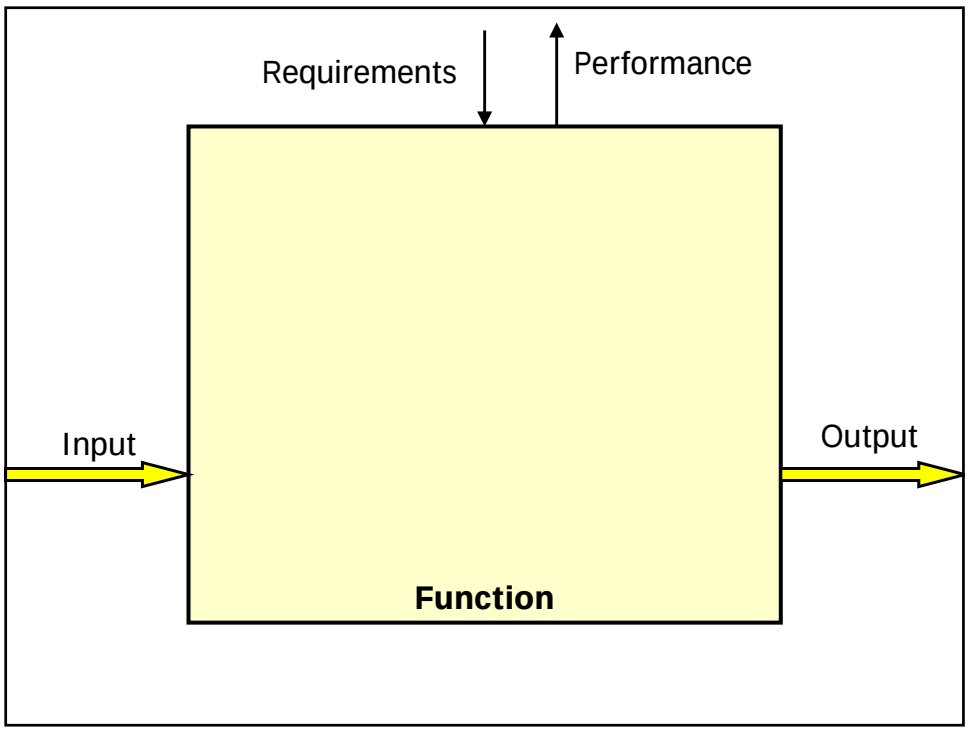
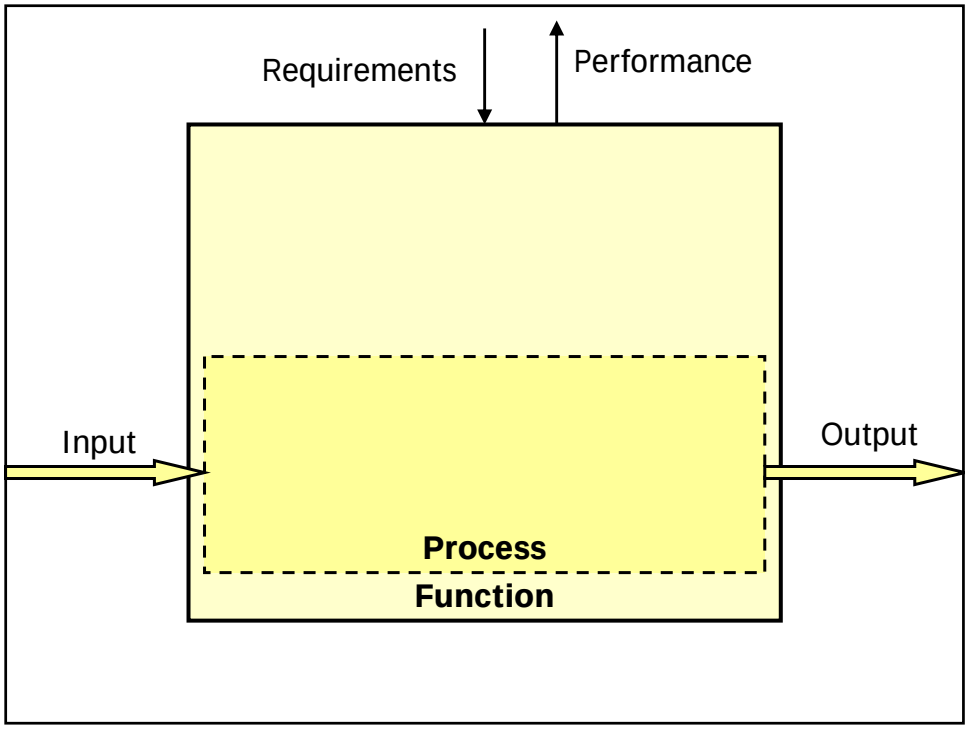
Function

