



MANAGING RISK

Organizational Maturity Extension of the SPICE Model (ISO/IEC 15504)



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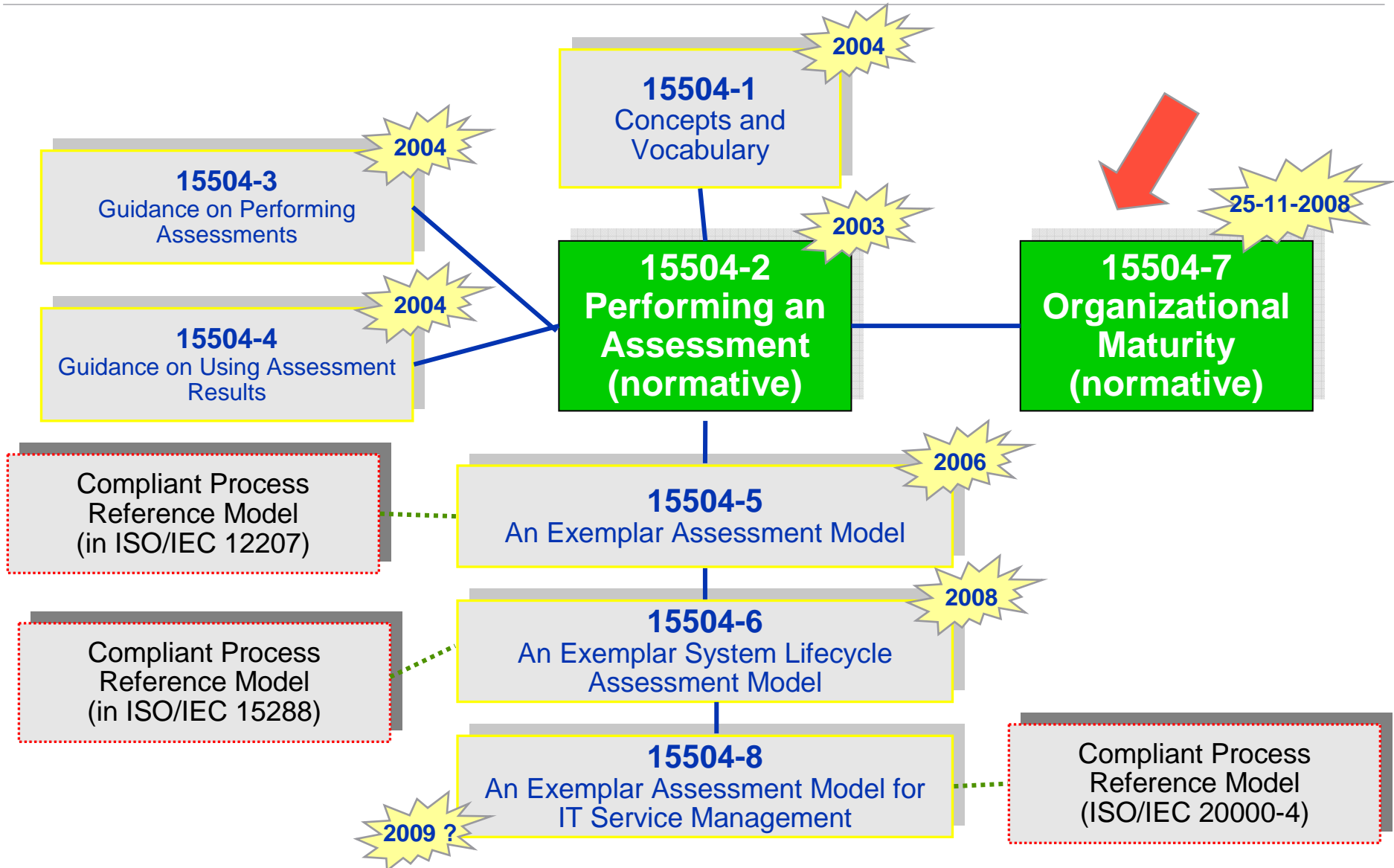
Automotive SPIN Italy – 4° workshop on Automotive Software
Torino (Italy) – 11 dic. 2008

Agenda

- L'evoluzione dello standard ISO/IEC 15504
- Il modello continuous “sposa” il modello staged anche in SPICE
- L'approccio open all'organizational maturity
- SPICY SCAMPI

