

Kontrola kvaliteta

Dr Tomo Popović

Upravljanje informacionim tehnologijama
UDG



Quality Assurance

- U opštem smislu, **sve aktivnosti i metode za nadgledanje procesa implementacije IT rješenja i postizanje željenog kvaliteta**

Quality Assurance

- Quality Management System ISO 9001
- Agilne metode i QMS
- Capability Maturity Measurement Integration CMMI
- ISO 9001 vs. CMMI
- Relevantni standardi

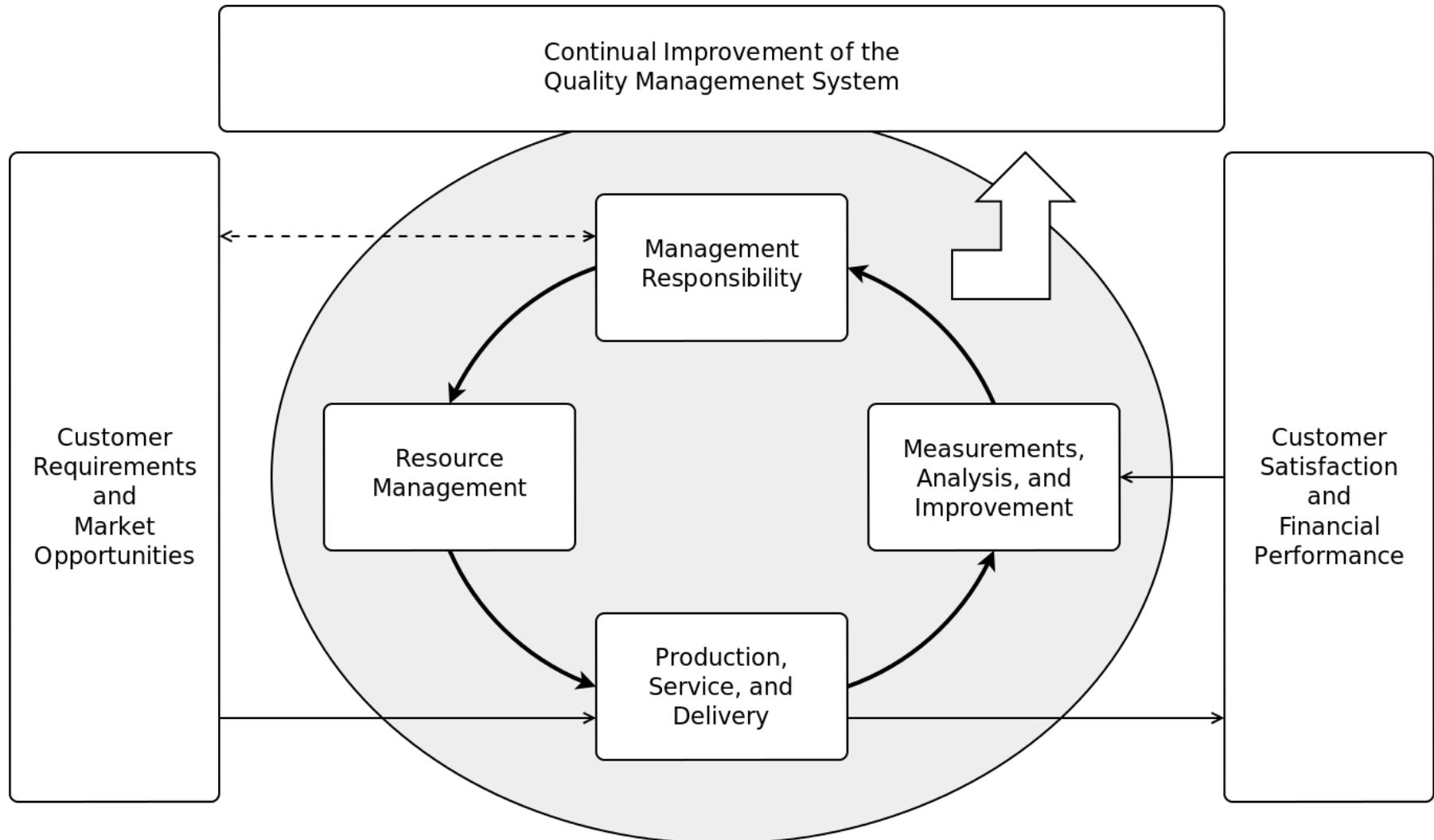
Quality Management System

- ISO 9001 standard
- Za firme koje prave **proizvode** ili pružaju **usluge**
- IT projekti i rješenja se nekad mogu smatrati **proizvodom**, ali i **uslugom**
- ISO9001 je **kompatabilan** sa IT procesima i metodama