Process

Task

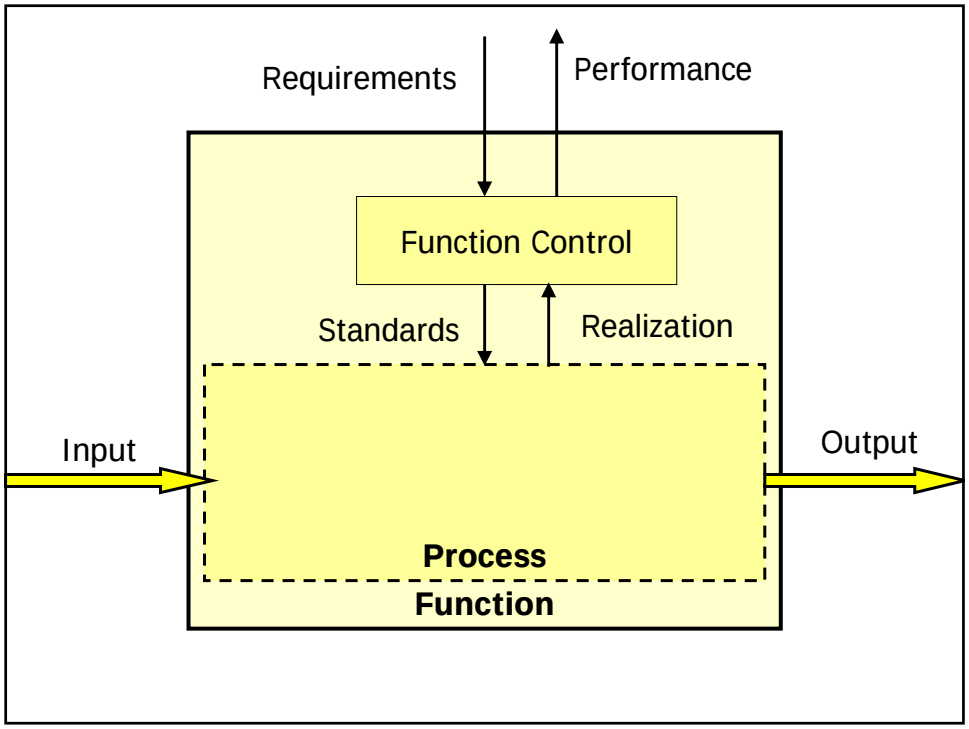


A function is physically realized by a process



A function is physically realized by a process

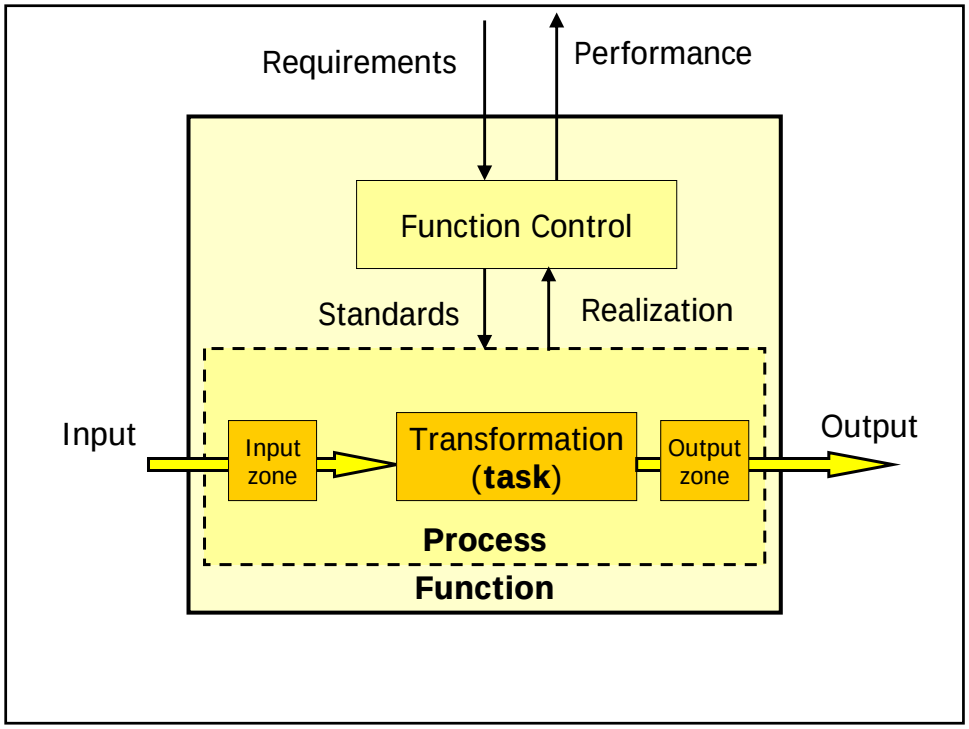
The performance should be achieved in a controlled way (Control paradigm)



A function is physically realized by a process

The performance should be achieved in a controlled way (Control paradigm)

The process “transforms” “correct” input into “correct” output.