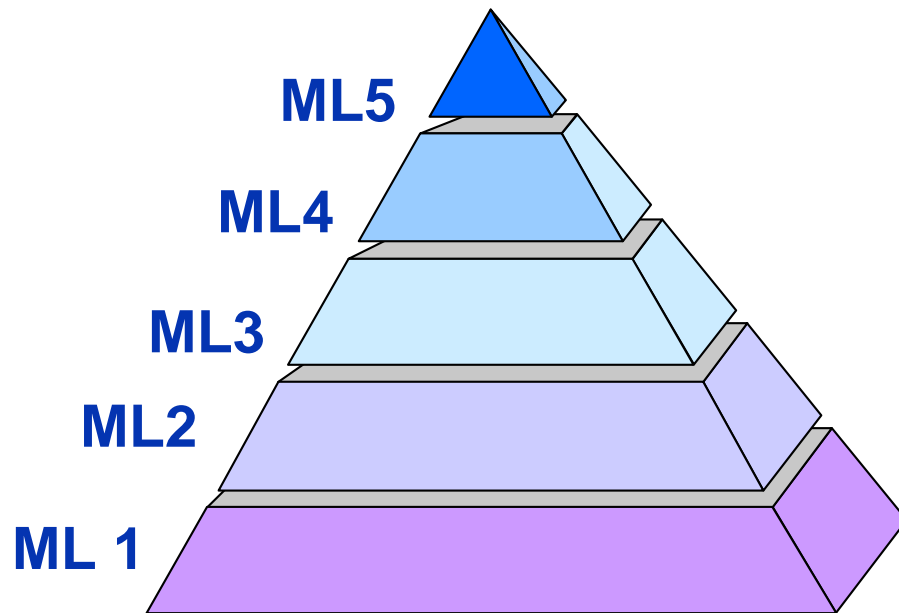


ISO/IEC 15504 today



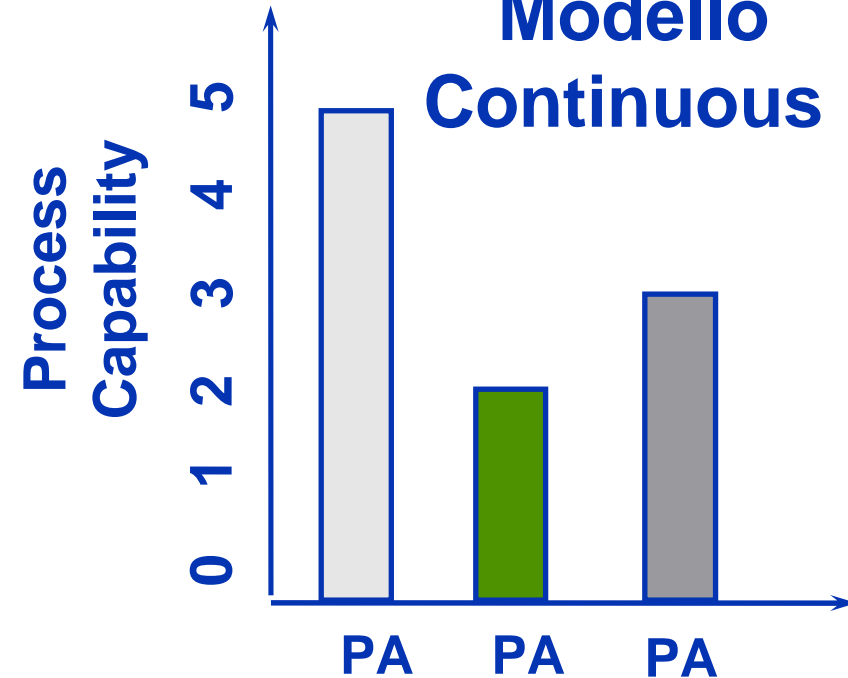
Modelli Staged e Continuous

Modello Staged



...per un insieme prestabilito di processi di una organizzazione

Modello Continuous



...per un singolo processo

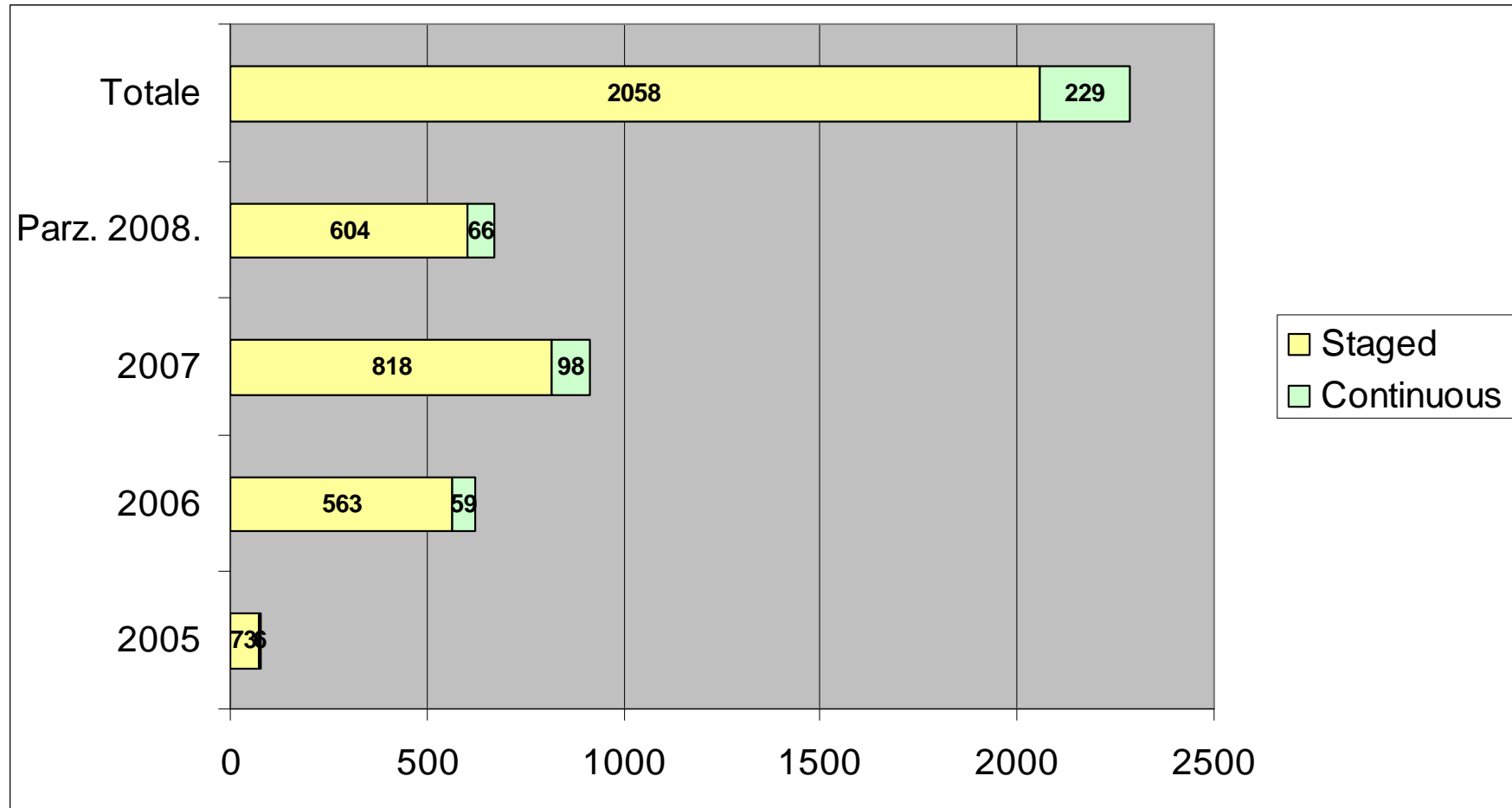
Motivi per la parte 7 della ISO/IEC 15504

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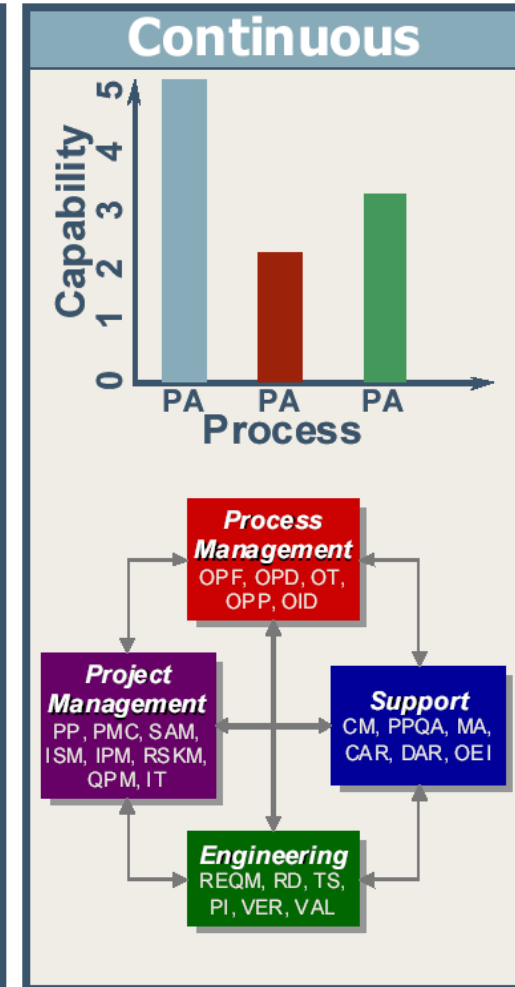
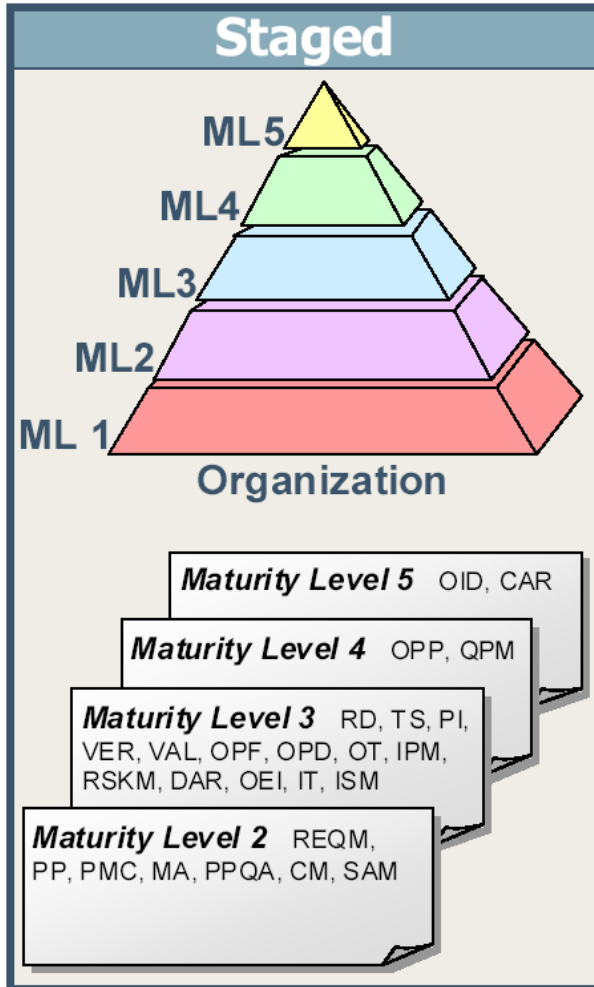
- Modello staged (maturity) rappresentazione preferita negli appraisals CMMI (SPICE solo continuous)
- CMMI ha dimostrato che il modello staged (tradizionale SEI) può integrarsi e coesistere con il modello continuous (derivato da SPICE) attraverso l'equivalent staging
- Modello staged criticato da alcuni esperti per la mancanza del livello 1 (oggi è solo un livello di “default” quando livello 2 non raggiunto)
- Necessità di maggior rigore, affidabilità e verificabilità degli assessment SPICE – requisiti della 15504-2 troppo deboli
- Mantenere comunque l'approccio “open” (in contrasto con CMMI)

