

МУК 2016/2017:

Модели за управление на качеството.
[Курс на базата на CMMI]

Software Quality Models
[CMMI based course]

REQM – Requirements Management

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www.esicenter.bg

Информация, източници:

www.esicenter.bg >> general info and in "Resources"

links to CMMI models

<http://cmmiinstitute.com/cmmi-solutions/>

<http://www.sei.cmu.edu/cmmi/tools/index.cfm>

CMMI –DEV v 1.3 model (CMMI Institute, and SEI, Carnegie Mellon University)

<http://cmmiinstitute.com/resource/cmmi-for-development-version-1-3/>

www.sei.cmu.edu/reports/10tr033.pdf

General

www.sei.cmu.edu

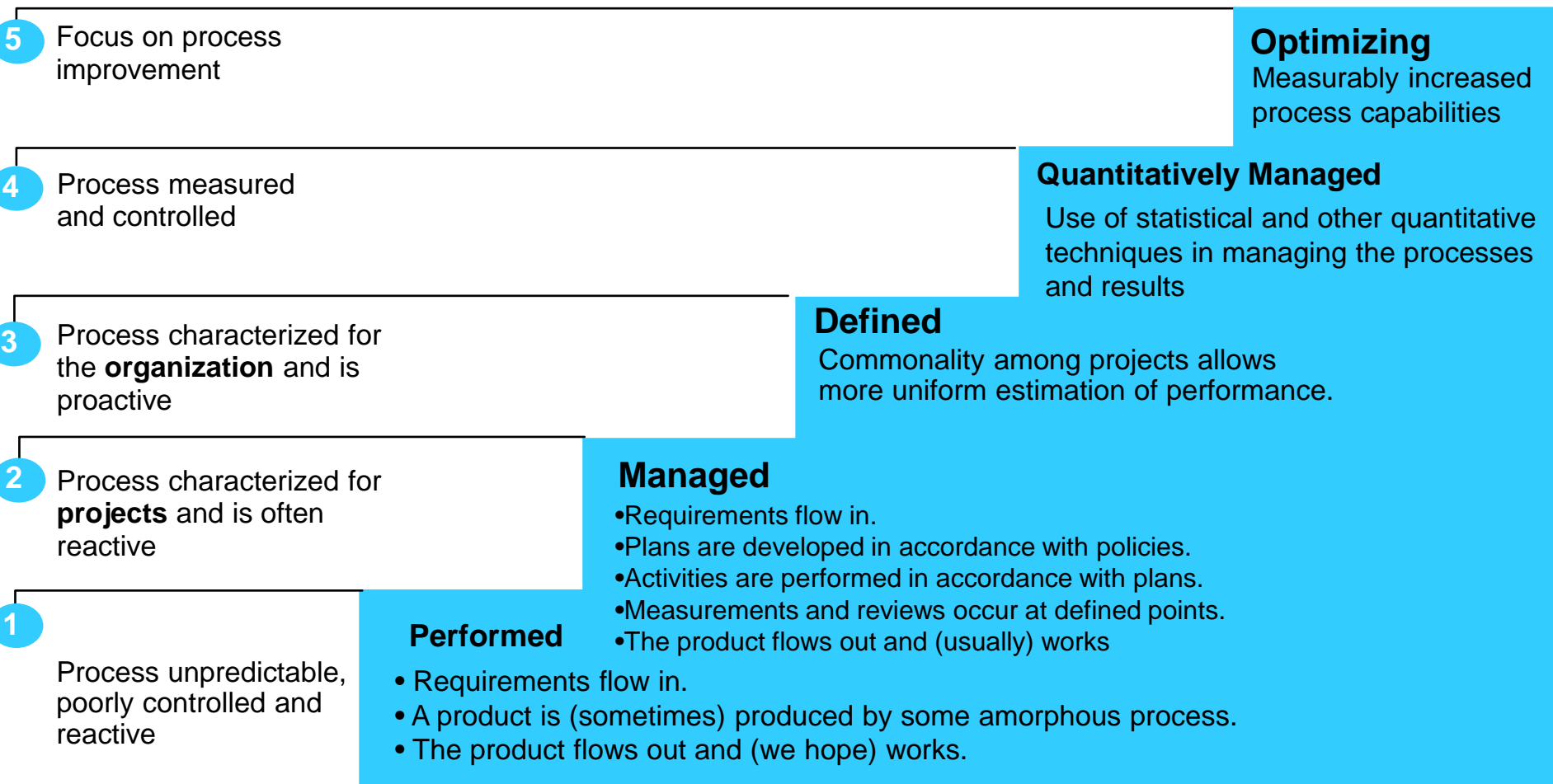
www.cmmiinstitute.com

Къде сме?

