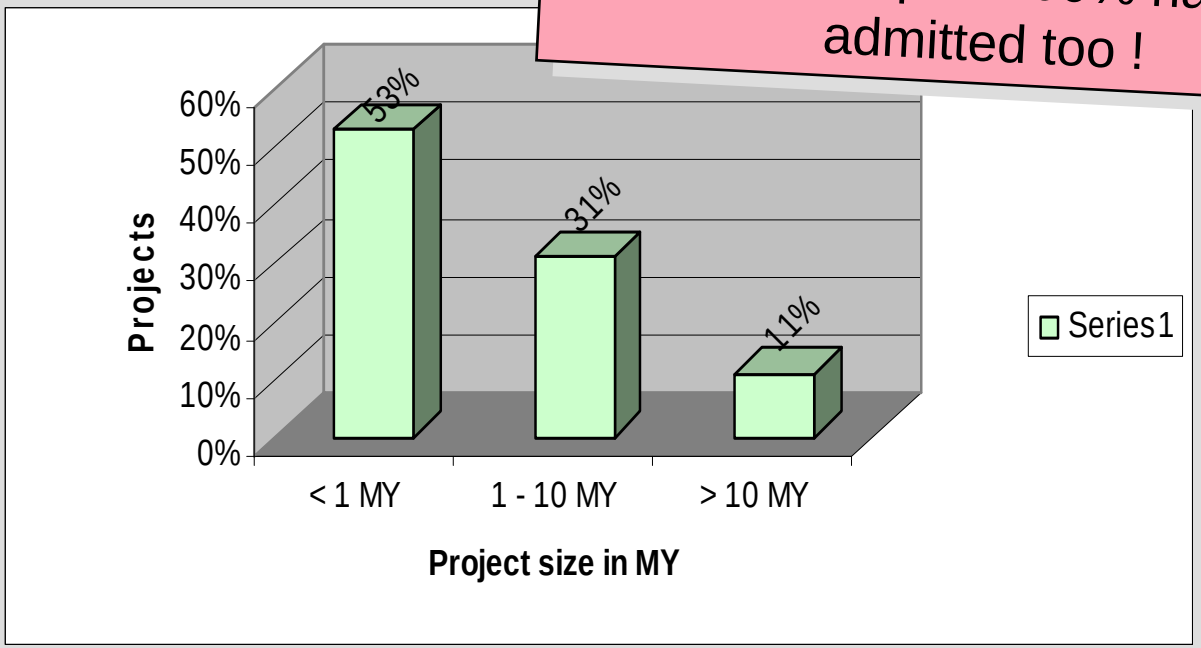
Effort estimation

Accuracy of estimation

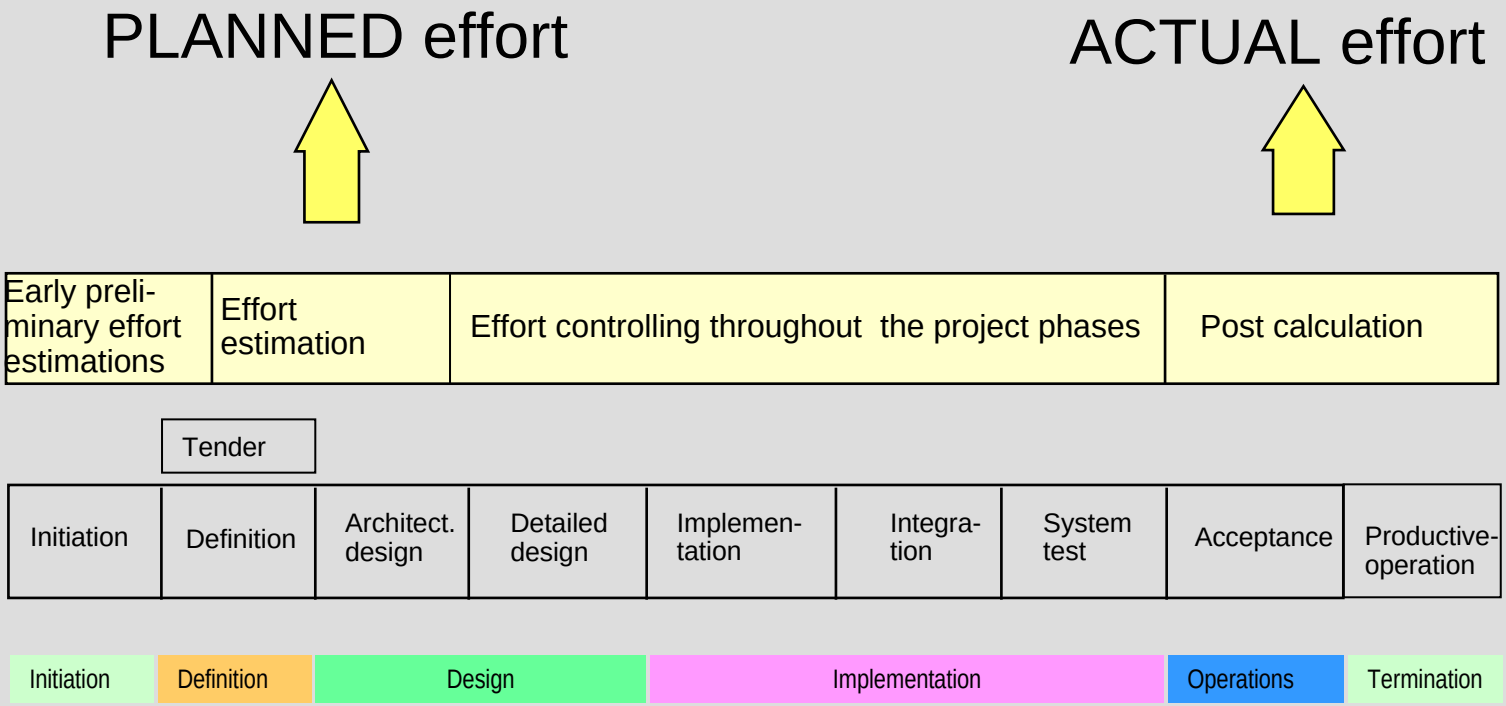
Question: How many products are completed with a <25% variance from the expected effort?

Overruns of up to 300% have been admitted too !