Staged vs Continuous (CMMI)



Appraisal registrati presso il SEI (Fonte SEI)

Co-esistenza staged & continuous (CMMI)





Name	Abbr	ML	CL1	CL2	CL3	CL4	CL5
Requirements Management	REQM	2	Target Profile 2				
Project Planning	PP	2					
Project Monitoring and Control	PMC	2					
Supplier Agreement Management	SAM	2					
Measurement and Analysis	MA	2					
Process and Product Quality Assurance	PPQA	2					
Configuration Management	CM	2					
Requirements Development	RD	3	Target Profile 3				
Technical Solution	TS	3					
Product Integration	PI	3					
Verification	VER	3					
Validation	VAL	3					
Organizational Process Focus	OPF	3					
Organizational Process Definition +IPPD	OPD +IPPD	3					
Organizational Training	OT	3					
Integrated Project Management +IPPD	IPM +IPPD	3					
Risk Management	RSKM	3					
Decision Analysis and Resolution	DAR	3					
Organizational Process Performance	OPP	4	Target Profile 4				
Quantitative Project Management	QPM	4					
Organizational Innovation and Deployment	OID	5	Target Profile 5				
Causal Analysis and Resolution	CAR	5					

Equivalent Staging in CMMI



The Concern

- The Maturity Model does not pay attention at an early stage to the importance of “doing a good job”.
- The quality of engineering is not considered as a significant issue.
 - Most engineering concerns are not addressed until Level 3.
- There is an assumption that “engineers do adequate engineering”.

CMMI Users Group, 2004

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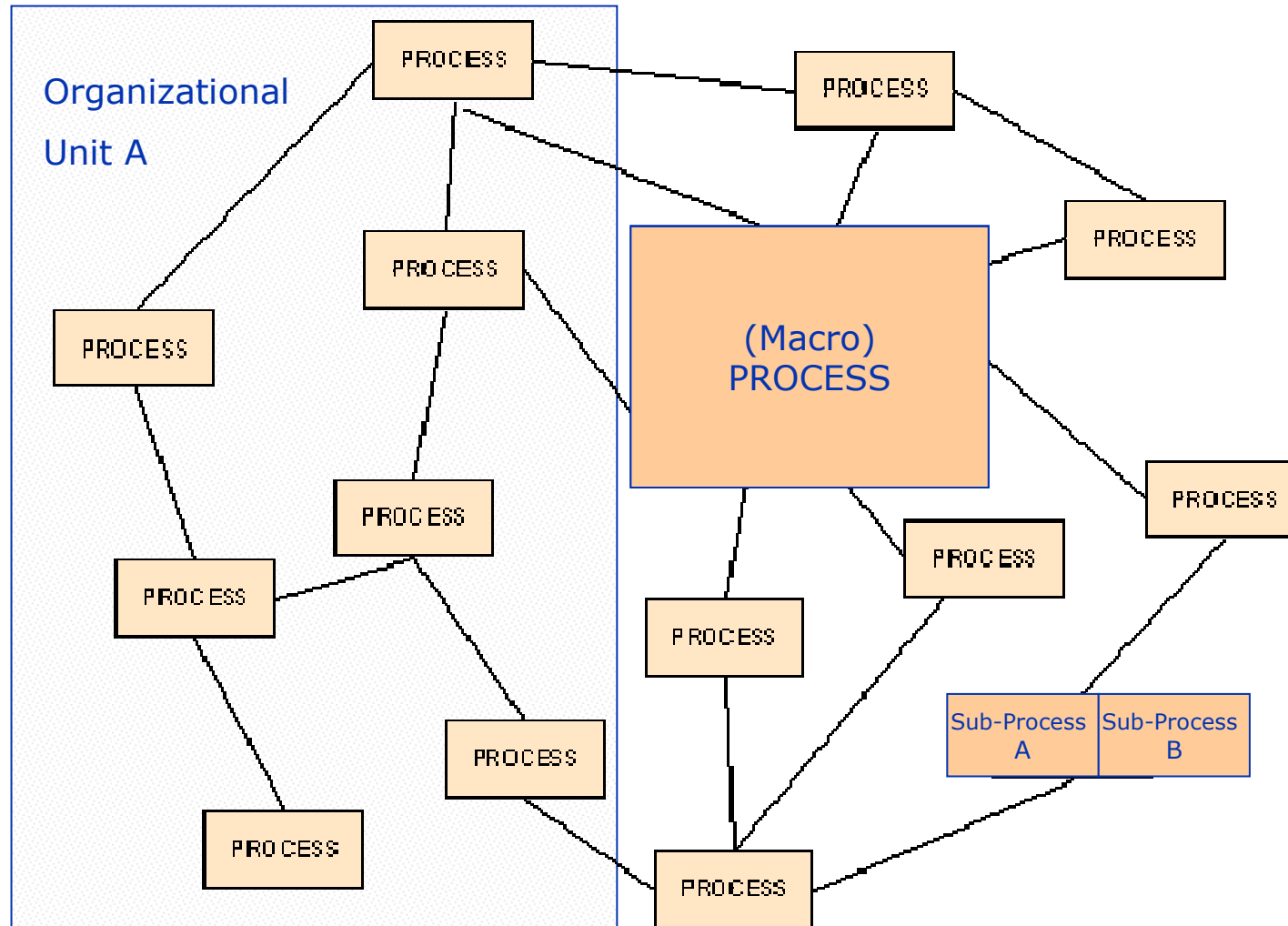
 **Griffith** UNIVERSITY
Fonte: Terry Rout