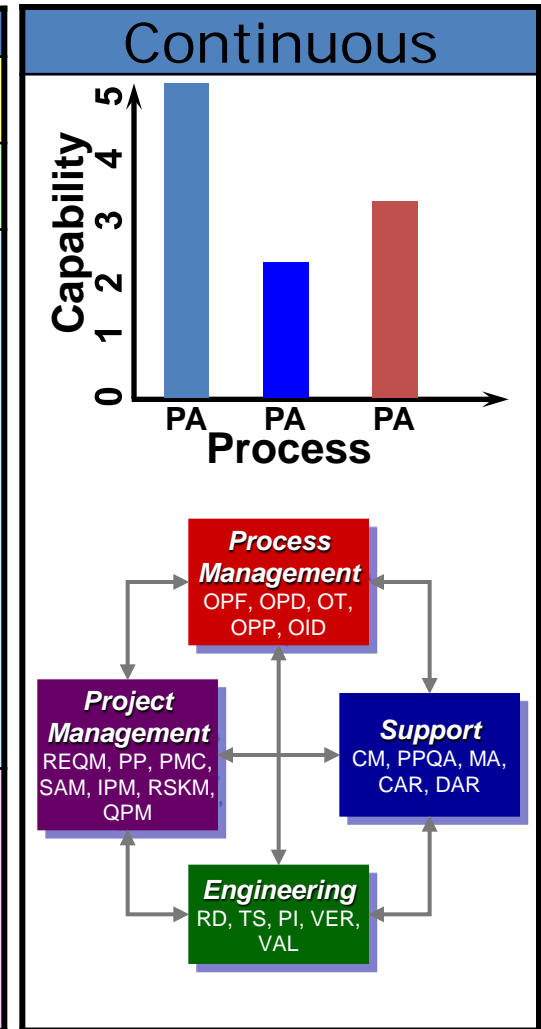
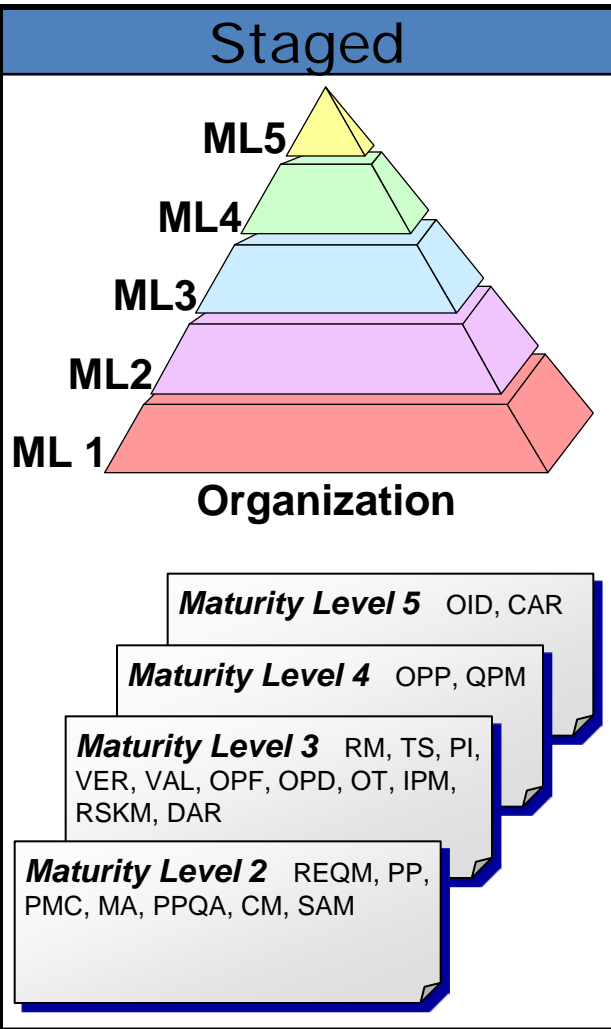
1	Увод в управление на качеството. Компоненти и цена на качеството. Процеси. Преглед на моделите за управление на качеството и подобряване на процесите. Методи за оценка на зрелостта на ИТ-интензивни и софтуерни организации. Стратегически карти/Балансирана система от показатели (balanced ScoreCards).
2	Модел CMMI (ver 1.3). История, внедряващи организации. Обща структура. Процесни области. Генерични и специфични цели и практики. Презентации – Maturity/Capability нива на Continuous и Staged representations. Категории процесни области: Process Management, Project Management, Engineering, Support.
3	Процесни области от ниво 2 на CMMI. Детайлно представяне на: REQM – Requirements Management PP – Project Planning MA – Measurement and Analysis PPQA – Process and Product Quality Assurance CM – Configuration Management PMC – Project Monitoring and Control Преглед на: SAM-Supplier Agreement Management
4	Процесни области от ниво 3 на CMMI. Детайлно представяне на: RD – Requirements Development VAL - Validation VER - Verification RSKM - Risk Management TS - Technical Solution Преглед на: DAR - Decision Analysis and Resolution , IPM - Integrated Project Management , OPD - Organizational Process Definition , OPF - Organizational Process Focus, OT - Organizational Training , PI - Product Integration Преглед на Maturity Level 4 и 5. Обобщение на връзките между процесните области: Tying all together
5	Внедряване на програма за подобряване на процесите на база CMMI. Адаптирани подходи – Agile CMMI, CMMI/ISO. Нови модели CMMI – CMMI for Services, CMMI for Acquisition. Оценка (SCAMPI), роли.
6	Подобряване на процесите в малки фирми – IT Mark. Компоненти на зрелостта – бизнес, организация/процеси, информационна сигурност. Оценка на нивото и план за подобрения.