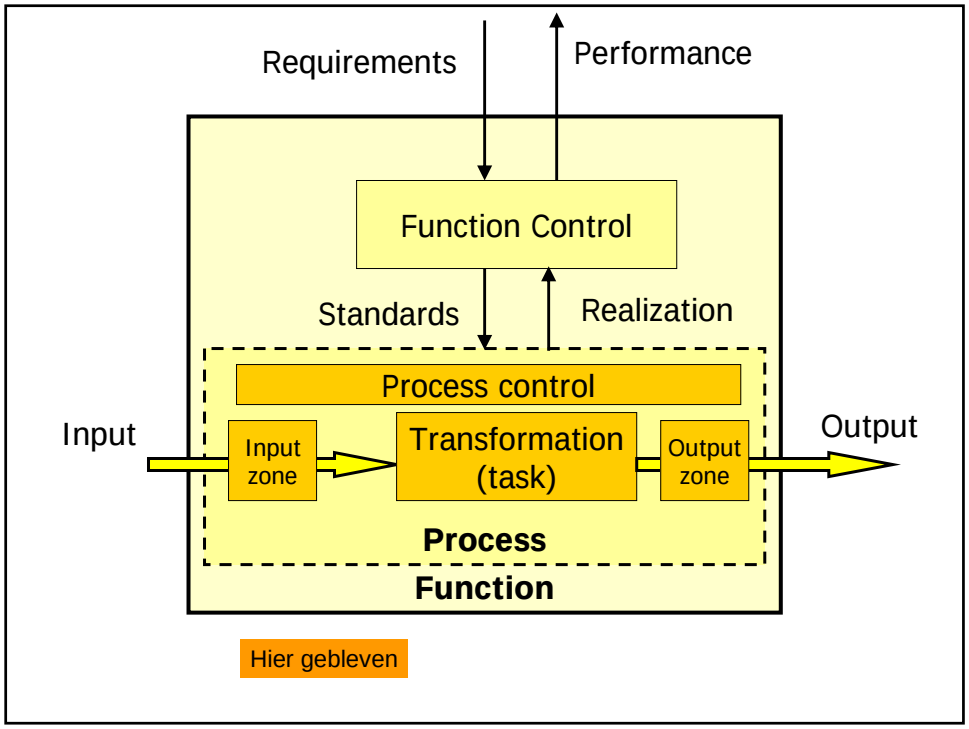


A function is physically realized by a process

The performance should be achieved in a controlled way (Control paradigm)

A single execution of the process “transforms” “correct” input into “correct” output.

Repeated transformations should achieve the required result.



Function expresses the *goal*

Process expresses the *repetition* of actions

Transformation expresses the single *action*

Task is a transformation with a specific *resource*

Systems Approach is primarily used

to ANALYZE a problem

The analysis is successful if
- The **cause** of the problem has been found
- The problem can be **reformulated** in terms of a solution

Realization is the result of
process and process control

Performance is the result of
realization and function control

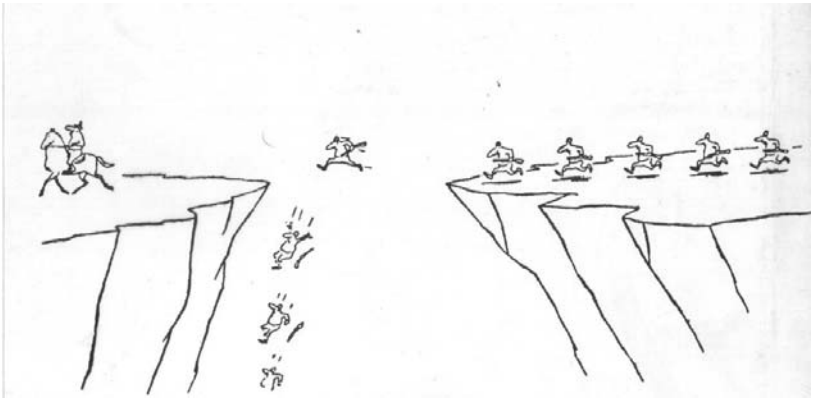
System control:

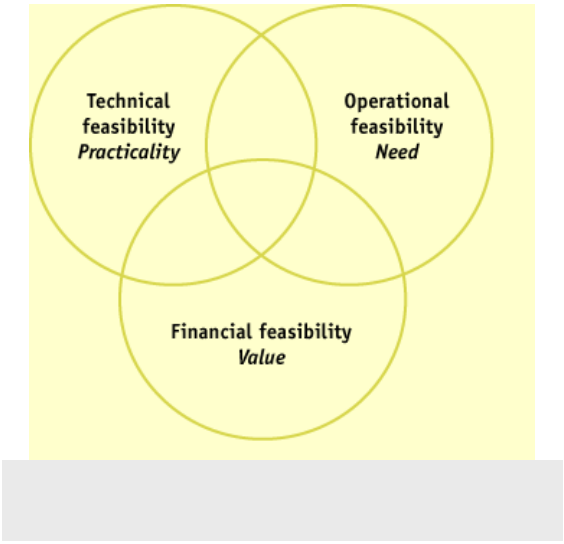
1. Function Control
2. Process Control

System control

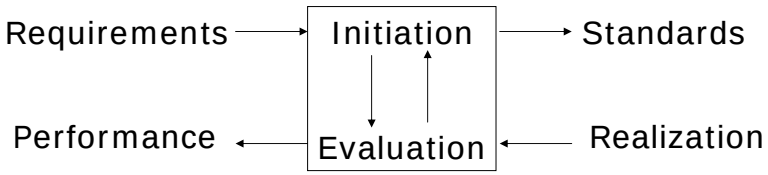
- the system needs a **target** state
  in order to achieve the goal

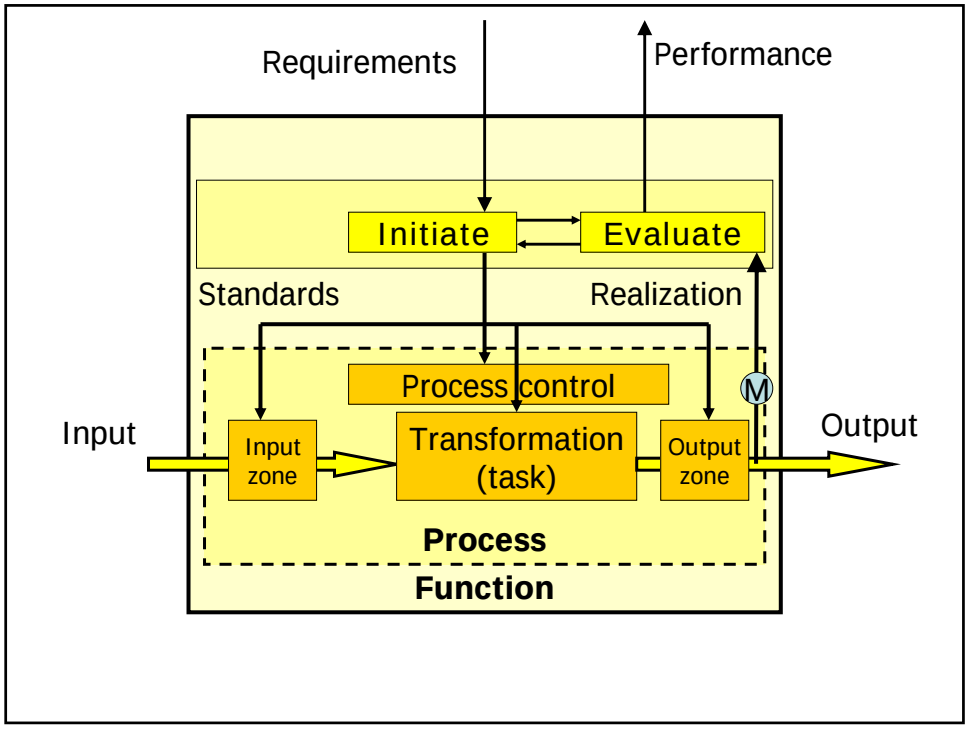
- the system must be **capable**
  of achieving the target state
  FEASIBILITY