The Risk

- The aim at Level 2 is to institutionalise the basic management practices.
 - “The ingrained way of doing business that an organization follows routinely as part of its corporate culture.”
- If basic engineering practices are inadequate, the risk is that these may become institutionalised;
 - And therefore resistant to change.

Fonte: Terry Rout

Organization = system of processes



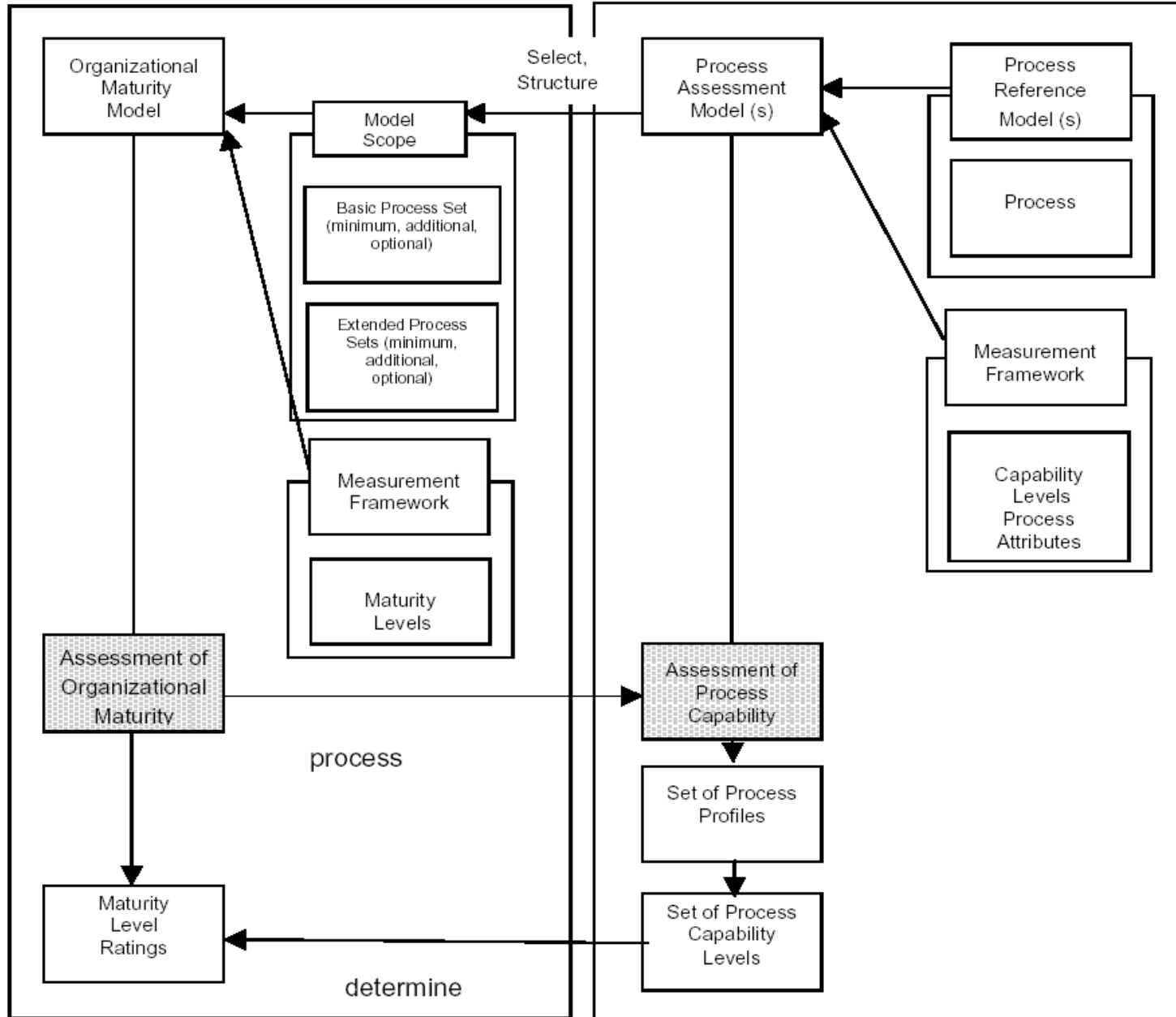
- Organizational Maturity - Una misura di quanto un'organizzazione implementa in modo coerente e sistematico un insieme di processi, all'interno di un ambito applicativo, che contribuisce al raggiungimento degli obiettivi di business (attuali e futuri)
- Organizational Maturity Model – si basa su uno o più Process Assessment Model, e copre il dominio ed il contesto d'uso dei Process Reference Model su cui si basano i Process Assessment Model.
- ISO/IEC 15504-7 definisce un framework per derivare la Maturità Organizzativa, dai profili di capacità dei processi (risultanti da una valutazione dei processi svolto secondo la ISO/IEC 15504-2)