CMMI (SEI/CMU) – reference model or **de facto** industrial standard

CMMI-DEV, CMMI-ACQ, CMMI-SVC



Remember: CMMI Representations



ML2 GG&GPs

GG2: Institutionalize a Managed Process

What should be applied to all PAs (from ML2 and up):

GP2.1: Establish an Organizational Policy

GP2.2: Plan the Process

GP2.3: Provide Resources

GP2.4: Assign Responsibility

GP2.5: Train People

GP2.6: Control Work Products

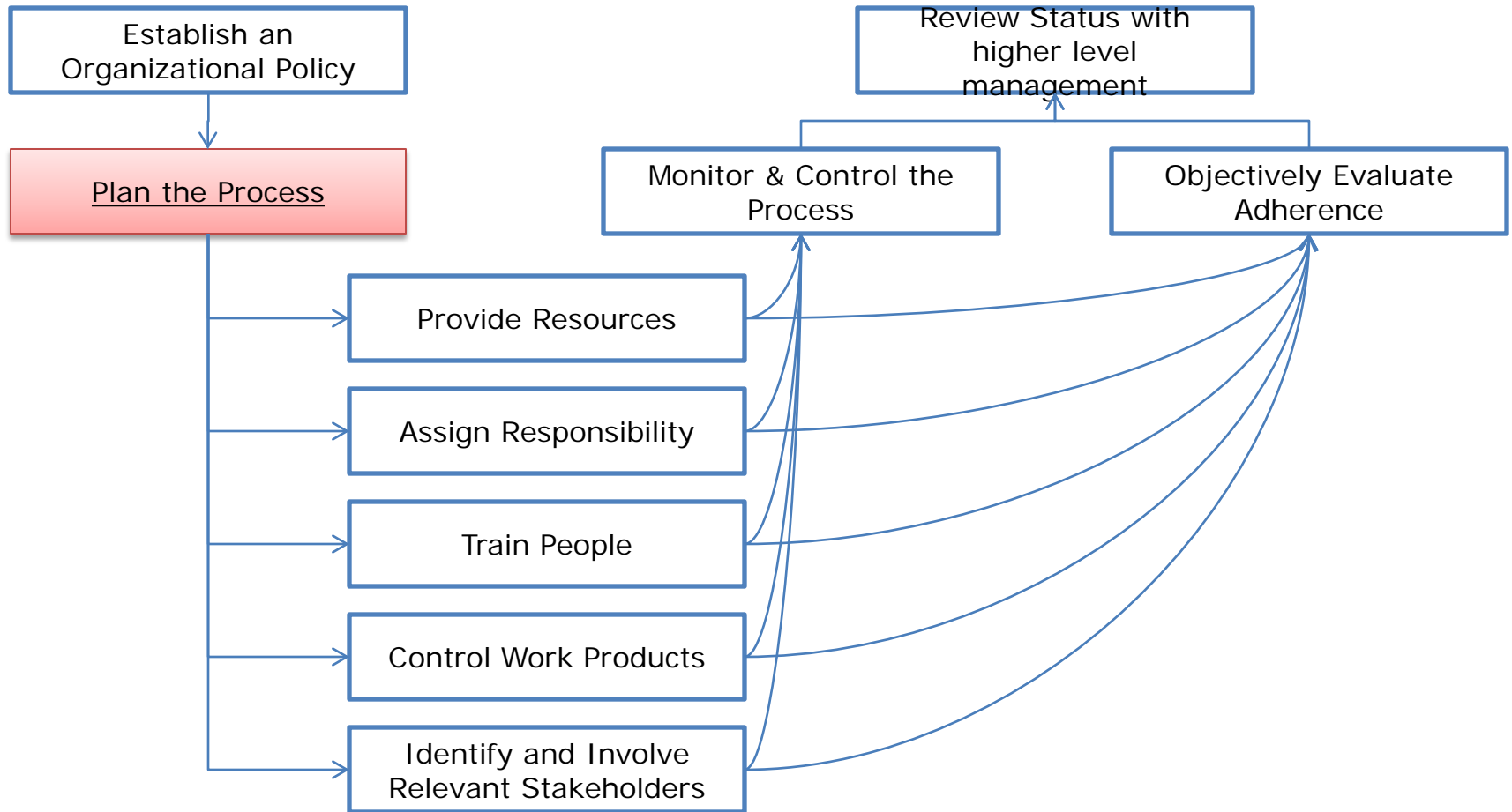
GP2.7: Identify and Involve Relevant Stakeholders