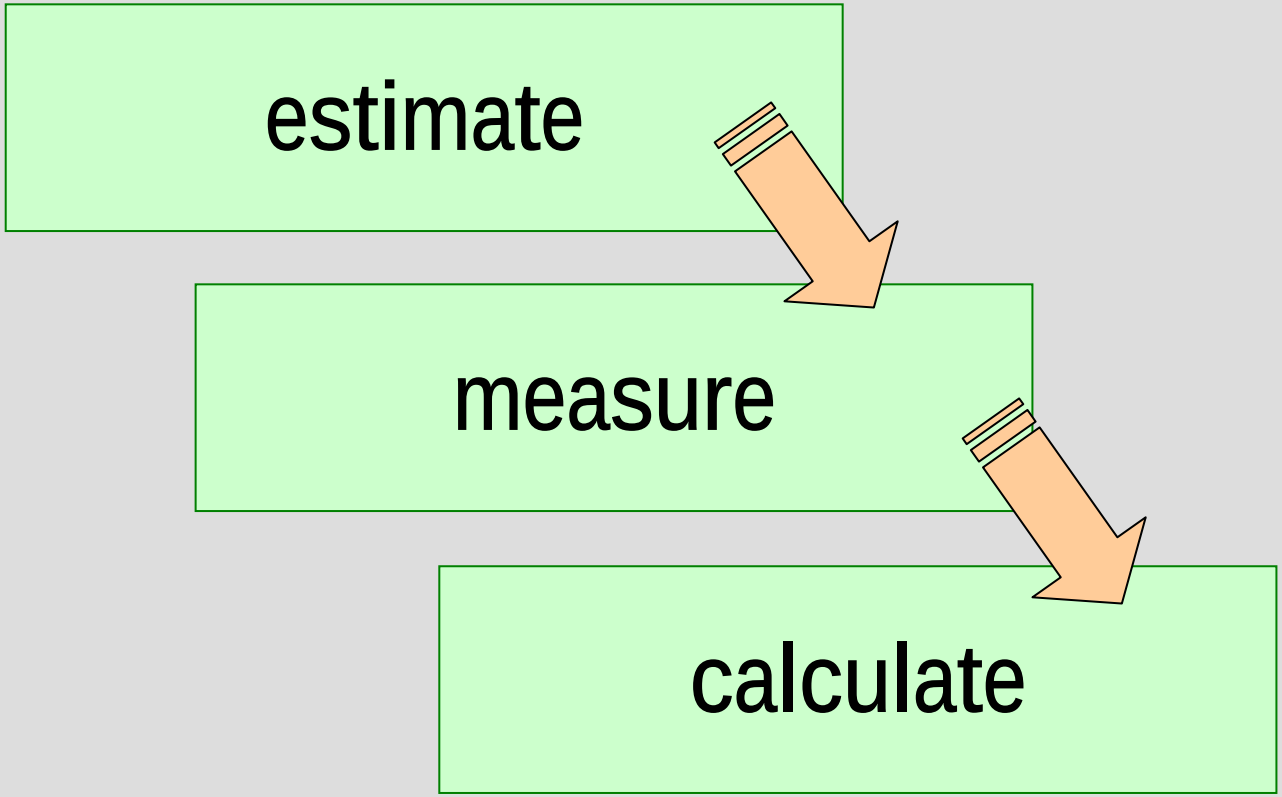


Source: study conduced by University of Osnabrück in the late 1980ies

Determination of effort during project runtime



Determination of effort – estimation only?



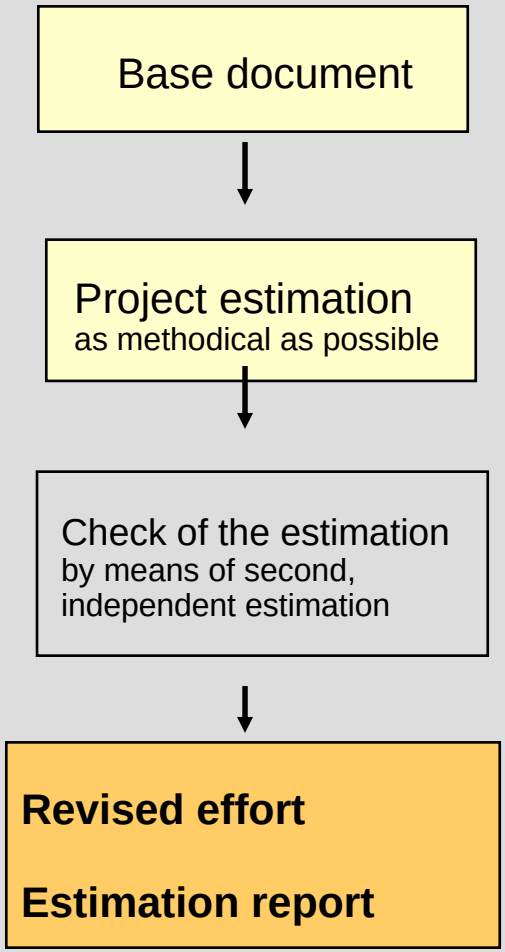
Estimation is necessary only if it is not possible to measure or calculate!

Basic effort estimation methods

- **Analogy method**
  - Effort estimation based on similar projects (evaluation of differences)
- **Multiplier method**
  - Breakdown and classification in uniform parts; estimation for only a few parts, followed by multiplication
- **Weighting method**
  - Identifying and assessing effort drivers; calculated by means of a formula
- **Percentage method**
  - Detailed estimation of a phase; extrapolation
- **Function Point method**

