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Organisaation ohjelmistokehitysprosessi vs. projektin prosessi

11 November

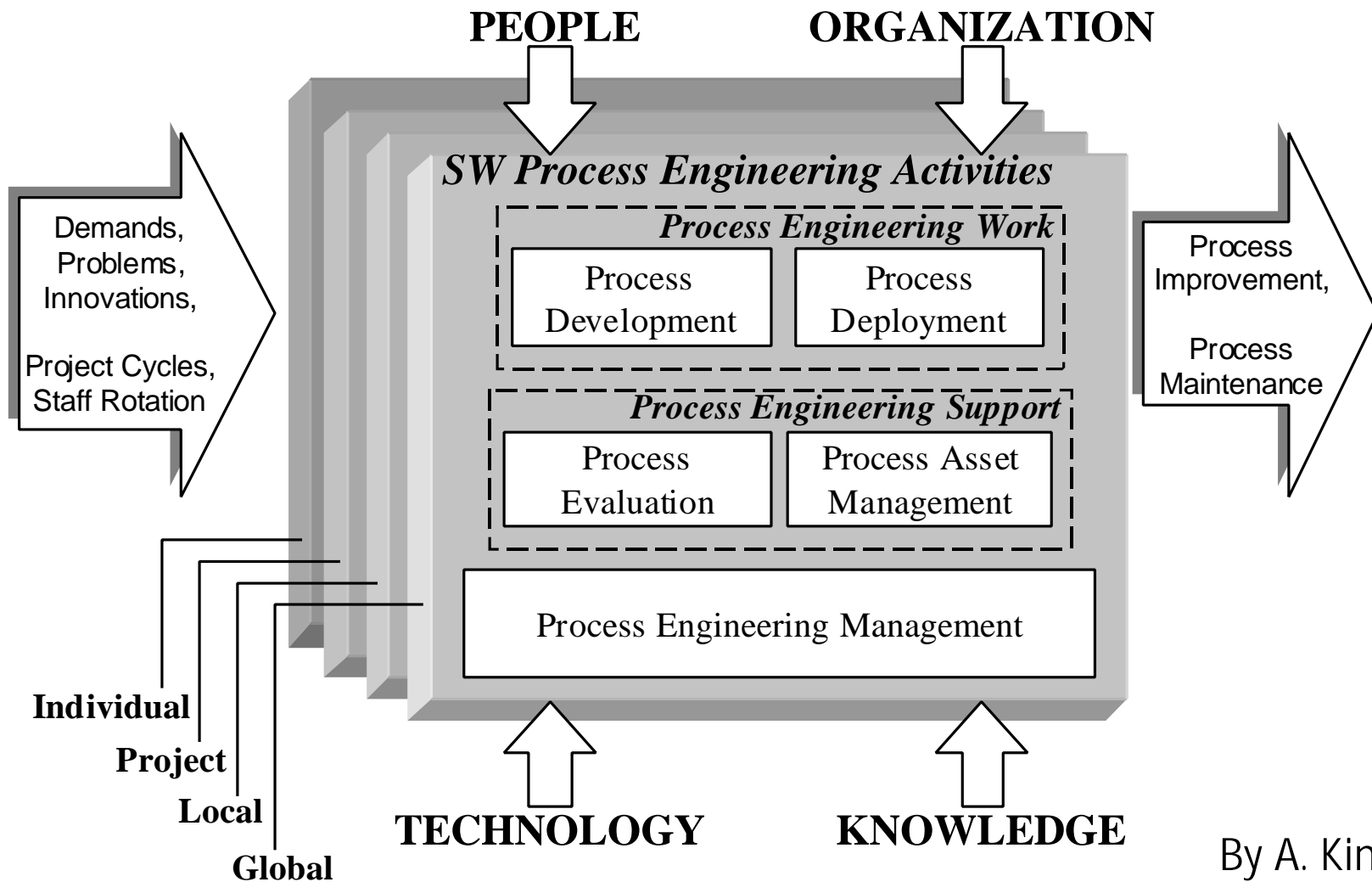
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Contents

- Model of SW Process Engineering
- Organization's standard SW process
- Demo of the NMP SW Engineering Process
- Process tailoring - Project specific SW process

Model for SW Process Engineering



By A. Kinnula

SW-CMM Level 3: Organization Process Definition

- The purpose of Organizations Process Definition is to develop and maintain a usable set of software process assets that improve process performance across the projects and provide basis for cumulative, long-term benefits to the organization.
- Organization's Process Definition involves developing and maintaining the organization's standard software process, along with related process assets, such as descriptions of software life cycles, process tailoring guidelines and criteria, the organization's software process database, and library of software process-related documentation.
- ...