GP2.8: Monitor and Control the Process

GP2.9: Objectively Evaluate Adherence

GP2.10: Review Status with Higher Level Management

How PAs relate to Generic Practices?



Source: Kiril Karaatanasov, ESI Center Bulgaria

Note

A CMMI model is **not a process!**

A CMMI model describes the **characteristics of effective processes** and **“WHAT TO DO-s”**

**“All models are wrong,
but some are useful.”**

George Box
(Quality and Statistics
Engineer)



ML2: Managing the Project Involves

Understand and commit to the **requirements**

Estimating the scope and work that needs to be performed

Developing **mechanisms to acquire** identified products

Developing a **project plan**

Getting **commitments to the plan**

Working with **suppliers to acquire** identified products

Monitoring progress against the plan

Identifying and analyzing **risks**

Taking action to address **significant deviations** from the plan

Taking action to appropriately **mitigate risks**

Project Management PAs (overview)

Requirements management (REQM)

- **SG1: Manage requirements**

Project Planning (PP)

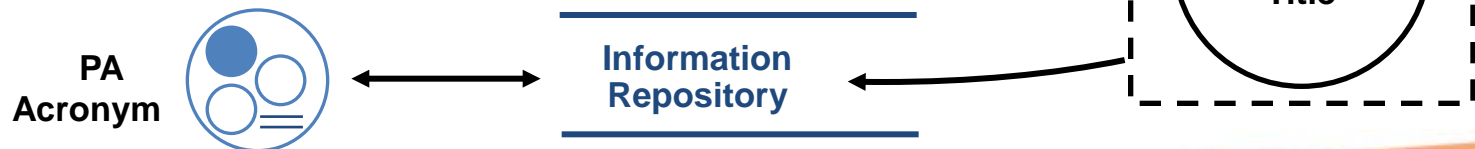
- SG1: Establish Estimates
- SG2: Develop a project plan
- SG3: Obtain Commitment to the plan

Project Monitoring and Control (PMC)

- SG1: Monitor Project Against Plan
- SG2: Manage Corrective action to closure

Context Diagrams

- Intended to show graphical mapping of practices to goals
- Not intended as a data flow diagram
- Not intended to show exhaustive relationships within a process area