Part 7 Assessment of Organizational Maturity

Part 2 Performing an Assessment



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Esempio di livello 1 (Basic process set)

Exemplar Organizational Maturity Model basato sul PAM ISO/IEC 15504-5

	ML	List of Processes	Minimum Set	Additional processes	
				ID	Conditions (Required or Optional)
Basic Process Set	1	ENG.1 Requirements elicitation ENG.2 System requirements analysis ENG.3 System architectural design ENG.4 Software requirements analysis ENG.5 Software design ENG.6 Software construction ENG.7 Software integration ENG.8 Software testing ENG.9 System integration ENG.10 System testing ENG.11 Software installation ENG.12 Software and system maintenance SPL.2 Product Release	ENG.1 ENG.4 ENG.5 ENG.6 ENG.7 ENG.8 SPL.2	ENG.2	<u>Required</u> where development covers system issues and not exclusively software issues.
				ENG.3	
				ENG.9	
				ENG.10	
				ENG.11	<u>Required</u> where the Organization Unit is responsible for installing the software product in the customer environment.
				ENG.12	<u>Required</u> where the Organization Unit is responsible for ongoing maintenance and evolution of the software and/or system.

Requisiti per un Organizational Maturity Model

*An Organizational Maturity Model relates to a **specified domain of application** or set of related domains of application. The domain of application of the Organizational Maturity Model shall be specified clearly and unambiguously.*

The Organizational Maturity Model shall document the community of interest of the Organizational Maturity Model and the actions taken to achieve consensus within that community of interest:

An Organizational Maturity Model shall be based upon one or more specified Process Assessment Model(s). The Organizational Maturity Model shall specify the elements, drawn from the specified Process Assessment Model(s) that constitute the elements of the Organizational Maturity Model, and the relationships between these elements and the organizational maturity levels specified in Clause 4.1.

An Organizational Maturity Model shall specify a continuous subset of maturity levels defined in the measurement framework for the assessment of organizational maturity, starting with maturity level 1 (through the basic process set), for each of the maturity levels within its scope.

An Organizational Maturity Model shall include a set of elements from the Process Assessment Model(s) constituting the basic process set for the model. The basic process set shall include:

- A minimum set of elements that define Level 1 maturity for all assessments based on the model;*
- Additional elements that are required for assessments in particular domains or scope of application; and*
- Additional elements that are optional depending on the particular circumstances of the organization.*

The model shall include specifications of the particular circumstances for inclusion of the additional processes in the basic process set, and an indication of how the use of additional processes is to be reflected in the published assessment record. The model shall define, through reference to the established mapping of the Process Assessment Model(s), the processes from relevant Process Reference Model(s) that constitute the basic process set.

Extended Process Set

An Organizational Maturity Model shall include sets of elements constituting the extended process sets for each maturity level addressed by the model. The extended process sets shall include:

- A minimum set of elements that define the specified level of Maturity for all assessments based on the model;*
- Additional elements that are required for assessments with particular scope of application; and*
- Additional elements that are optional depending on the particular circumstances of the organization.*

The model shall include specifications of the particular circumstances for inclusion of the additional processes in the extended process set, and an indication of how the use of additional processes is to be reflected in the published assessment record. The model shall define, through reference to the established mapping of the Process Assessment Model(s), the processes from relevant Process Reference Model(s) that constitute each extended process set.