Terms & Definitions

Process

- “An *organizational process* (e.g. business process) is a logical organization of people, technology, and practices into work activities designed to transform information, materials, and energy into a specified end result.”¹
 - “Processes have important dynamic (temporal) orientation, addressing what happens over time. This dynamic orientation is naturally conceptualized as a partially ordered set of activities, actions, phases, events, or the like, that take place over time and lead to a specified end result or purpose.”²
- “A *software process* is an organizational process that develops and/or evolves software. It mediates between people, technology, and product, within context of the project’s environment”³

¹ Gabriel A. Pall: Quality Process Management. Englewood Cliffs, N.J., USA, Prentice-Hall, Inc., 1987.

² James W. Armitage, Loic Briand, Marc I. Kellner, James W. Over, Richard W. Phillips: Software Process Definition Guide: Content of Enactable Software Process Representations. (CMU/SEI-94-SR-21), Pittsburgh, Pa.: Software Engineering Institute, Carnegie-Mellon University, 1994.

³ Marc I Kellner, James W. Over: “A Software Quality Improvement Framework.” Proceedings of the Software Engineering Symposium - 1992 (S.E.S.Y.'92): Software Factory and Quality Factory (Held at Milan, Italy, June 10-11, 1992), Advanced Software Technology Division of O.GROUP, Olivetti Information Service, 1992.

Terms & Definitions

Process representation

- “A description, depiction, likeness, portrayal etc., of a process, which helps conveying a process to the mind
 - May be presentation in text and/or graphics
 - Modes (by form and usage):
 - process models
 - process guides
 - process templates and forms
- Created or modified during:
 - Process baselining - to describe an existing process
 - Process improvement - to evolve an existing process
 - Process reengineering - to prescribe a new process
- Used during a variety of activities, including Process Engineering and reengineering, Baselining, Planning, Training, Enactment (by humans or machines), Assurance, Improvement and Simulation”¹

¹ James W. Armitage, Loic Briand, Marc I. Kellner, James W. Over, Richard W. Phillips: Software Process Definition Guide: Content of Enactable Software Process Representations. (CMU/SEI-94-SR-21), Pittsburgh, Pa.: Software Engineering Institute, Carnegie-Mellon University, 1994.

Terms & Definitions

Process model

- “A relatively detailed, formal or semi-formal representation of a process
 - to provide a mechanism for understanding a process as well as a vehicle for reasoning about a process
 - can be used in all activities related to Process Representations (see previous slide)
 - can be part of Process Guide (see next slide)
 - can be in the form of graphics and/or text
 - as with most models, generally represent some important aspects of a process, but not all possible aspects.”¹

¹ James W. Armitage, Loic Briand, Marc I. Kellner, James W. Over, Richard W. Phillips: Software Process Definition Guide: Content of Enactable Software Process Representations. (CMU/SEI-94-SR-21), Pittsburgh, Pa.: Software Engineering Institute, Carnegie-Mellon University, 1994.

Terms & Definitions

Process guide

synonym: process
definition
(document)

- “A process representation intended to describe a particular process
 - **to support process participants in carrying out the intended process**
 - i.e. enactment, deployment or implementation of the process by humans
 - also to support training, planning and assurance
 - a structured, work-flow oriented, reference document
 - typically both text and graphics
 - should contain much more than simply a formatted process model: narrative text, decision tables or decision trees, graphical aids, examples, templates, checklists etc.
 - easily understood, communicated and followed
 - may be informal, but should be precise and explicit
 - can support training but is not, by itself, a substitute for training”¹

¹ James W. Armitage, Loic Briand, Marc I. Kellner, James W. Over, Richard W. Phillips: Software Process Definition Guide: Content of Enactable Software Process Representations. (CMU/SEI-94-SR-21), Pittsburgh, Pa.: Software Engineering Institute, Carnegie-Mellon University, 1994.

Terms & Definitions

Process templates and forms

- “A process representation
 - to support organizing, recording and reporting process information (in interviews etc.), when modeling the process
 - highly structured textual representations, in which information is organized and structured into predefined, named slots”¹

¹ James W. Armitage, Loic Briand, Marc I. Kellner, James W. Over, Richard W. Phillips: Software Process Definition Guide: Content of Enactable Software Process Representations. (CMU/SEI-94-SR-21), Pittsburgh, Pa.: Software Engineering Institute, Carnegie-Mellon University, 1994.