How to make an estimation

How to proceed



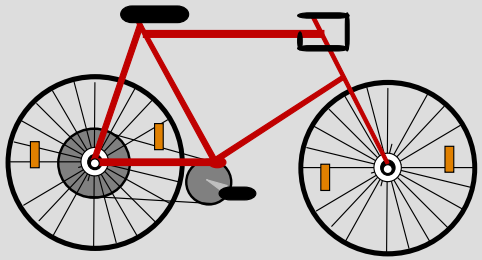
Results

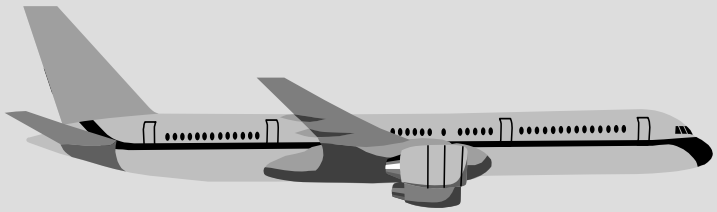
- **Revised effort**
- **Estimation report** should detail:
  - Estimation team
  - Reviewer(s)
  - Estimation basis (base documents)
  - Estimation result
  - Estimation method
  - Assumptions/preconditions for estimation
  - Identified risks

Effort estimation by means of a function point analysis

Basic principles

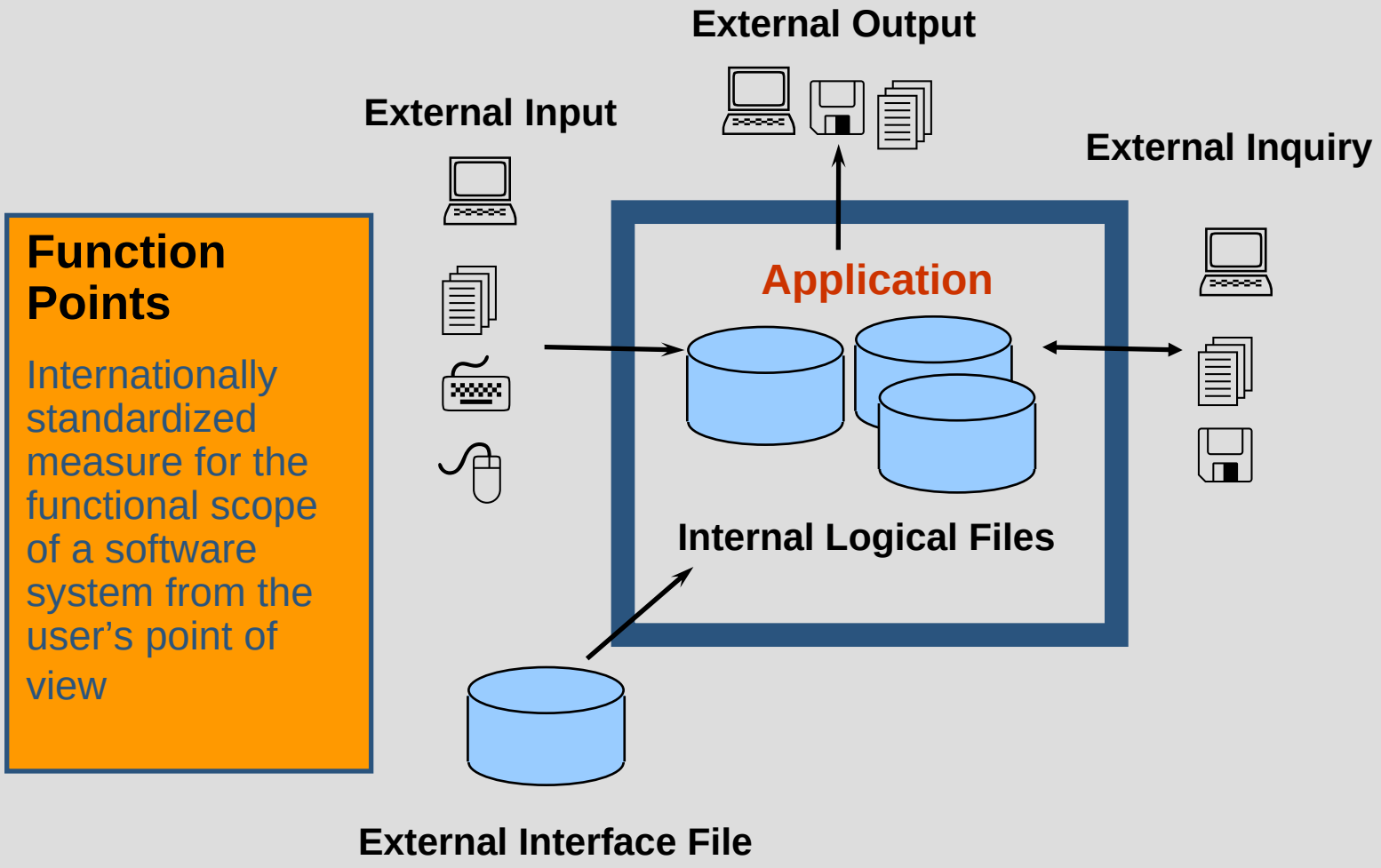
- SW considered from outside (blackbox), from the user's point of view
- Statistical mean of very simple and highly complex elements
- Simple external interfaces – simple processing
  Complex external interfaces – complex processing





