

How to Improve the Improvement Process

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Chair of the ICT Process Improvement and Assessment Track

Who I am?

1975 MSc in Electrical Engineering / Technical Informatics, RWTH in Aachen, Germany

1975 Brown Boveri & Cie, Power system control programmer, project leader, quality manager, manager

1987 Co-founder of *INFOGEM AG*, consultant quality management, project management, reviews and testing, configuration management, metrics

sports table tennis, tennis, skiing

arts literature, theatre

Co-author of two books

'Software-Projektmanagement und –Qualitätssicherung' and

'Software-Prüfung – eine Anleitung zum Test und zur Inspektion'

... a sporty software engineer interested in arts and in all facets of quality

Involvement in professional activities



Swiss Association for Quality
Software Engineering Group



European Organisation for Quality
Software Group



1995 San Francisco
2000 Yokohama
2005 München
2008 Bethesda
2011 Shanghai



American Society
for Quality

Software Quality
Professional

VOLUME ELEVEN • ISSUE TWO • MARCH 2007



C A S T B
Czech and Slovak Testing Board

Originator Bridge Guard Art / Science Residence Centre



In 2001 the Mária Valéria bridge between Štúrovo (Slovakia) and Esztergom (Hungary) was reopened. This bridge built in 1895 was in its history destroyed for a longer time than it was actually connecting the two towns.

The aim is to support artists, scientists and personalities from other professions who work on projects that emphasise uniting, connecting, and bridging.

The post of Bridge Guard requires a person in whose work boundaries of countries or eras are bridged, mental, social, religious or political boundaries are crossed, different scientific fields are connected, or various artistic media are utilised.

ICT Process Improvement and Assessment

- Process
- Assessment
- Process Metrics
- Improvement
- Process Monitoring
- PDCA revisited



To be able to improve ...

... you need to have something that is not good enough

if you want to improve a process ...

... you need to have one

that's easy

You can't have no process ...

... unless you don't work –

but even if you don't work you're engaged in the idle process

what's not easy is to know your proces(ses)

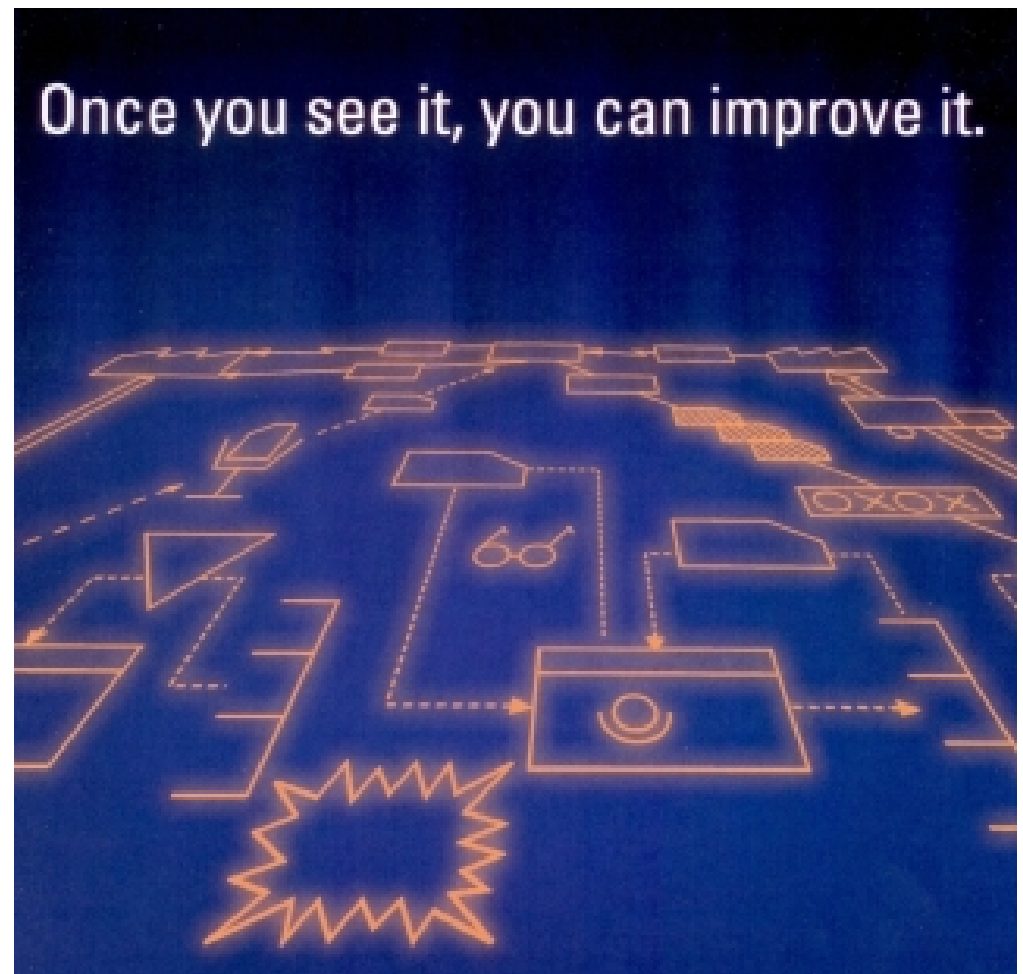
Make your processes visible

Make your processes visible



Techniques for making processes visible

1. describe or engineer & describe the processes
2. monitor the processes continuously



Process descriptions

great success!