Objectives for SW process documentation

- Why SW process documentation is needed?
- The objective is:
 - to support communication, learning and understanding
 - of SW development activities
 - between individuals, groups and projects
 - to provide visibility into SW projects' progress and quality
 - control, measurement
 - to maintain process continuity
 - no time to start from scratch with every project
 - need for transferring good practices from project to project
 - to help process improvement
 - to improve performance, predictability and reliability of the process

Context for SW process documentation

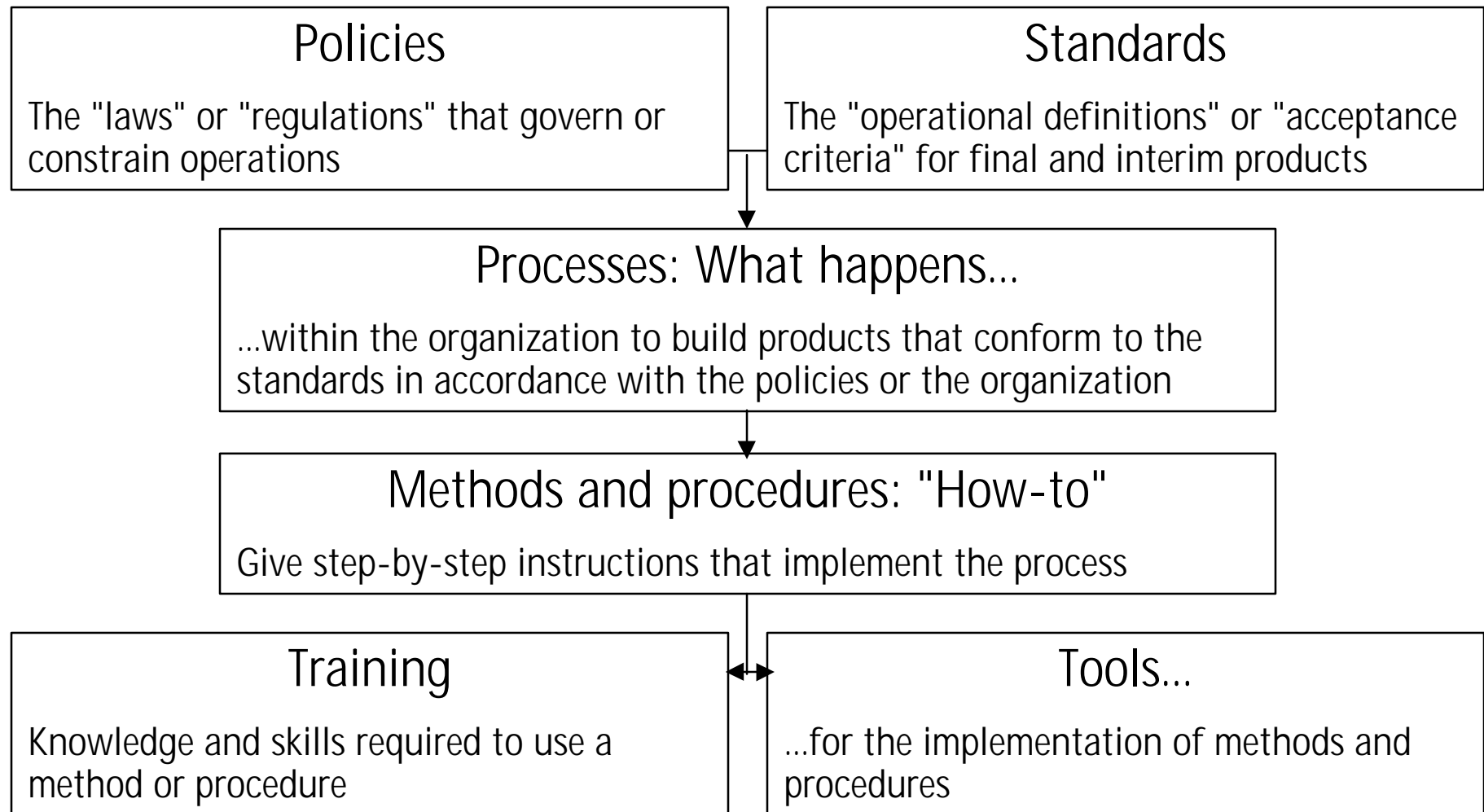


Diagram by Marc I Kellner, Developing and documenting improved software engineering processes, European SEPG '99 conference, June 7-10 1999, Amsterdam.