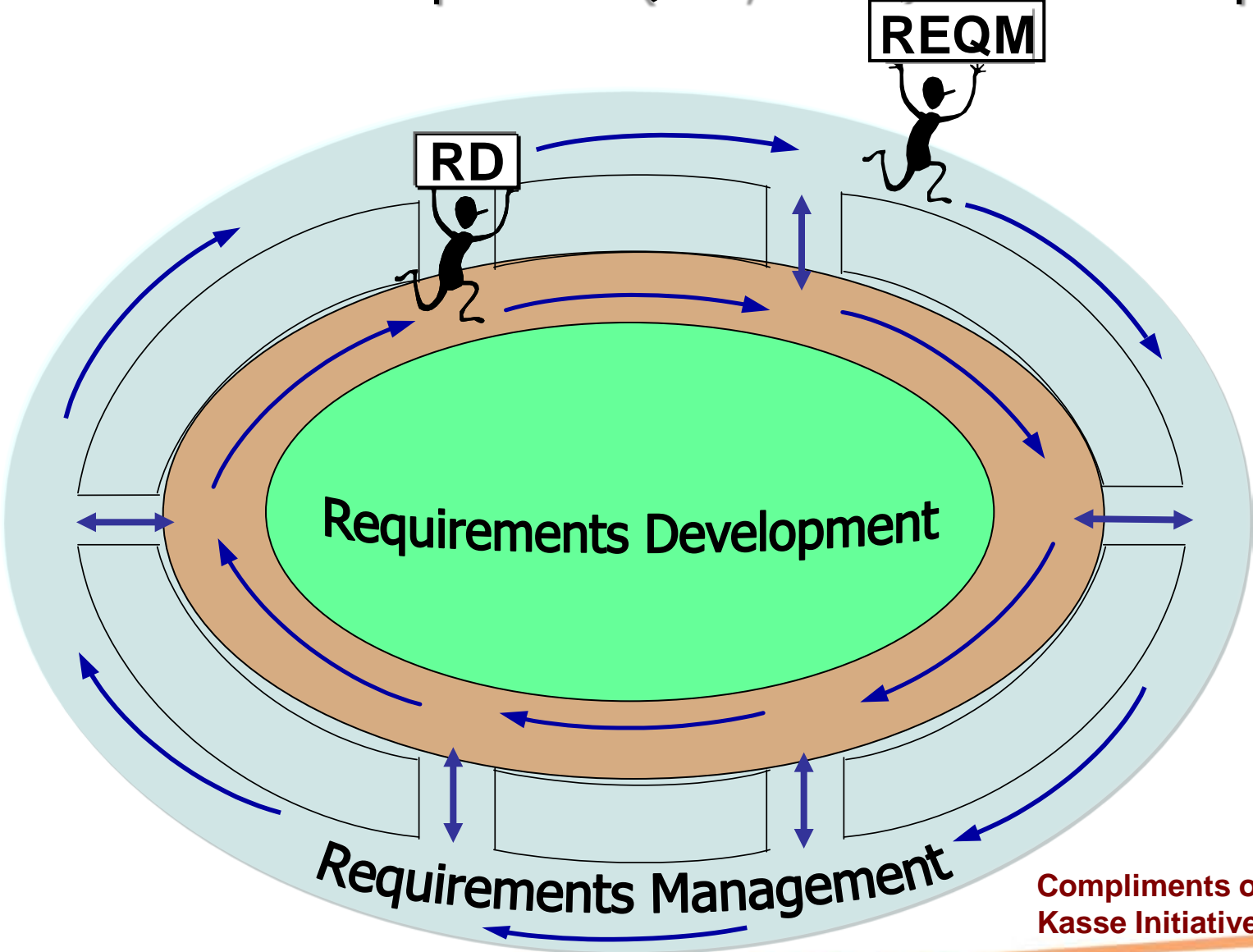
Think about:

What Product/SW Development Needs?

Establishing and maintaining sets of requirements

- customer requirements
- product requirements
- product component requirements
- managing the requirements as the product evolves

The Requirements Management (REQM, ML2) and Requirements Development (RD, ML3) Partnership



Compliments of
Kasse Initiatives, LLC

Requirements Management (REQM)

*The purpose of Requirements Management (REQM) is to **manage the requirements** of the project's products and product components and to identify inconsistencies between those requirements and the project's plans and work products.*



SG1: Manage Requirements

Requirements are managed and inconsistencies with project plans and work products are identified.

The process area also has generic goals to support institutionalization.

When Requirements Management Is Not Done Well...

Requirements are accepted by staff from **any source** they deem to be authoritative.

The project experiences a high level of **requirements changes**.

There are high **levels of rework** throughout the project.

There is an inability to prove that **the product meets the approved requirements**.

Lack of requirements traceability often results **in incomplete or incorrect testing** of the product.

Relevant Terminology

Requirements traceability

A discernable association between requirements and related requirements, implementations, and verifications.

Bidirectional traceability

An association among two or more logical entities that is discernable in either direction (i.e., to and from an entity).

