

Software Process Improvement bij NASA

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Interessante documenten en "guidebooks" van NASA

<http://www.ivv.nasa.gov/SWG/resources/>

- **Hierin vind je onder meer links naar**
 - **NASA-GB-A302: Formal inspections guidebook.**
 - **NASA-GB-001-94.pdf: NASA Software Measurement Guidebook**
 - **NASA-GB-001-95.pdf: NASA Process Improvement Guidebook**
 - **NASA-GB-001-96.pdf: NASA Software Management Guidebook**

Goals

- **CMM:**
 - Domain independent and generalized
 - Focus on improving the software process
- **NASA:**
 - Domain dependent
 - Focus on improving the software product

Level 5
Optimizing

Defect prevention
Technology change management
Process change management

Level 4
Managed

Quantitative process management
Quality management

Level 3
Defined

Organisation process focus
Organisation process definition
Training program
Integrated development management
Product engineering
Intergroup coordination
Peer reviews

Level 2
Repeatable

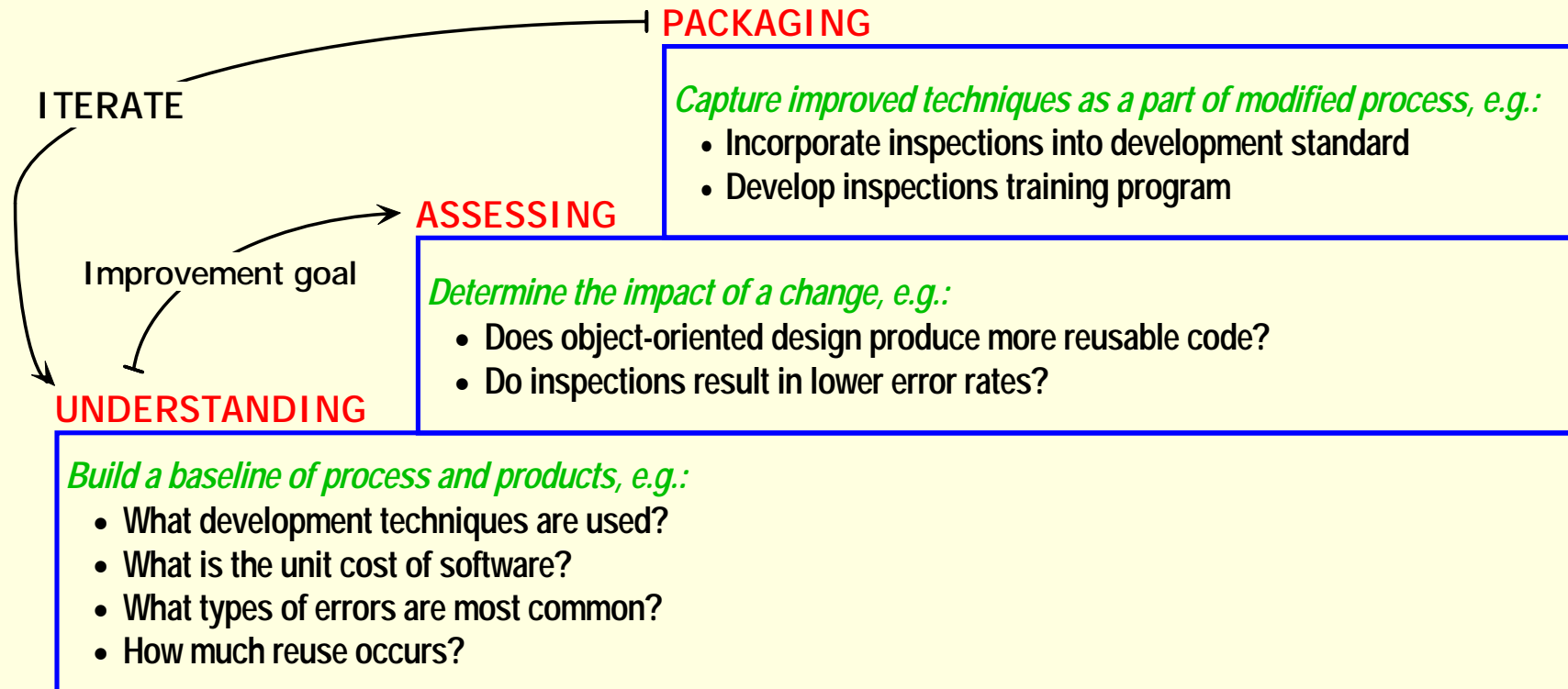
Requirements management
Project planning
Project tracking and oversight
Subcontract management
Quality assurance
Configuration management

Level 1
Initial

Ad-hoc processes

The Capability Maturity Model (CMM) Key Process Areas (KPAs)

NASA Three-Phase Approach to Software Process Improvement



Understanding phase

- **Capture characteristics of ongoing processes and products**
- **Measure:**
 - **Product: Cost, Size, Errors**
 - **Process: Effort distribution, Resources usage**
- **Identify high-level goals for improvement**
 - **Cut costs, Improve reliability, ...**