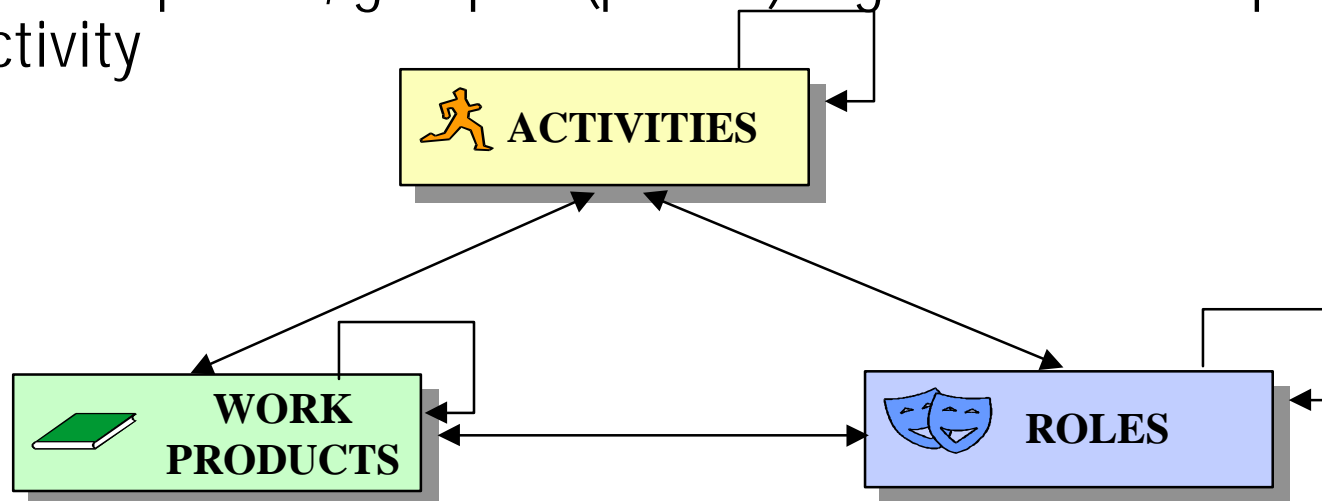
Case Nokia Mobile Phones

- Organization's standard software process in NMP is SWEP, i.e. SW Engineering Process
- In the following slides replace in your mind "SWEP" with "Organization's standard software process"

Case

Basic Process Architecture Elements 1/2

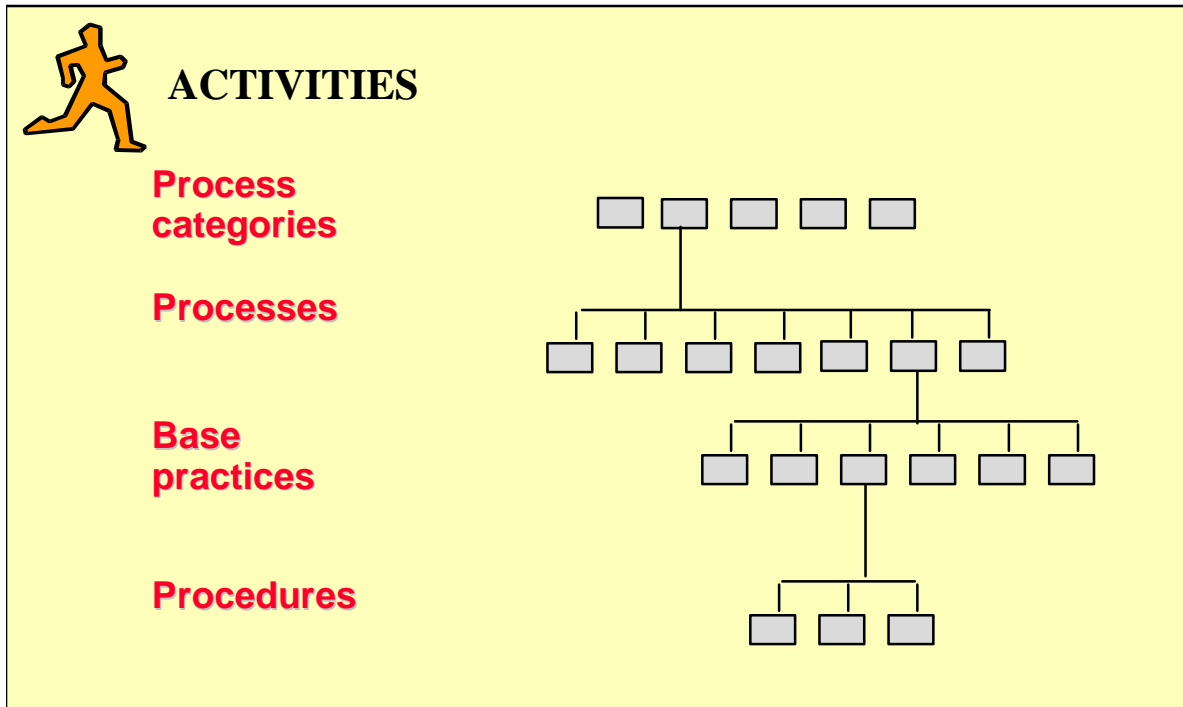
- Processes are described by using following three basic elements and the relationships between them:
 - Activity:** A description of what happens, what is done, and how is it done, within a SW engineering process
 - Work product:** A document, or a piece of information or materials, which is produced by an activity and/or used or updated in an activity
 - Role:** A person, group or (part of) organization that performs an activity



James W. Armitage, Loic Briand, Marc I. Kellner, James W. Over, Richard W. Phillips: Software Process Definition Guide: Content of Enactable Software Process Representations. (CMU/SEI-94-SR-21), Pittsburgh, Pa.: Software Engineering Institute, Carnegie-Mellon University, 1994.