Exemplar Organizational Maturity Model



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Basic Set



Extended Sets



	ML	List of Processes	Minimum Set	Additional processes	
				ID	Conditions (Required or Optional)
Basic Process Set	1	ENG.1 Requirements elicitation ENG.2 System requirements analysis ENG.3 System architectural design ENG.4 Software requirements analysis ENG.5 Software design ENG.6 Software construction ENG.7 Software integration ENG.8 Software testing ENG.9 System integration ENG.10 System testing ENG.11 Software installation ENG.12 Software and system maintenance SPL.2 Product Release	ENG.1 ENG.4 ENG.5 ENG.6 ENG.7 ENG.8 SPL.2	ENG.2	Required where development covers system issues and not exclusively software issues.
				ENG.3	
Basic Process Set	1			ENG.9	Required where the Organization Unit is responsible for installing the software product in the customer environment.
				ENG.10	
Basic Process Set	1			ENG.11	Required where the Organization Unit is responsible for ongoing maintenance and evolution of the software and/or system.
				ENG.12	
Extended Process Sets	2	SUP.1 Quality Assurance SUP.2 Verification SUP.3 Validation SUP.4 Joint Review SUP.7 Documentation SUP.8 Configuration Management SUP.9 Problem Resolution Management SUP.10 Change Request Management MAN.3 Project Management MAN.5 Risk Management ACQ.3 Contract Agreement ACQ.4 Supplier Monitoring ACQ.5 Customer Acceptance SPL.3 Product Acceptance Support	SUP.1 SUP.2 SUP.7 SUP.8 SUP.9 SUP.10 MAN.3 MAN.5	ACQ.3	Required where external or internal suppliers of product components, services or infrastructure are involved in the development projects.
				ACQ.4	
				ACQ.5	
				SUP.3	Required where confirmation of fitness for use of the work products is the responsibility of the Organization Unit.
Extended Process Sets	2			SUP.4	Optional where the work in the Organization Unit involves agreements with stakeholders.
				SPL.3	Optional where the work in the Organization Unit involves product acceptance support.
Extended Process Sets	3	RIN.1 Human Resource Management RIN.2 Training RIN.3 Knowledge Management RIN.4 Infrastructure PIM.1 Process Establishment PIM.2 Process Assessment PIM.3 Process Improvement MAN.2 Organization Management MAN.4 Quality Management MAN.6 Measurement SUP.5 Audit REU.1 Asset Management REU.2 Reuse Program Management REU.3 Domain Engineering	RIN.1 RIN.2 RIN.3 RIN.4 PIM.1 PIM.2 PIM.3 MAN.2 MAN.4 MAN.6 SUP.5	REU.1	Optional if the Organization Unit has a structured reuse program in force - the three processes are mutually reinforcing.
				REU.2	
Extended Process Sets	3			REU.3	
Extended Process Sets	4	QNT.1 Quantitative Performance Management			
Extended Process Sets	5	QNT.2 Quantitative Process Improvement			