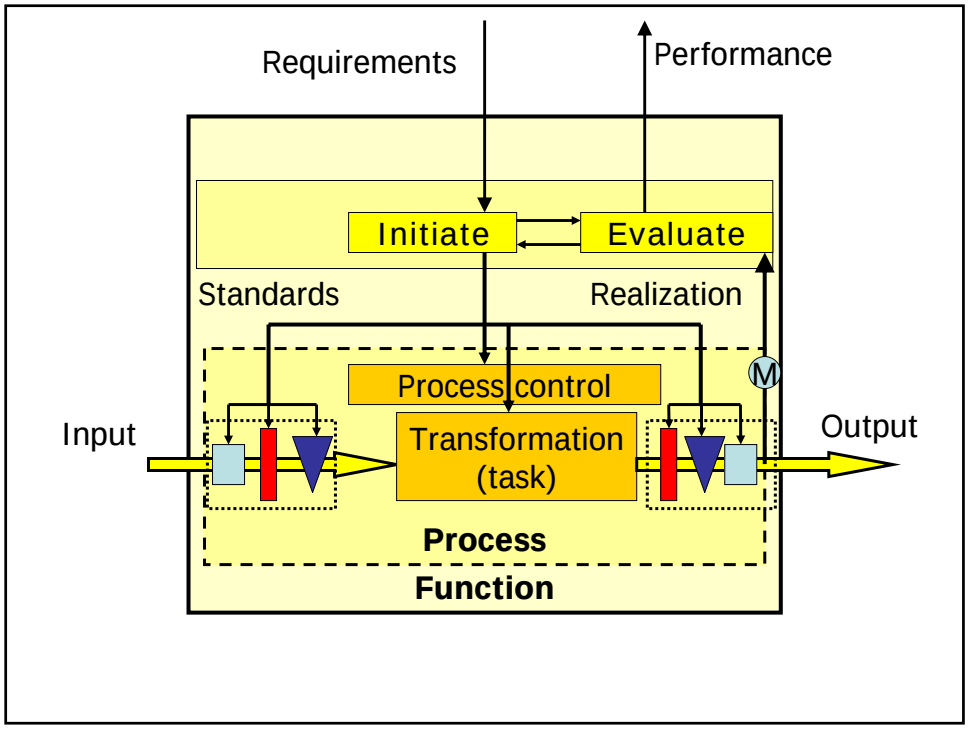




Function control




Requirements
Performance
Initiate
Evaluate
Standards
Realization
Process control
M
Input
Input zone
Transformation (task)
Output zone
Output
Process
Function


Requirements
Performance
Initiate
Evaluate
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Realization
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M
Input
Transformation (task)
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Process
Function

Standards depend on:

- Requirements
- Expectations (or model) of the process behavior
- Realizations of the past

Function control is

a medium- to long-term feedback loop

to match functionality and reality.

It does NOT react to individual circumstances!!!

(don't confuse statistics with individual instances)