Sample process relationships

$$\text{Effort (in staff months)} = 1.48 * (\text{kLOC})^{0.98}$$

$$\text{Duration (in months)} = 4.6 * (\text{kLOC})^{0.26}$$

$$\text{Pages of documentation} = 34.7 * (\text{kLOC})^{0.93}$$

$$\text{Annual maintenance cost} = 0.12 * (\text{Development cost})$$

$$\text{Average staff size} = 0.24 * (\text{kLOC})^{0.73}$$

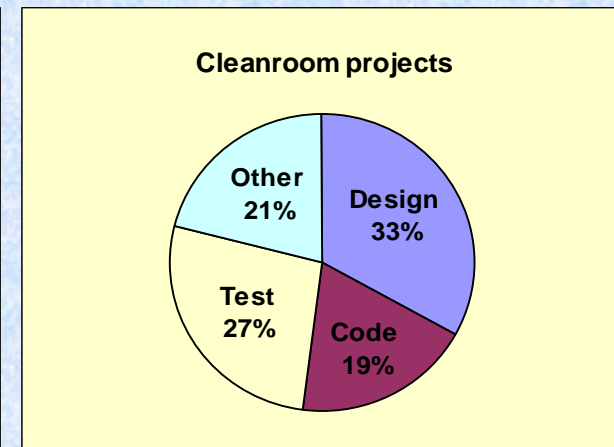
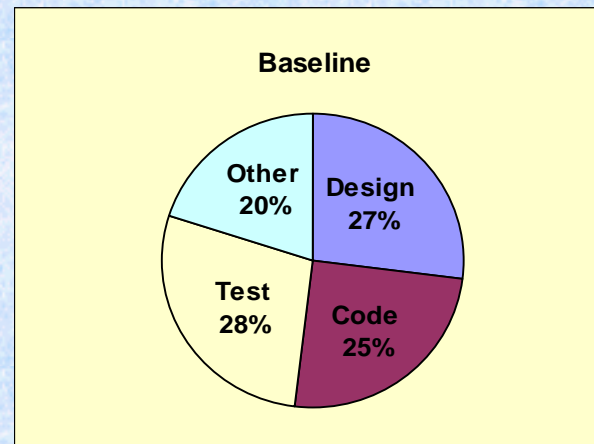
Assessing evaluation of the effect of introducing a change

- **Set specific objectives for improvement**
- **Introduce changes in the current process**
- **Analyse impact on product and process**

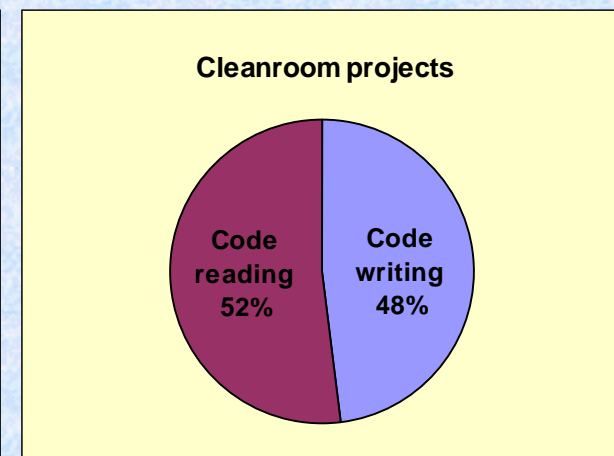
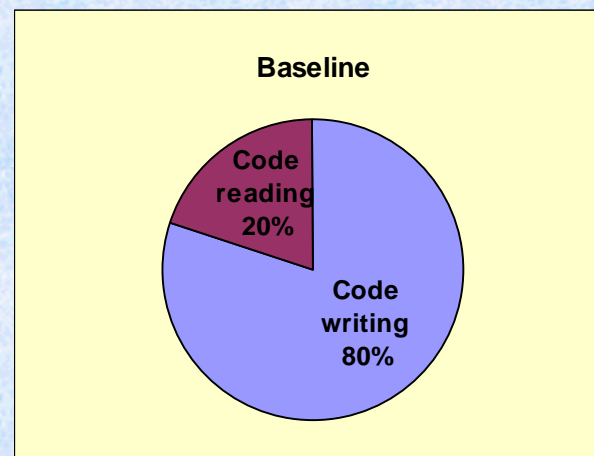
Experiment

Assessing impact of Cleanroom on Process

All activities:
Slight impact on
design and code



Code activities only:
Substantial
process impact



Packaging

- **Satisfactory changes (measurable improvement) incorporated in organisation**
- **New models, standards, training materials developed based on what has been learned put in experience base**
- **Packaging:**
 - **Standards, policies, guidebooks, training, tools, ...**

Software process improvement

- **Understanding**
 - What are we doing?
 - How are we doing it?
- **Assessing**
 - Analysing the impact of change
- **Packaging**
 - Experience base
 - Dissemination

Activities of the Software Process Improvement Organisation (NASA)

DEVELOPERS

- Develop/maintain software
- Participate in studies
- Provide information (to analysts)
- Reuse models and processes

ANALYSTS

- Design experiments
- Analyse information
- Package experience (develop models, processes, baselines)

SUPPORT STAFF

- Process data (collecting, QA, managing, archiving project data)
- Maintaining experience base:
 - Projects database
 - Library

NASA Metrics Experience

- **Measurement is a means, not an end in itself**
- **Understand the goals**
- **Make sure the measurements apply to the goals**
- **Start small**
- **Avoid over-reporting**
- **Do not expect to:**
 - **Measure error correction effort precisely**
 - **Find generalised, well-defined process measures**
 - **Find a database of process measurements**
 - **Automate data-collection**
- **Use lines of code (pages of doc) to represent size**

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