Case Basic Process Architecture Elements 2/2

Activity hierarchy



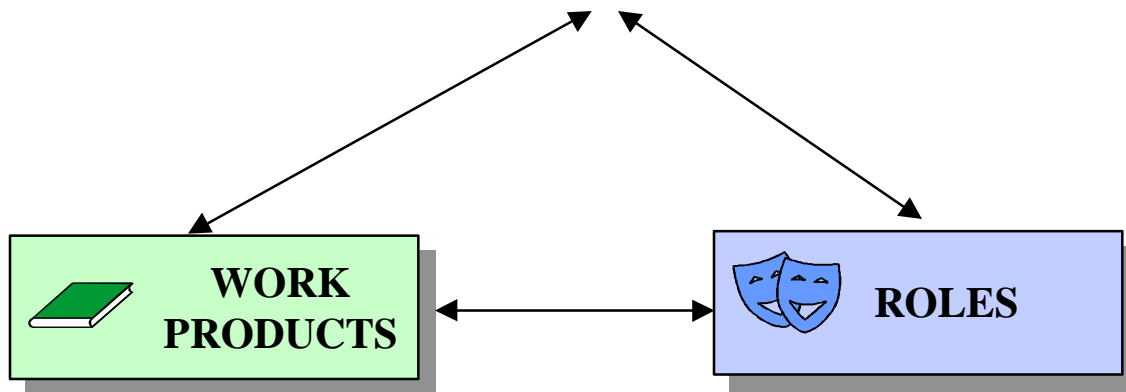
To serve multiple purposes and to allow tailoring, there are 3 different types of activity descriptions:

- process descriptions,
- base practice descriptions, and
- procedures.

Descriptions vary in amount of detail and they form a hierarchy: top-level description (process) provides an overall view, and low-level descriptions (procedures) contain all details needed.

SPICE Process assessment framework (ISO standard 15504) has been used as a reference for:

- activity decomposition (a model and contents)
- list of work products



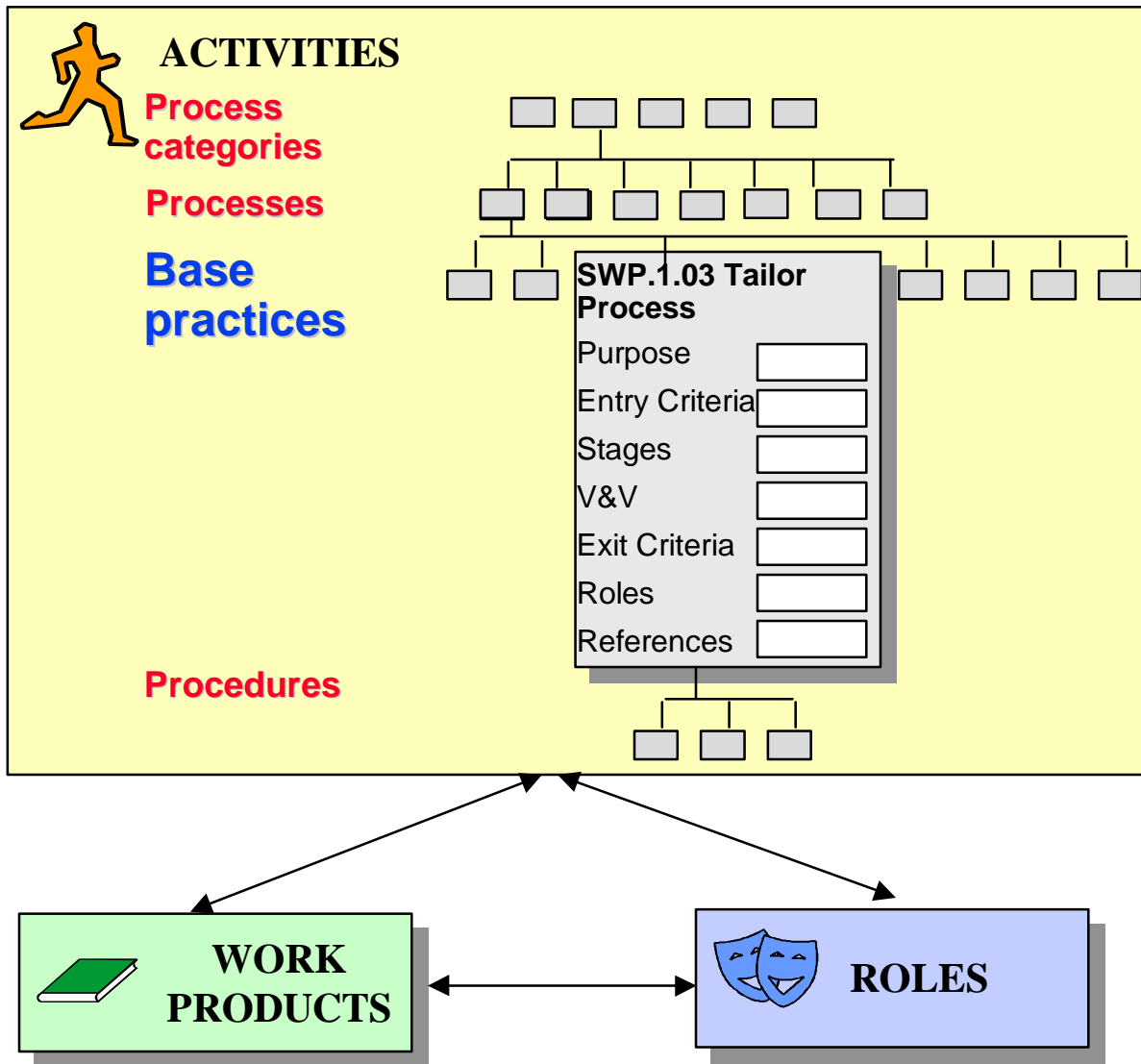
SWEP document design 1/2

- SWEP documents have consistent
 - structure
 - look and feel
 - layout
 - links
- Modularity within documents has been developed using Information Mapping[®] method
- SWEP includes process templates for:
 - Processes
 - Base practices
 - Procedures
 - Work products
 - Roles

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Case SWEP document design 2/2

Example of a process template: Base practice



Base practices describe the activity in detail. They focus on WHAT should be done (not how it should be done).

Base practices are described using ETVX notation:

- Entry criteria
- Tasks (Stages in SWEP)
- Verification & Validation
- Exit criteria

SWEP includes process templates for:

- Processes
- Base practices
- Procedures
- Work products
- Roles

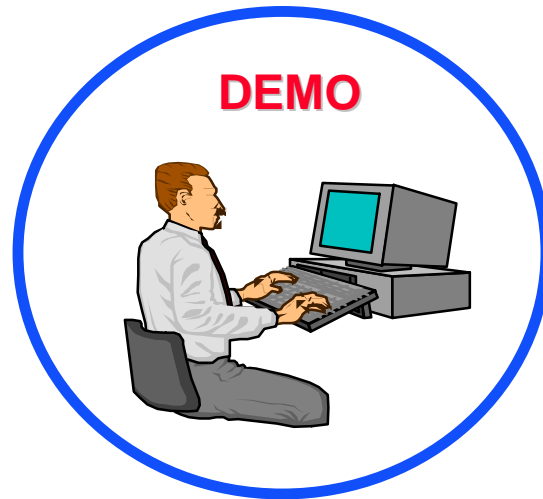
Other Process Architecture Elements 1/2

- Other elements:
- Process Tailoring Guidelines & SW project types
 - Descriptions of the standard SW project types of NMP
 - Instructions how to tailor SWEP for a SW project (e.g. for project planning purposes) based on different SW project types
- SW glossary
 - Definitions of SWEP related terms

Other Process Architecture Elements 2/2

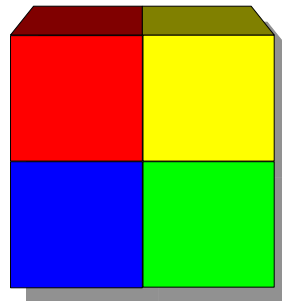
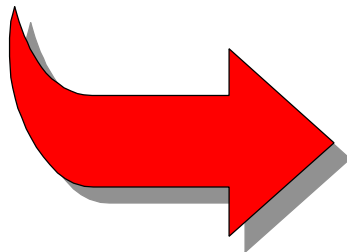
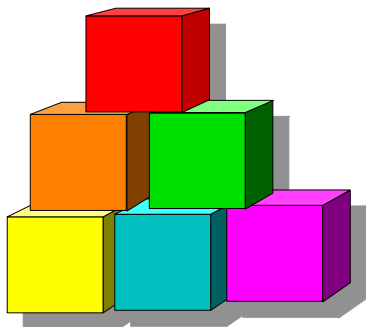
- Other elements (continue):
- SW metrics
 - Definitions of SWEP related metrics
- SW training
 - SW role based tutorials (not implemented yet)
 - SWEP course materials
- References
 - References, which are external to SWEP, but relevant to SWEP audience (e.g. references to other processes of NMP, tool user manuals, or books)

Demonstration of NMP SWEP, example of an organization's standard SW process



How to Use Organization's Standard SW Process in a Project?

- SWEPP Tailoring



SW-CMM and Process Tailoring

- When an organization is operating near or above CMM's 'defined' level (level 3), an organizational standard SW process and a set of tailoring guidelines are used to develop the project specific SW process.
- In the SW-CMM this is referred to (in level 3) as tailoring the OSSP to form the project's defined SW process.
- E.g. in Integrated Software Management: ... Integrated Software Management involves developing the project's defined software process and managing the software project using this defined software process. The project's defined software process is tailored from the organization's standard software process to address the specific characteristics of the project.