The goal of initiating is
to derive feasible standards

The goal of evaluation is
to preserve the feasibility

Function control is sufficient

iff there are no disturbances

The function of **process control**

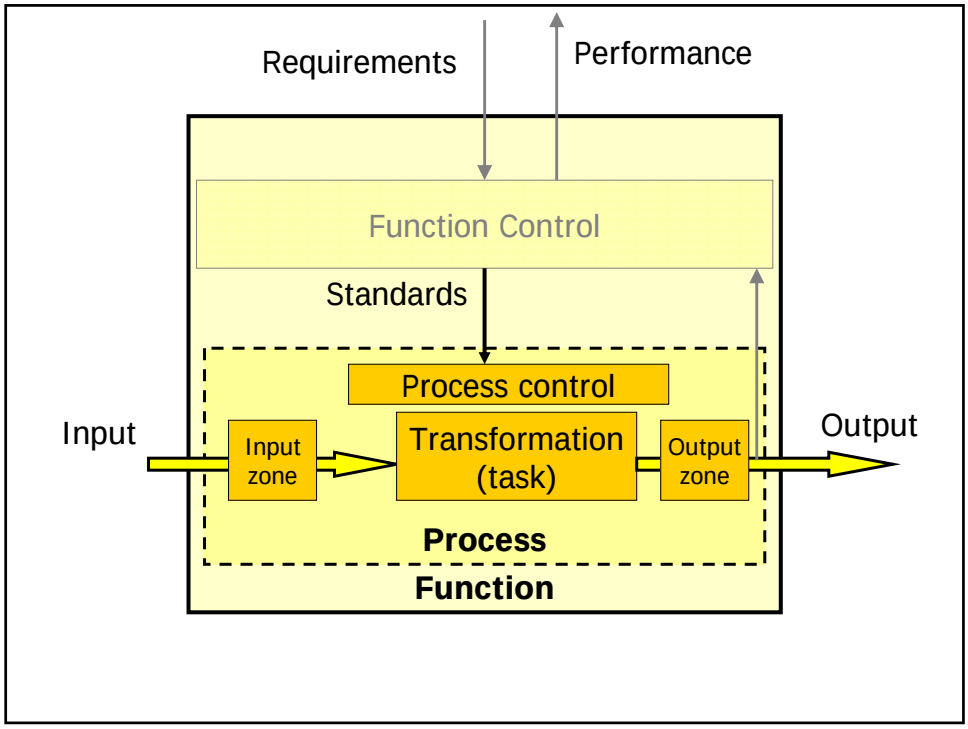
is to deal with disturbances

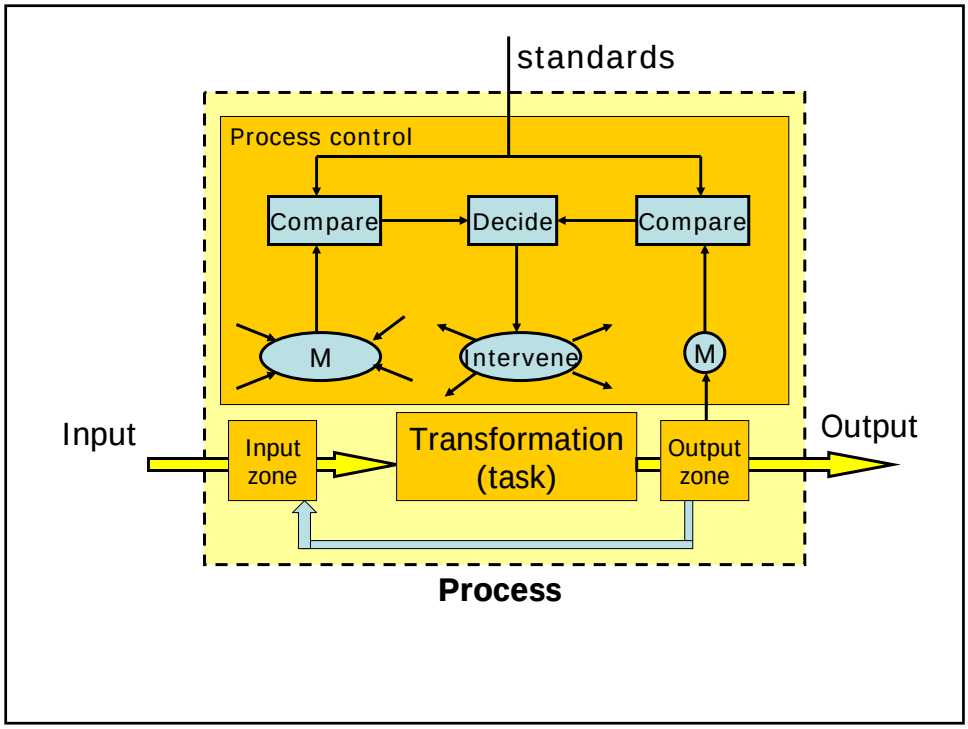
in processing

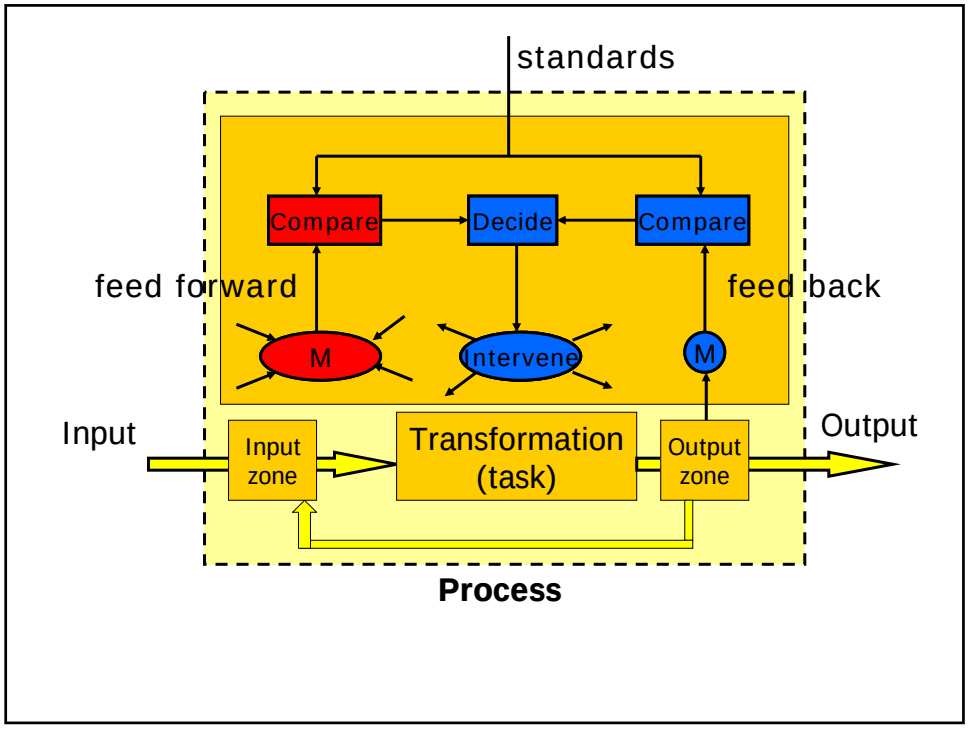
We all make mistakes,
so now and then.