Minimum Set

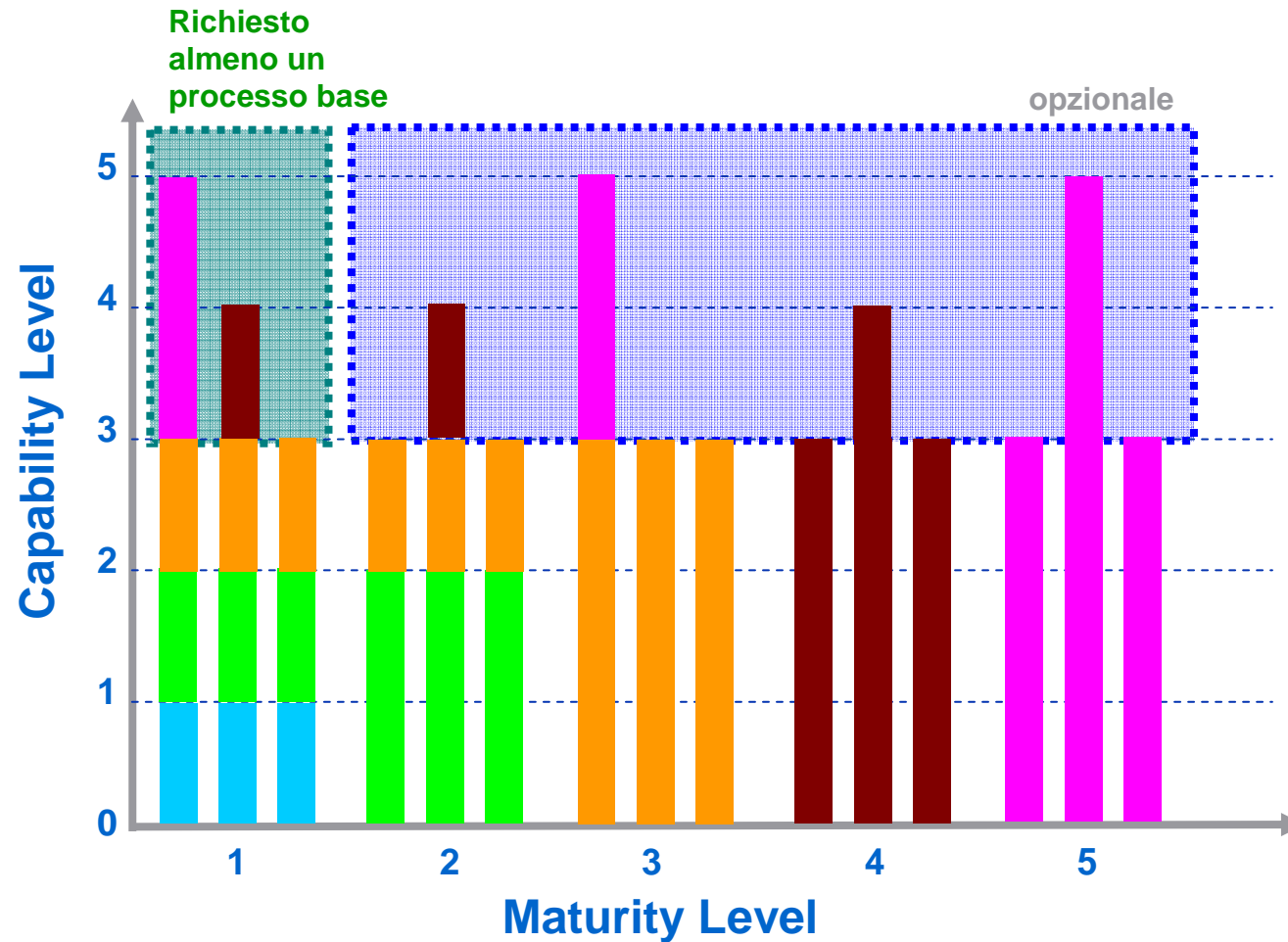
Additional Processes

High Maturity Levels (4 and 5):

QNT.1 Quantitative Performance Management

QNT.2 Quantitative Process Improvement

Regole per determinare il livello di maturità



SPICY SCAMPI ??



Introduzione di maggior rigore negli assessment SPICE

Assessment Type

	Type A	Type B	Type C	Type D
Body performing the assessment	The body performing the assessment is independent of the organization being assessed		The body performing the assessment is part of the organization being assessed	The body performing assessment may or may NOT be independent of the organization being assessed
Competent assessor	Independent of the organization being assessed	Independent of the organization being assessed	Adequate separation of responsibilities from personnel in other functions	Need NOT be independent of the organization being assessed
Assessors (other than competent assessor)		May be from the organization being assessed provided clear separation of the responsibilities of the assessors from personnel in other functions		

■ Classe 1

- Alto livello di affidabilità - adatto per benchmarking con altre organizzazioni
- Derivazione di conclusioni affidabili circa punti di forza/debolezza
- Utilizzabile per: process improvement, benchmarking esterno e capability determination

■ Classe 2

- Adatto per benchmarking interno tra diverse Unità Organizzative o linee di prodotto
- Conclusioni affidabili circa opportunità di miglioramento e rischi di processo
- Utile per assessment iniziale nell'ambito di un programma di miglioramento

■ Classe 3

- Risultati di carattere generale che possono indicare opportunità critiche di miglioramento e rischi chiave correlati ai processi
- Adatto per assessment di monitoraggio in un programma di miglioramento o per l'identificazione degli elementi chiave per successivi assessment di classe superiore

How SPICY do you want your SCAMPI ?

Classe \ Requisito	Classe 1	Classe 2	Classe 3
Numero minimo istanze di processo	4	2	Nessun vincolo
Num. minimo di assessor (compreso competent)	2 Competent assessor indipendente	2	1
Tipo di evidenza	Work products + Testimonianza	Work products + Testimonianza	Nessun vincolo
Rating	Outcomes per ogni istanza (F,L,P,N) Attributi per ogni istanza(F,L,P,N) Attributi globale (F,L,P,N) Livello di Capability	Attributi globale (F,L,P,N) Livello di Capability	Attributi globale (F,L,P,N) Livello di Capability
Document & Reporting weakness/gaps	SI	SI	Non richiesto

Requisiti per la raccolta di evidenze (Classe 1 & 2)

Process Attribute	Process Instance 1	Process Instance 2	Process Instance 3	Process Instance 4	
PA 1.1	Work product	Testimony	Work product	Testimony	For each process attribute there shall be both work product evaluation and testimony (5.2.3.2.a).
PA 2.1	Testimony	Work product & Testimony	Work product	Testimony	
PA 2.2	Work product	Testimony	Testimony	Testimony	
PA 3.1	Work product	Work product	Testimony	Testimony	
PA 3.2	Work product	Work product	Work product & Testimony	Work product	
	Each process instance shall include both work product evaluation and testimony (5.2.3.2 b)				

Nuovo progetto di norma appena approvato:

ISO/IEC 29169

“The application of conformity assessment methodology to process capability and organizational maturity”

Co-editors: Terry Rout (Australia) -Tony Coletta (Italy)

Domande ?