QMS – ISO 9001 principi

- Customer focus
- Leadership
- Engagement of people
- Process approach
- Improvement
- Evidence-based decision making
- Relationship management

QMS – ISO 9001 koncept



QMS – 9001 dokumenti

- Quality Manual, definition of the quality policy and objectives (4.2.2),
- Control of Documents (4.2.3),
- Control of Records (4.2.4),
- Internal Audits (8.2.2),
- Control of Nonconforming Product / Service (8.3),
- Corrective Action (8.5.2),
- Preventive Action (8.5.3).

QMS – Quality Manual

- Glavni dokument
- Definiše vrstu aktivnosti, procese i metriku od interesa za uspostavljanje QMS

QMS – ostali dokumenti

- Definišu kontrolu dokumenata, zapisa, internog odita (audit), nezadovoljavajućeg proizvoda ili usluge
- Ključni su kontrola i upravljanje
 - Preventivnim akcijama
 - Korekcionim akcijama
- Korišćenje softverskih alata i automatizovanje gde je moguće (Issue tracking)

Agilne metode i QMS

- Usvojiti neki od agilnih procesa – Scrum
- Definisati vrstu proizvoda ili usluge
 - Procesni dijagram
- Identifikovati izuzeće uz opravdanje
- Razvoj 7 obaveznih dokumenata
- Implementacija QMS-a
 - Sastanci
 - Kontinualno nadgledanje i dokumentovanje

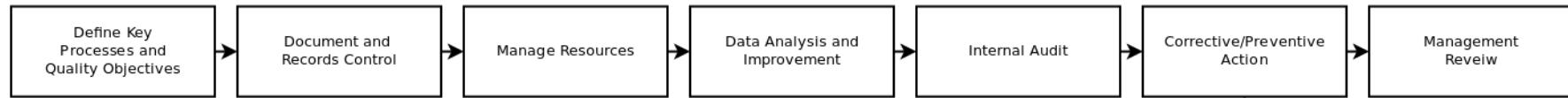
Agilne metode i QMS

- Postoji mišljenje da je kontradiktorno - **pogrešno**
- Dokumentacija se može minimizovati i **automatizovati**
- Treba napraviti **preklapanje** između agilnih metoda i QMS zahtjeva