System control

- the system needs a **target** state
- the system must be **capable** of achieving the target state
- It should be possible to influence the behavior of the system


Requirements
Performance
Function Control
Standards
Process control
Input
Input zone
Transformation (task)
Output zone
Output
Process
Function


standards
Process control
Compare
Decide
Compare
M
Intervene
M
Input
Input zone
Transformation (task)
Output zone
Output
Process

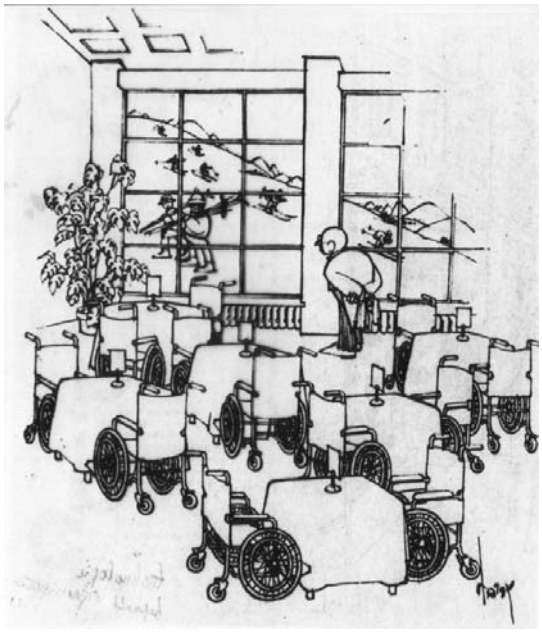


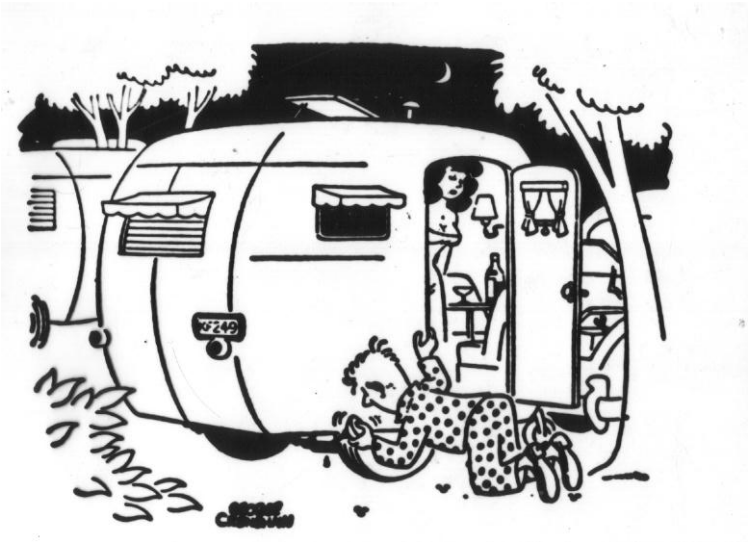
Feed forward:

<u>cause</u> determines the intervention

Feed back:

<u>result</u> determines intervention





System with feedforward only:

A company spends €100.000,- a year on advertisements.

Risks:

- The company spends too much

- The company spends too little

System with feedback:

A company keeps on advertising until 10% of the market knows their product.

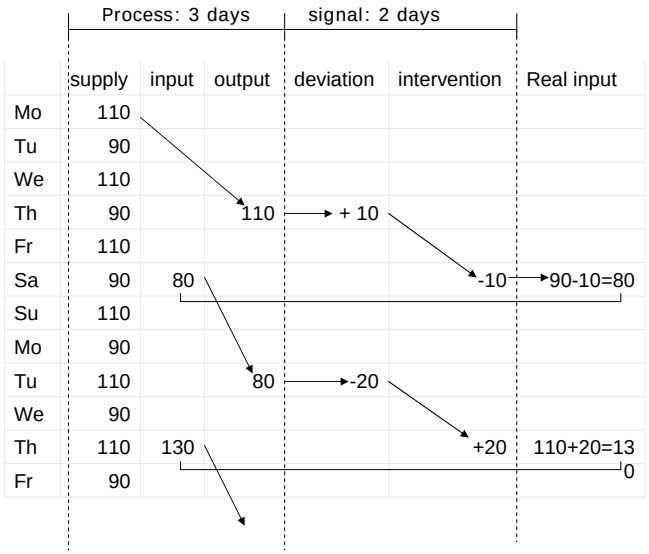
Everytime polls show that their reputation decreasing they automatically start advertising.