SWEP is Not applicable as such as a project process

- One objective of standard SW Engineering Process is to support all different types of NMP's SW projects. It doesn't describe all of the necessary issues for a project specific process, e.g. project life-cycle and organization, which may vary a lot from project to project.
- Each project has to tailor a project specific SW process by deriving it from the organization's standard SW process.

SW Engineering Process Tailoring

- Projects do not use everything from SWEP
- Each project type has a different set of activities
- All projects have their own process, which should be **TAILORED from SWEP**.
- SWEP offers to a project a set of building blocks. **TAILORING GUIDELINES** tell what blocks do you need and how to put the pieces together
- Project is using it's own process, which is made visible in project's **SW QUALITY PLAN** (logical part of SW Project Plan).
- Tailored process helps to build the quality into the outcome of the project.

Slide by T. Lalli

Process Tailoring in the Process

SWP.1 Manage SW Project

SWP.1.01 Define Objectives

SWP.1.02 Determine Development Strategy

SWP.1.03 Tailor Process

The purpose of this base practice is to develop a project specific process for a SW project by tailoring the organization's standard SW process i.e. NMP SW Engineering Process (SWEP). A resulting process shall be appropriate to the scope, magnitude, and complexity of a SW project.

SWP.1.04 Develop Project Estimates

SWP.1.05 Develop WBS and Dependency Network

SWP.1.06 Establish Schedule and Budget

SWP.1.07 Acquire Infrastructure Resources

SWP.1.08 Acquire Human Resources

SWP.1.09 Establish Commitments

SWP.1.10 Plan Project Tracking

Steps of Process Tailoring

- Identify project characteristics.
- Define (or select) the SW life cycle and milestone schema for the project and document it in SW Quality Plan/ SW Engineering Process.
- Select the appropriate SW Engineering process assets, e.g. processes and base practices, and document results in SW Quality Plan/ SW Engineering Process.
- Tailor each individual process asset, if necessary, and document results in SW Quality Plan/ SW Engineering Process. Tailoring includes:
 - deviations from selected process assets, and
 - definition of additional information.

SW Quality Plan Example: THE SW ENGINEERING PROCESS AND ITS DOCUMENTATION

The NMP SW Engineering Process is described in the " SW Engineering Process Manual"(SWEP manual).

?[project]? uses the SW Engineering Process Manual version ?[version number]?

?[[Project shall make the reference to the latest SWEP manual release at the beginning of the project. If and when, new SWEP manual releases are available during the project life, the project can decide to :

- 1) go on with the older version,
- 2) start to use the new version (all references) or
- 3) refer some documents from different manual version(s) than the main reference.

All deviations from the main reference to the SWEP manual release shall be stated always when such documents are referenced.]]?

Software shall be developed fulfilling the exit criteria of all the base practices relevant to the Project.

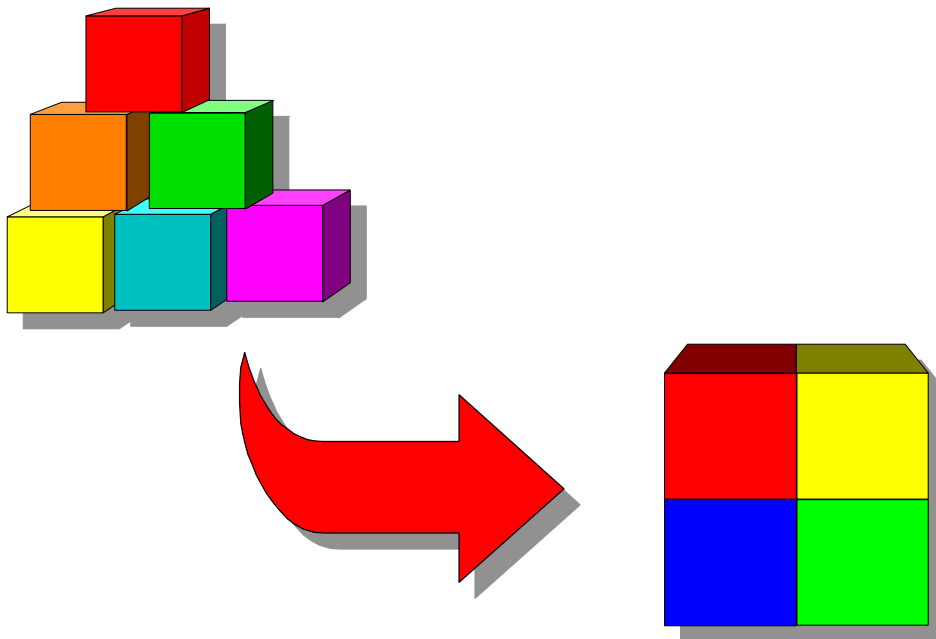
This section defines:

