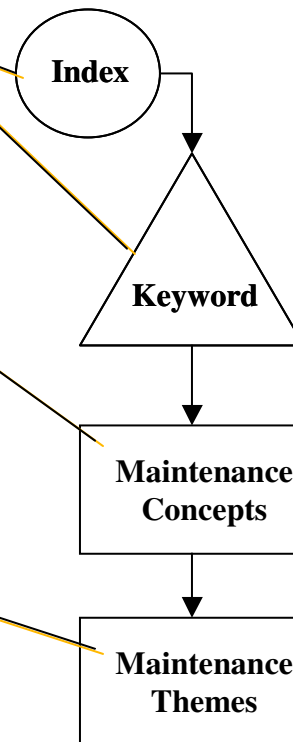
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 - [Are the services/requests planned?](#)
 - [Is the maintenance personnel aware of agreed priorities and flexibl](#)



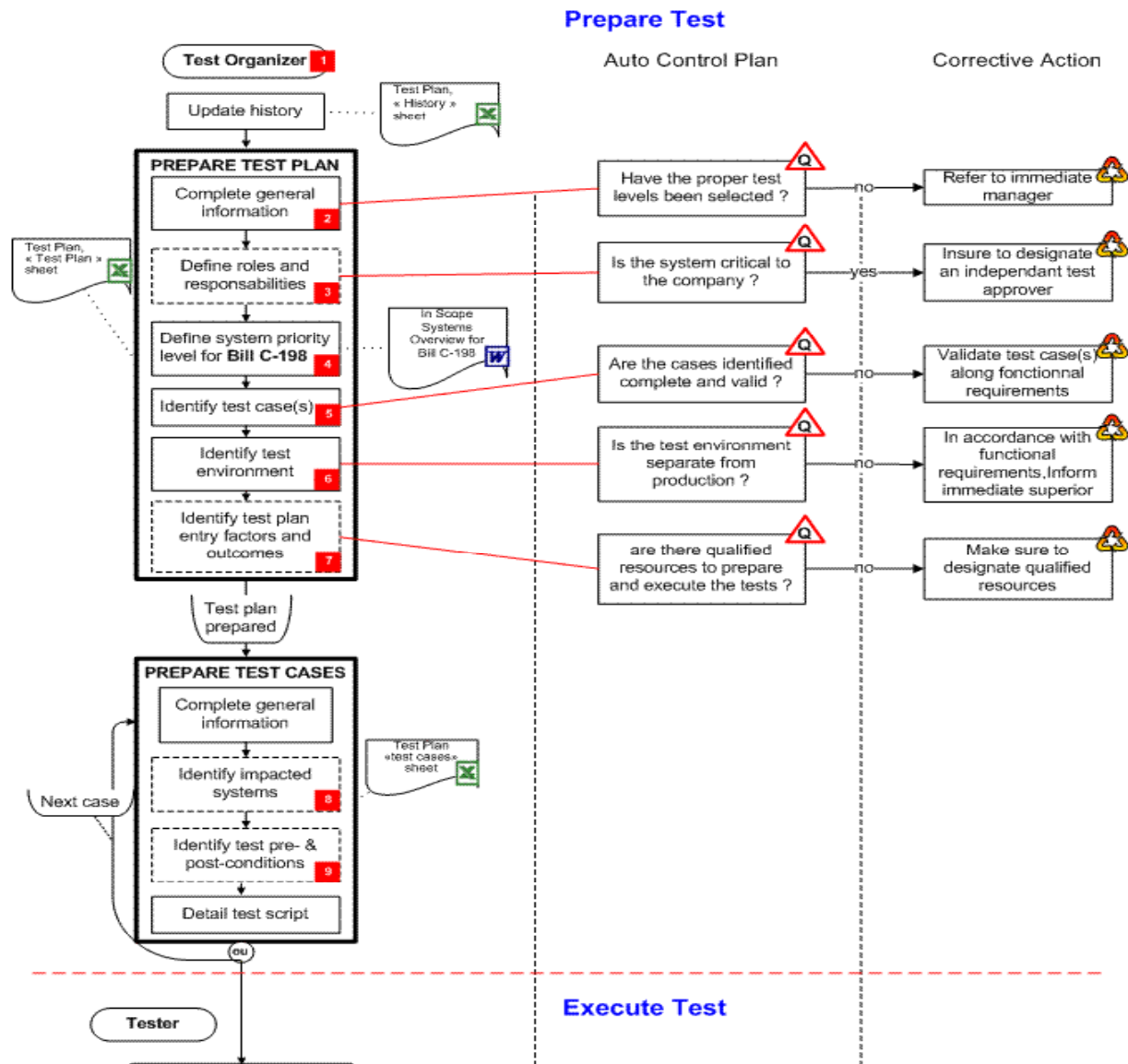
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S3^M - Process Example (for SOX)





Thank
You