What is a function point analysis?

Items under consideration



Function Points

Internationally standardized measure for the functional scope of a software system from the user's point of view

Steps of Function Point Analysis

- New development from scratch or enhancement?
- Define application bounderies
- Evaluate data bases
  internal, external
- Evaluate Functions
  input, output, inquiry
- Evaluate 14 factors of influence

Function Points are a measure for the functional scope

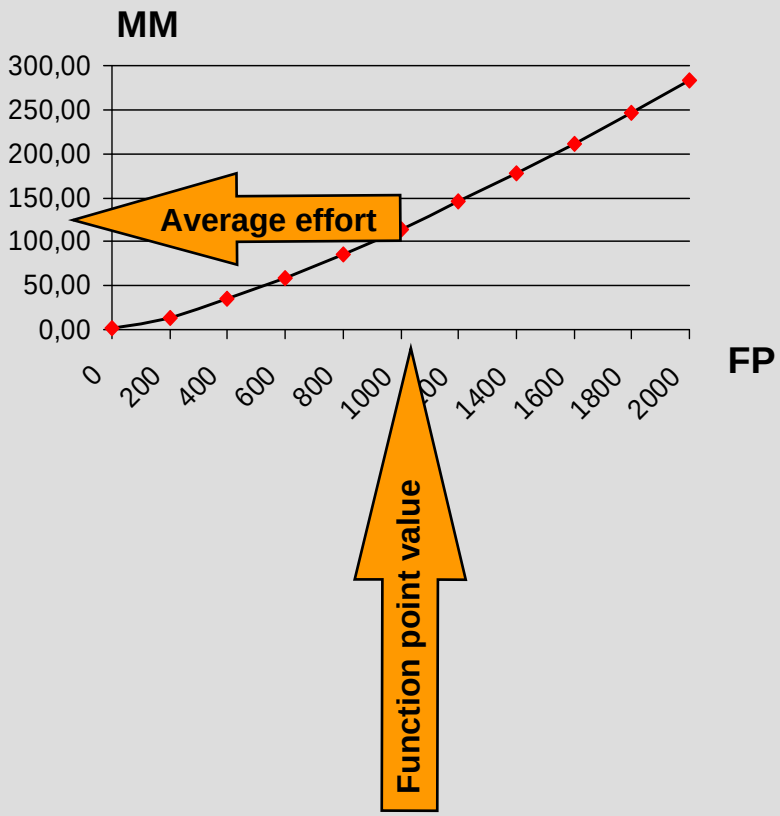
Calculation of Function Points

Function typ complexity	Low	Average	High
Internal Logical File ILF	7	10	15
External Interface File EIF	5	7	10
External Input EI	3	4	6
External Output EO	4	5	7
External Inquiry EQ	3	4	6

raw Function Points

From function points to effort figures

Transformation table
(experience from previous projects)



Influencing factors

- ❑Stability of requirements
- ❑Experience of the team
- ❑Productivity of the team
- ❑Tools and methods
- ❑Reuse
- ❑Special risks

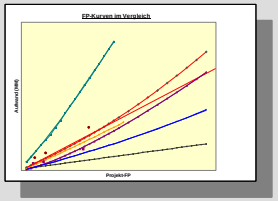
Effort estimation meeting - project-spec. correction factors

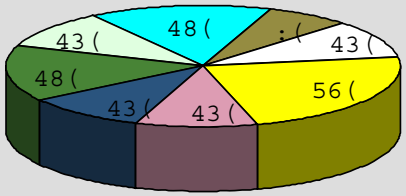
Estimated effort for the project

How to estimate effort by means of a function point analysis

- FP analysis provides interview synergy of project and method know-how between
  - FP expert from the Support Center, and
  - know-how owner from the project