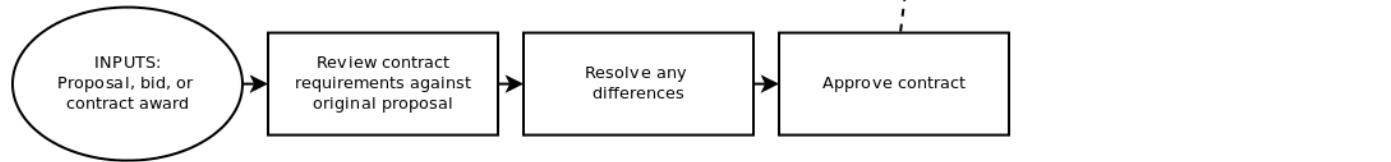
QMS – usluga pravljenja softvera

Company ABC

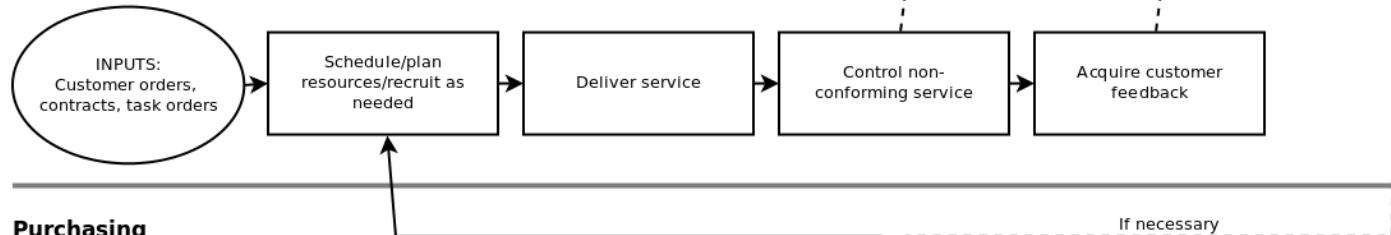
Quality Management



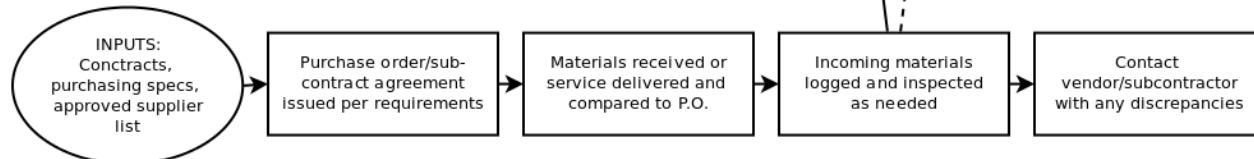
Contract Management



Service Delivery



Purchasing



QMS - dokumentovanje izuzeće

Exclusion	Justification
7.5.2 Validation of processes for production and service provision	The company does not have any processes where deficiencies become apparent only after the product is in use
7.5.5 Preservation of product	The company does not have any service deliverable with limited shelf-life or where special handling techniques are needed to preserve the product
7.6 Control of monitoring and measuring equipment	The company does not use any equipment to monitor and measure processes for products delivered to the customer

QMS – ISO 9001 i Scrum

- Definition of Ready
 - Checklist
- Definition of Done
 - Checklist
 - Zavisi od **tipa** industrije

QMS vs. Scrum

- **Kontinualno** nadgledanje i minimalno dokumentovanje
- **Ključ** je upotreba softverskih alata:
 - Scrum management tools
 - Product backlog, Sprint backlog
 - Meeting minutes
 - Testing tools
 - Test specifications, reports
 - Issue tracking
 - Issue occurrence, description, fixing

QMS – ISO 9001 vs. Scrum

Requirement	Reference/Artefact(s)	Comment
Management Reviews (5.6.1)	Quality Manual	Agenda/minutes
Education, Training, Skills and Experience (6.2.2e)	Quality Manual	Scrum training certificates, Scrum materials, ISO 9000 materials (kit and videos)
Evidence that realization process and product meet requirements (7.1d)	Product backlog, Sprint backlog, Burn-down charts	Definition of done*
Requirements Review results (7.2.2)	Product backlog, Sprint backlog	Definition of done*
Design Inputs (7.3.2)	Product backlog	
Design Review results (7.3.4)	Product backlog, Sprint backlog	Definition of ready*
Design Verification results (7.3.5)	Sprint backlog, Burn-down charts	Definition of done*
Design Validation Results (7.3.6)	Sprint backlog, Burn-down charts	Definition of done*, Acceptance tests*
Design Change Reviews (7.3.7)	Product backlog, Sprint backlog	Definition of ready*
Validation of (Special) Processes(7.5.2d)	Exclusion	
Basis for Calibration (where not traceable to standards) (7.6 a)	Exclusion	
Calibration results (7.6)	Exclusion	
Validity of Previous Measurements when Equipment found out of Calibration (7.6)	Exclusion	
Audit results (8.2.2)	Quality Manual	Internal audit schedule, Internal audit checklist, Internal audit form
Evidence of Product Conformity, Acceptance Criteria and Release Authority (8.2.4)	Sprint backlog, Burn-down charts	Definition of done*, Acceptance tests*
Nature of Nonconformities, Subsequent Actions including Concession (8.3)	Sprint backlog, Burn-down charts	Documenting bugs or deficiencies as items in Sprint backlog; use of issue tracking tools
Results of Corrective Actions (8.5.2e)	Quality Manual, Sprint backlog, Burn-down charts	CAPA forms; successfully implemented using issue tracking tools*
Results of Preventive Actions (8.5.3d)	Quality Manual, Sprint backlog, Burn-down charts	CAPA forms; successfully implemented using issue tracking tools*