"Time" is important with feedback:

- the throughput time of the process

- the throughput time of the control loop

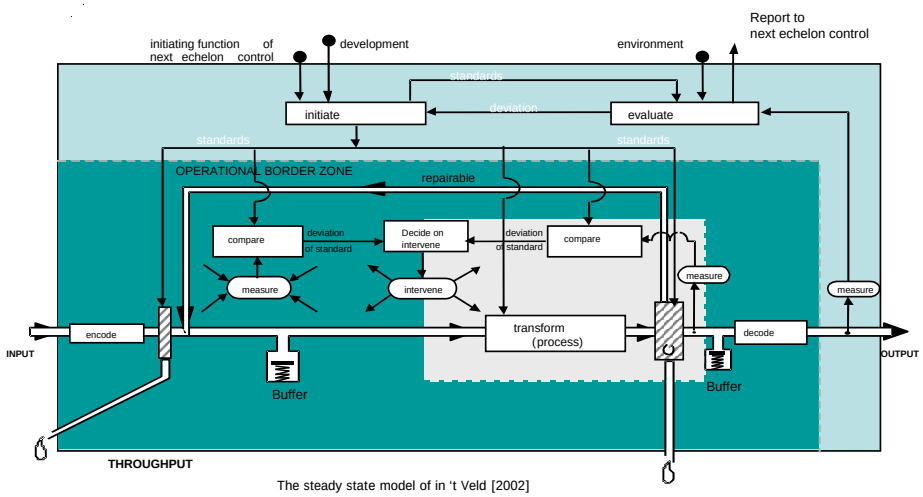
The cause may have changed, before the intervention takes place



positive feedback: acceleration

negative feedback: deceleration

feed forward: you need to know the causes beforehand: you need standards



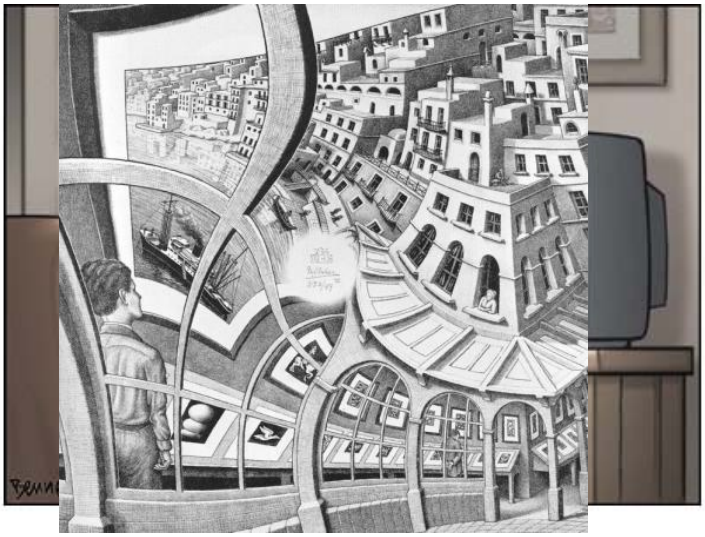
The steady state model of in 't Veld [2002]

Property:

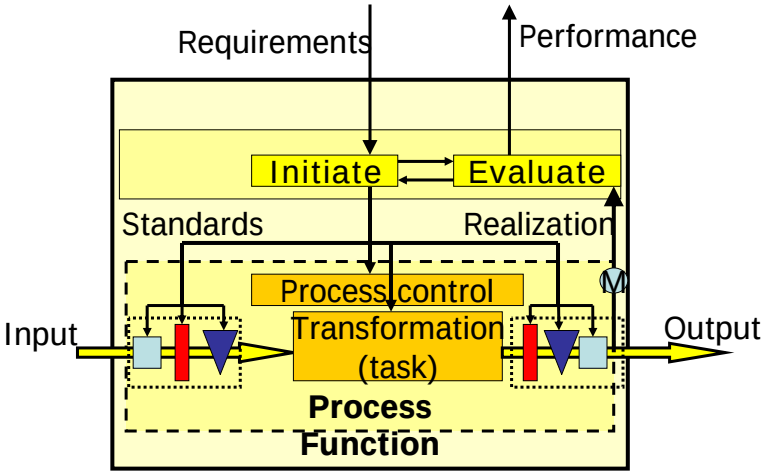
Each function inside the steady state model is a complete function again.

Droste

effect



“Opening a function”



Whenever you **open** a function you may always find:

- Transformation
- Encoding/Decoding
- Filter
- Buffer functions
- Process control
- Function control