- what base practices are relevant to ?[project]? project,
- what procedures will be followed, - what new procedures will be created,
- what work product templates will be used (, if more than one available), and
- all exceptions/additions to the above, and WHY they are being used instead

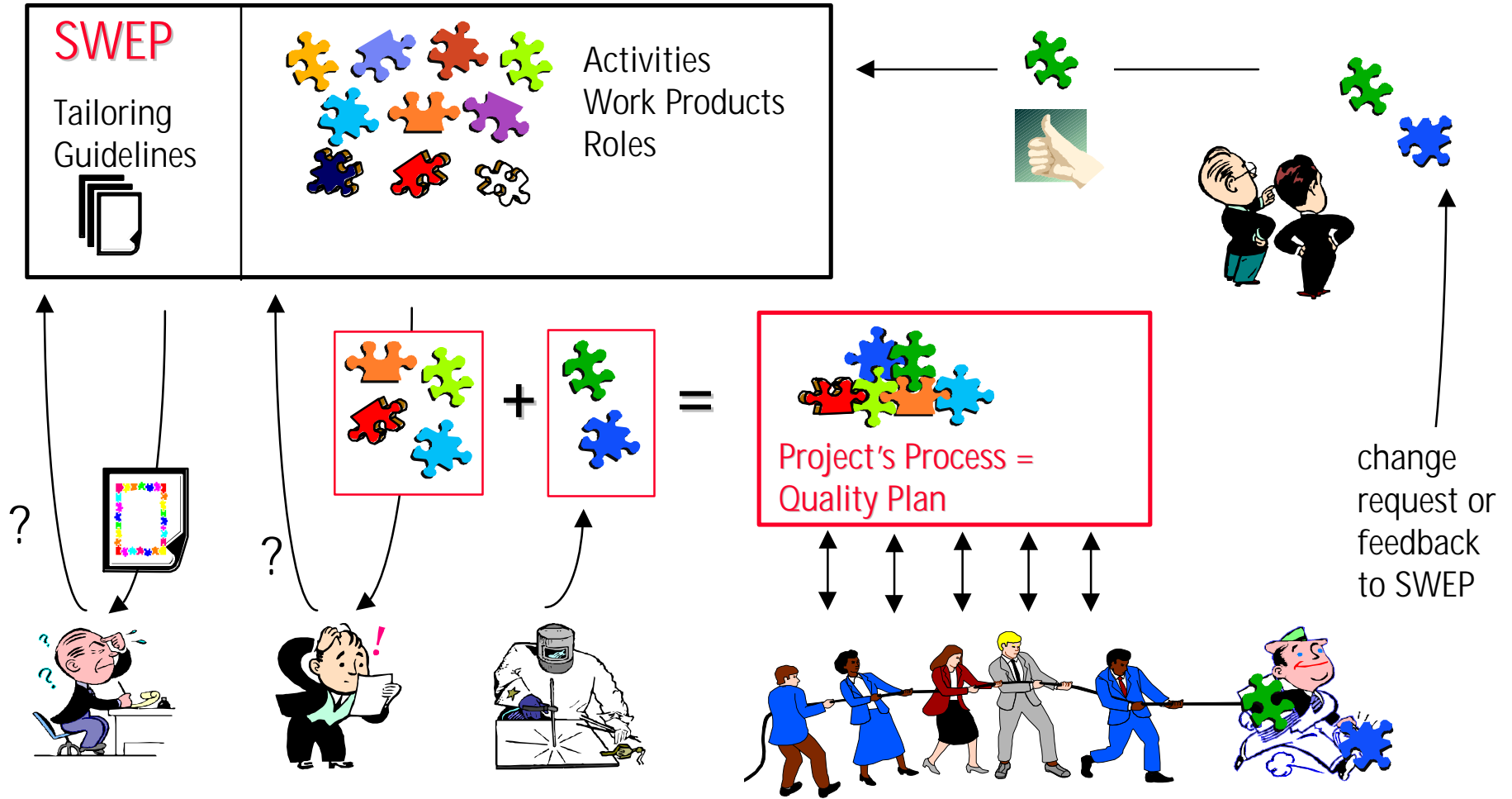
?[[Summarise in each sub-section any exceptions to normal development methods contained in the SW engineering process manual, and WHY they are being used instead. It is important that the way the project really behaves is in evidence.]]?

Purpose of Process Tailoring Guidelines

- The purpose of process tailoring guidelines is to support tailoring of the project specific SW process from the organizations standard SW process as one part of the project planning activity.



Tailoring & SWEP Improvement



Slide by T. Lalli

Process Tailoring