Requirements Management (REQM) Specific Practices

SP 1.1 Obtain an **Understanding** of Requirements

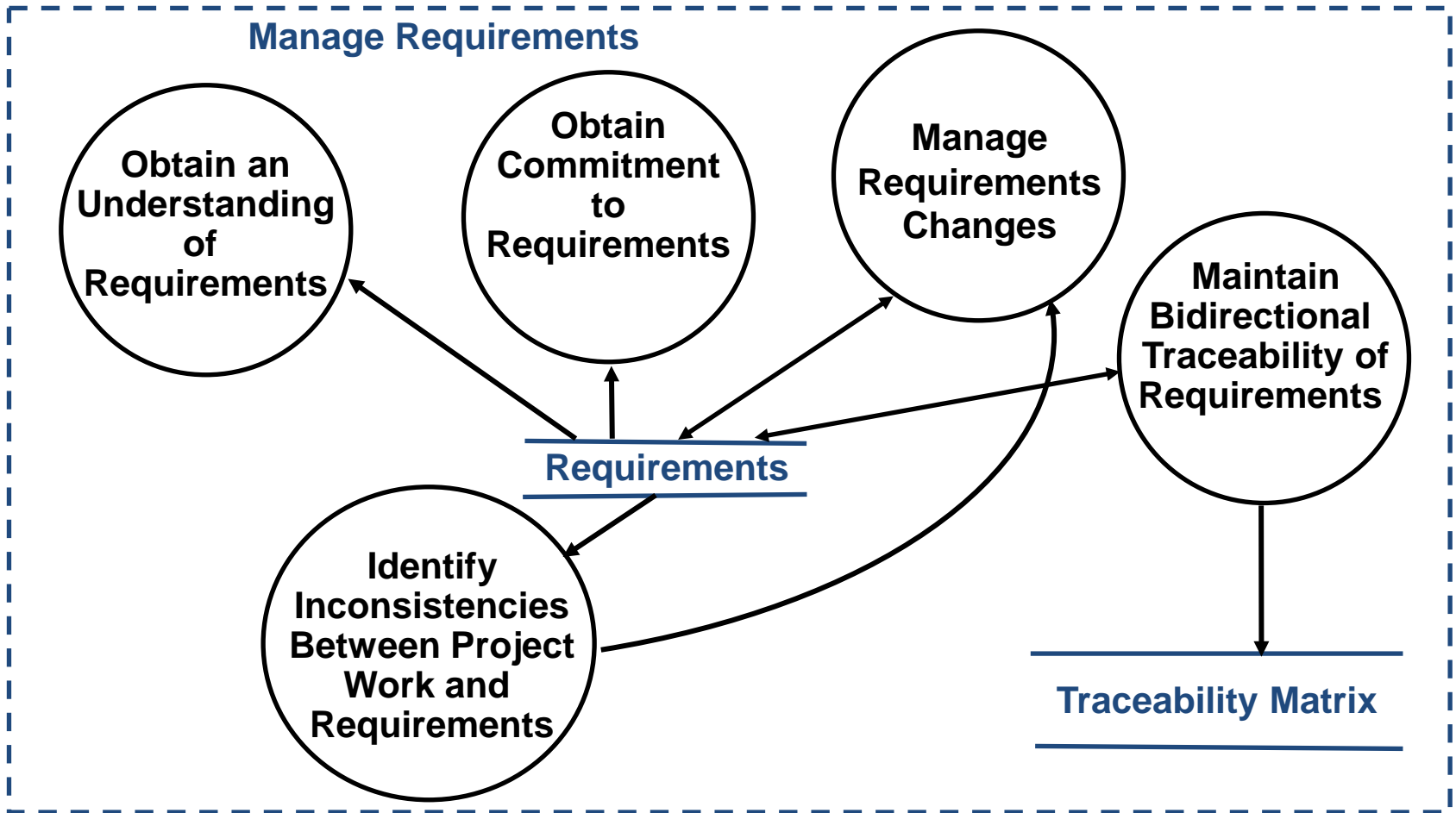
SP 1.2 Obtain **Commitment** to Requirements

SP 1.3 Manage Requirements **Changes**

SP 1.4 Maintain **Bidirectional Traceability** of Requirements

SP 1.5 **Identify Inconsistencies** between project work and requirements

Requirements Management Context



REQM Practices implementation:

- **Acceptance criteria** in place?
- Requirements **comply to criteria**?
- Is understanding **reached and is it documented? How?**
- Who are the **relevant stakeholders**?
- Did they agree to requirements?
- Is the **commitment documented? How?**
- All **requirements and their changes documented?**
- Requirements change **history and rationale documented?**
- Are **changes evaluated** by affected stake holders?
- **Bi-directional traceability** among the requirements and the project plans and work products maintained?
- Are the project plan/activities/work products reviewed to assess the **consistency with the (changed) requirements?**
- If inconsistencies have been are **corrective actions** initiated to solve them?