*Note: additional artefacts that need to be archived

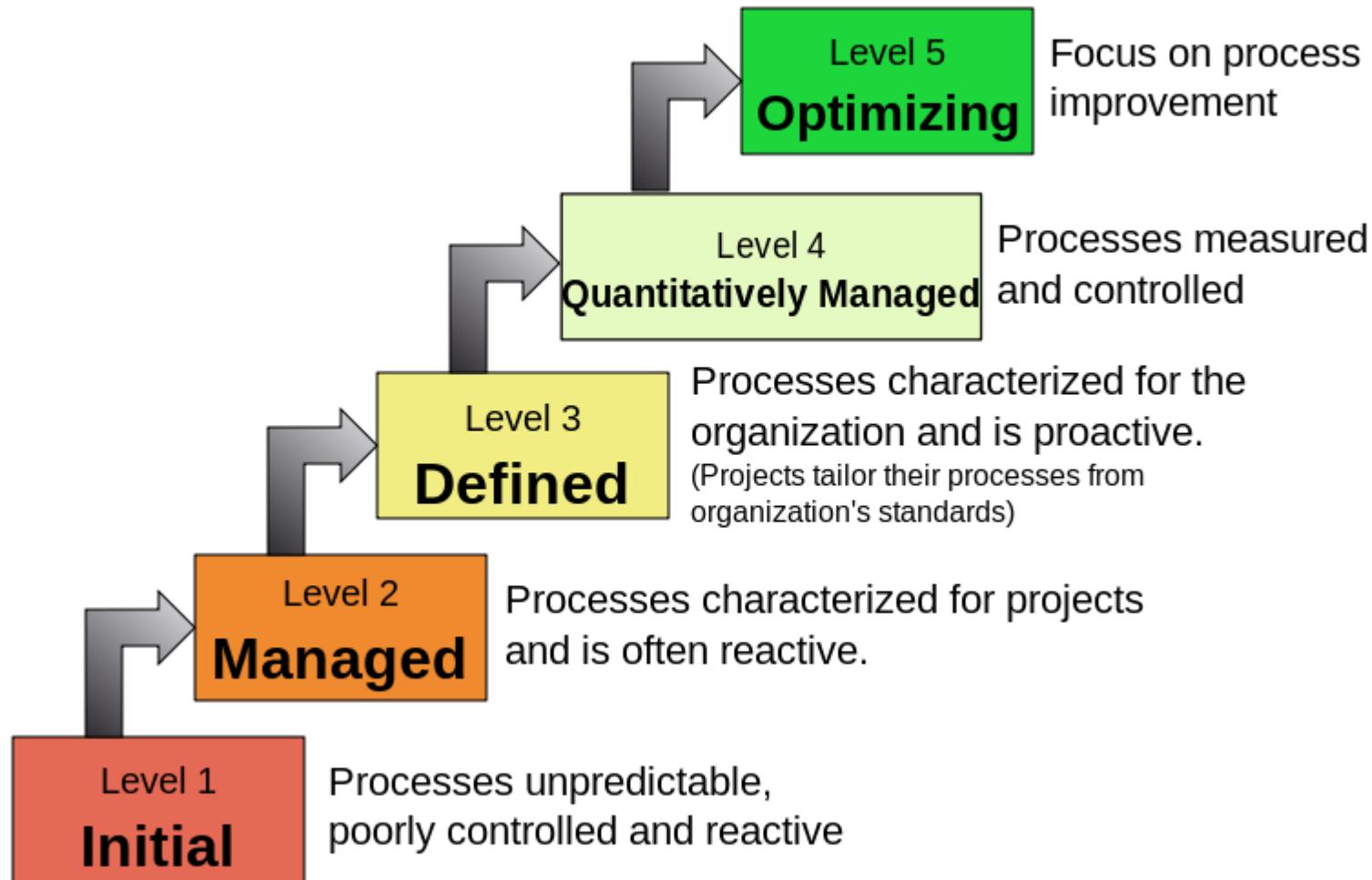
Capability Maturity Model Integration (CMMI)