- Organization-unit specific transformation table as basis
- Analysis and consideration of project-specific effort and risk factors:
  - Influencing factors
  - Contents of effort (effort distribution)





- FP evaluation by an expert from outside the project also has a quality assurance benefit

How to estimate effort by means of an expert estimation (meeting)

- “Bottom-up” procedure for effort estimation
- Structuring based on project structure (down to work package granularity – depending on implementation)
- Carried out by a team of experts, with the help of a moderator
- Recommended as an alternative to other methods, such as a function point analysis
- Ensures methodological approach and recording of estimations

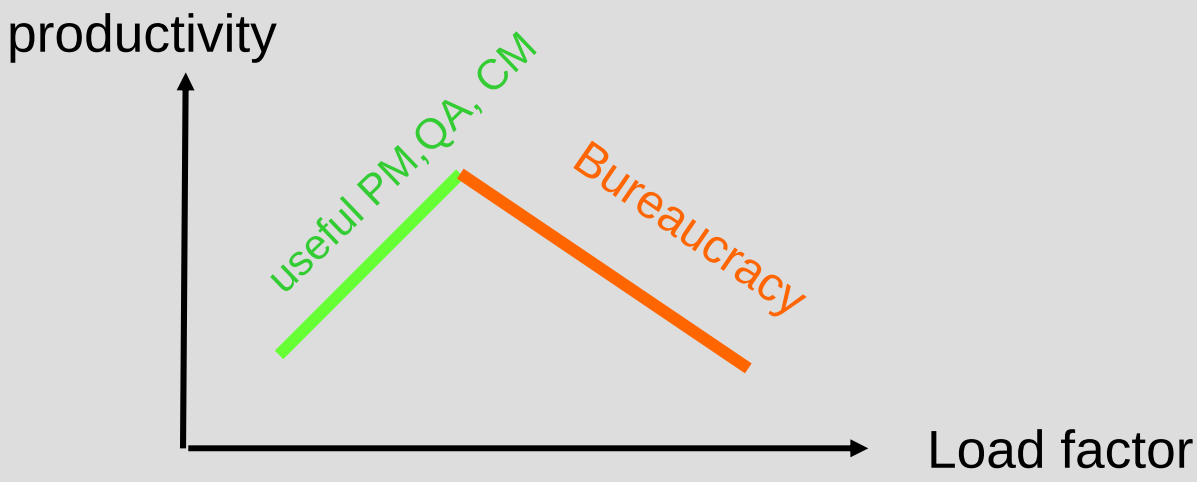
Results:

- Estimated effort per work package
- Effort for PM, QM, CM
- Total effort
- List of unresolved issues
- List of assumptions made
- List of risks discovered

Load factor

Addition to the effort of work packages for PM, QA, CM

Pressure to reduce load factor
What is the optimal load factor?



Pitfalls and tips (1)

Pitfall	Tip
☹ Almost everybody overestimates his own capacities.	⇒ What will it cost if somebody else does it? Take account of HR assignments (and dependencies)
☹ People will often exert pressure upon those making the estimation.	=> Use a tried and tested method, rely on experts from outside the project, provide accurate documentation of the estimation process **Function point analysis**
☹ Estimations made by others tend to be accepted without questioning (no verification, no weighting).	=> Verification of estimation through established method **Function point analysis** Beware of analogies (take account of circumstances and constraints)!

Pitfalls and tips (2)

Pitfall	Tip
☹ An estimation is made where it would be possible to make a calculation (e.g. percentage method after the end of a phase).	=>Use adequate methods; **function point analysis** + 2nd method (e.g.estimation based on experience or percentage method)
☹ Frequently, off-the-cuff estimations are given in personal contact with the client.	=>Communicate only verified estimations
☹ If estimated values are very high, people do not try to verify them, but simply decrease them.	=> Verify the estimate – reduce the requirements, if possible; “design to cost” on the basis of **FP** work breakdown
☹ Often nobody knows where an estimated value came from.	=>Estimation report (stored in CM system)