Remember:

Why do we need **bidirectional traceability**???

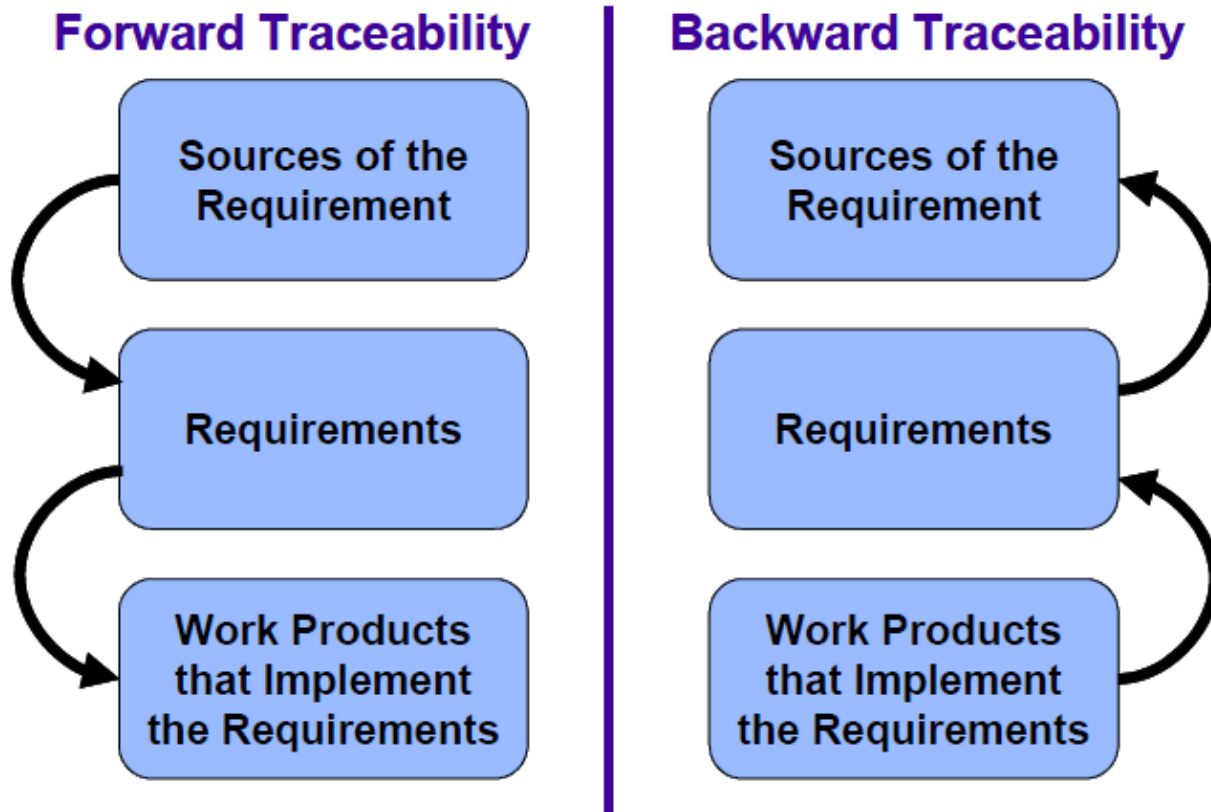


Figure 1: Bidirectional (Forward & Backward) Traceability

Benefits:

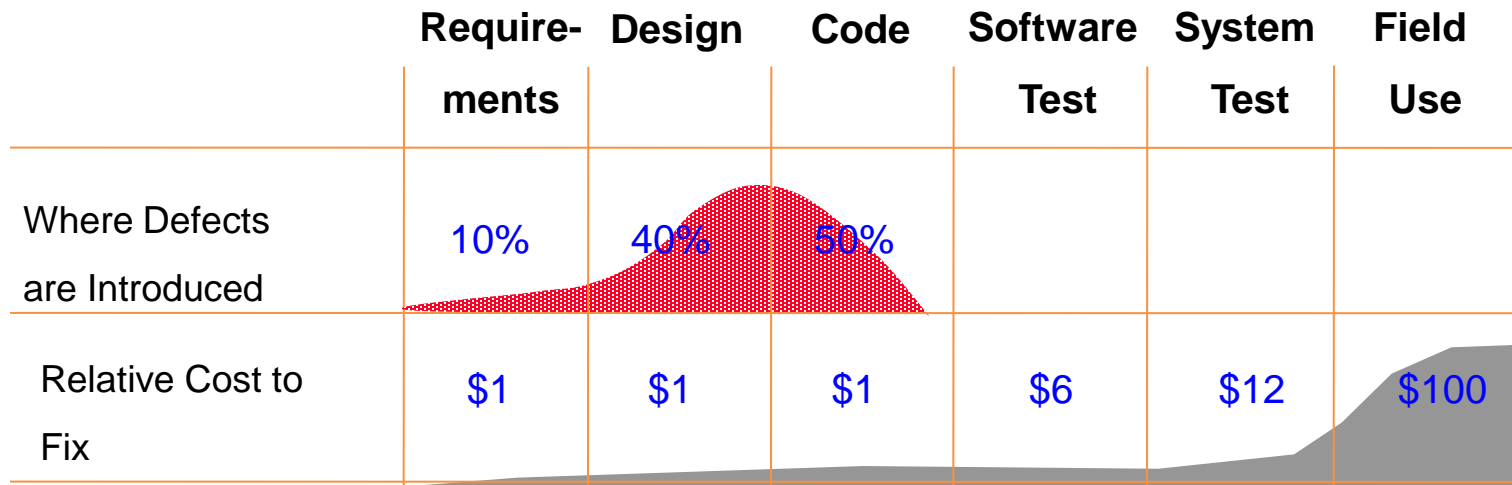
Analyze the impact of a change

- All **work products affected** by a changed requirement
- All **requirements affected** by a change or defect in a work product

Assess current status of the requirements and the project

- Identify **missing** requirements
- Identify **gold plating** (overdoing)

Defects : Insertion Pattern & Cost of Removal



Source: SEPG Asia Pacific 2009
presented by Ravindra Nath, KUGLER MAAG CIE GmbH

Sampling the Generic Practices

GP 2.1: Establish an Organizational Policy

Establish and maintain an organizational policy for planning and performing the requirements management process.

Elaboration for Requirements Management

This policy establishes organizational expectations for managing requirements and identifying inconsistencies between the requirements and the project plans and work products.

Sampling the Generic Practices

GP 2.3: Provide resources

Provide adequate resources for performing the requirements management process, developing the work products, and providing the services of the process.

Elaboration for Requirements Management

Examples of resources provided include the following tools:

- **Requirements tracking tools**
- **Traceability tools**

Sampling the Generic Practices

GP 2.6: Manage Work Products (Configurations)

Place designated work products of the requirements management process under appropriate levels of control.

Elaboration for Requirements Management

Examples of work products placed under control include the following:

- Requirements
- **Requirements traceability matrix**

Sampling the Generic Practices

GP 2.7: Identify and Involve relevant Stakeholders

Identify and involve the relevant stakeholders of the requirements management process as planned.

Elaboration for Requirements Management

Select relevant stakeholders from customers, end users, developers, producers, testers, suppliers, marketers, maintainers, disposal personnel, and others who **may be affected by, or may affect**, the product as well as the process.

Examples of activities for **stakeholder involvement** include the following:

- **Resolving issues on the understanding of the requirements**
- **Assessing the impact of requirements changes**
- **Communicating the bidirectional traceability**
- **Identifying inconsistencies among project plans, work products, and requirements**

Sampling the Generic Practices

GP 2.8: Monitor and Control the process

Monitor and control the requirements management process against the plan for performing the process and take appropriate corrective action.

Elaboration for Requirements Management

Examples of measures and work products used in monitoring and controlling include

the following:

- Requirements volatility (percentage of requirements changed)
- Schedule for coordination of requirements
- Schedule for analysis of a proposed requirements change

Sampling the Generic Practices

GP 2.9: Objectively Evaluate Adherence

Objectively evaluate adherence of the requirements management process against its process description, standards, and procedures, and address noncompliance.

Elaboration for Requirements Management

Examples of activities reviewed include the following:

- Managing requirements
- Identifying inconsistencies among project plans, work products, and requirements

Examples of work products reviewed include the following:

- Requirements
- Requirements traceability matrix

Sampling the Generic Practices

GP 2.10: Review Status with Higher Level Management
Review the activities, status, and results of the requirements management process with higher level management and resolve issues.

Elaboration for Requirements Management

Proposed changes to **commitments to be made external to the organization** are reviewed with higher level management to ensure that all commitments **can be accomplished**.