- **Evoluirao** od skupa najboljih metodologija
- Inicijalni fokus na velike firme koje **razvijaju softver**
- Kako pravilno implementirati procese i metodologije da se **poboljša uspješnost IT projekata**
- **CMMI model** adresira više **oblasti** na koje se firma može fokusirati sa ciljem da poboljša svoju uspješnost

CMMI

- Fokusira se na ciljeve
- Procesne oblasti su preporučene, ali ne obavezne
- Postavljeni ciljevi postaju obaveza tj. izbor metodologije kojom se postiže cilj
- Radi se procjena zrelosti po različitim oblastima, prati se napredak
- Ključ je da se uspostavi **predvidljivost** i **ponovljivost** kvaliteta

CMMI evaluacija



CMMI vs. ISO 9001

- ISO 9001 je uopšteniji nego CMMI, primjenljiv je na sve organizacije, a CMMI na softverske
- Certification in ISO 9001 vs. Appraisal (not the same concept)
- ISO 9001 poznaje koncept zrelosti, ali se najčešće ne primjenjuje
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ISO 9001 vs. CMMI

Table 3: *Summary Comparison of the Content Relationships Between the Major Clauses of ISO 9001 and the CMMI-DEV, V1.2 Process Categories*

	Process management	Project management	Engineering	Support	Quality Management System (4)	Management Responsibility (5)	Resource Management (6)	Product Realization (7)	Measurement, Analysis and Improvement (8)
Process management									
Project management									
Engineering									
Support									

Izvor: An Initial Comparative Analysis of the CMMI Version 1.2 Development Constellation and the ISO 9000 Family

ISO 9001 vs CMMI

Table 4: Detailed Comparison of how Major Clauses of ISO 9001 Overlap with the CMMI-DEV, V1.2 Generic Practices

CMMI-DEV, V1.2 Generic Practices	ISO 9001:2000 Sections				
	Quality Management System (4)	Management Responsibility (5)	Resource Management (6)	Product Realization (7)	Measurement, Analysis and Improvement (8)
Perform Specific Practices (1.1)					
Establish an Organizational Policy (2.1)					
Plan the Process (2.2)					
Provide Resources (2.3)					
Assign Responsibility (2.4)					
Train People (2.5)					
Manage Configurations (2.6)					
Identify and Involve Relevant Stakeholders (2.7)					
Monitor and Control the Process (2.8)					
Objectively Evaluate Adherence (2.9)					
Review Status with Higher Level Management (2.10)					
Establish a Defined Process (3.1)					
Collect Improvement Information (3.2)					
Establish Quantitative Objectives for the Process (4.1)					
Stabilize Subprocess Performance (4.2)					
Ensure Continuous Process Improvement (5.1)					
Correct Root Causes of Problems (5.2)					

Izvor: An Initial Comparative Analysis of the CMMI Version 1.2 Development Constellation and the ISO 9000 Family

Relevantni standardi

- ISO 9001
- CMMI 1.3
- ISO/IEC 33001
- ISO/IEC TR 19759:2005
- IEEE Software Life Cycle, SWEBOK v3
- ...

Zaključak

- Kontrola kvaliteta, uspostavljanje QMS
- ISO 9001
- Agilne metode i ISO9001
- CMMI model
- Uspostavljanje ponovljivosti kvaliteta
- Povećanje vidljivosti kompanije, kvalifikacija za određene vrste poslova

Resursi i literatura

- Software Engineering Body of Knowledge (SWEBOK), ISO/IEC TR 19759:2005
- Software Engineering Body of Knowledge SWEBOK v3, IEEE, 2014
- ISO 9001 standard
- CMMI standard
- An Initial Comparative Analysis of the CMMI Version 1.2 Development Constellation and the ISO 9000 Family, SEI Report, 2009