- million companies have a described and ISO 9001 certified QMS
- you can see on intranet or paper how the processes of these companies **suppose** to work.



Process descriptions

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great!

- but ...
we still don't know
how these companies
actually do work!!



We need a tool for observation

check whether the work is done how the players agreed to and did describe it

→ internal audits

check whether the work is done how SEI (or another institution) thinks it should be done

→ assessment

audits and assessments deliver a snapshot

⇒ we know how the people worked on the day X

⇒ how do they work today?

is it so great?

Be aware of ...

... that there is an underlying assumption that the reference – a standard or a maturity model – defines the state of the art **adequately**

→ audit or assessment provides a useful picture

⇒ hints what to keep

⇒ hints where to change what

the development of such references and of the underlying models is a job with great responsibility

! my deep respect to all who do participate in this effort

Improvement?

not every change is for better, you better know

- what does work: it would be a sin to change it
- what does not work: it may be beneficial to change it

but

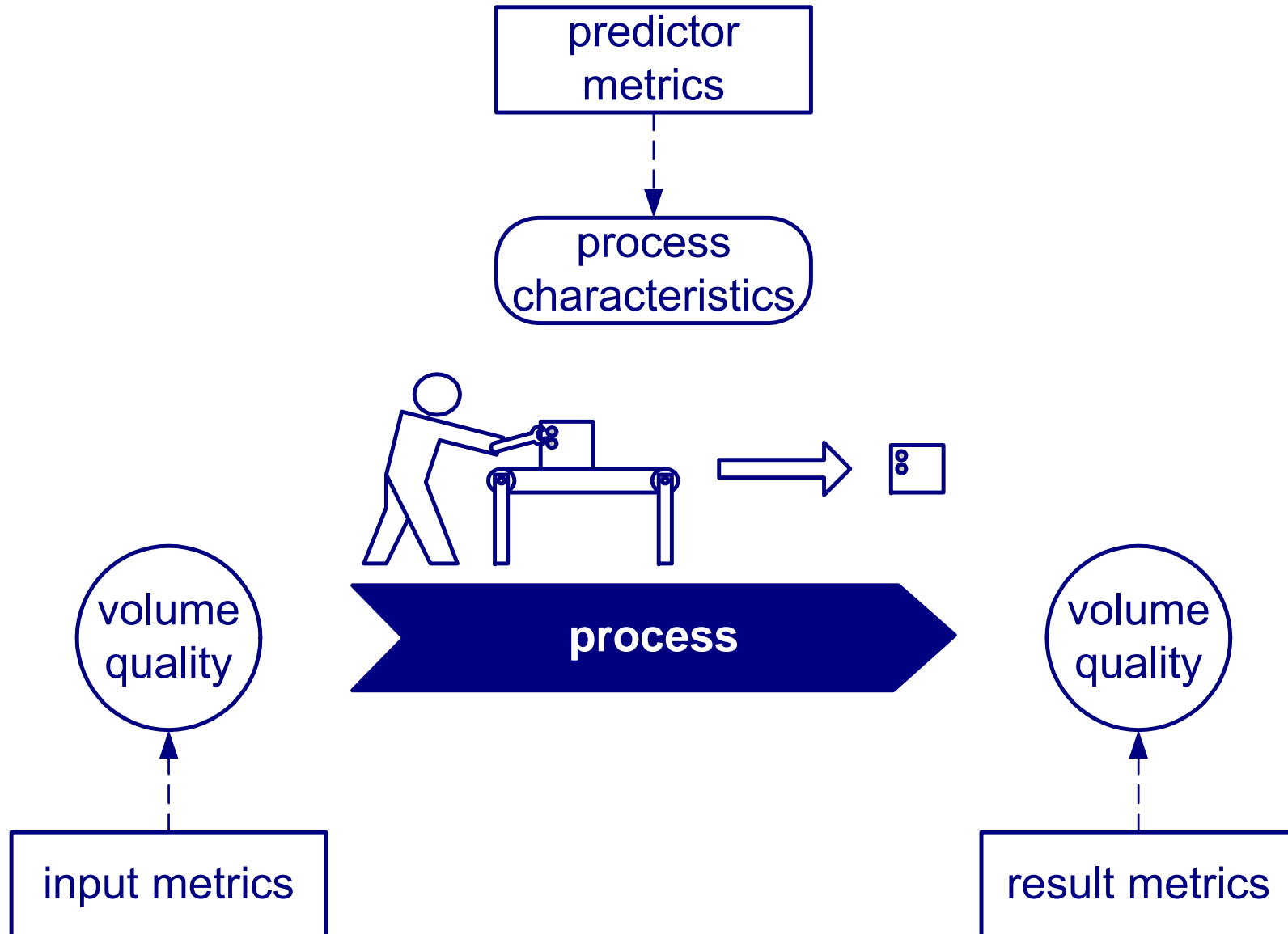
! don't use painkillers without taking into account the adverse reactions

in audits / assessments

- nail down actual process strengths too
- don't focus on deviations only



Another tool for observation – process metrics



Analogy with a car ride

process goal

- to arrive in Porto at 14:00

result metric

- arrival time in Porto, hotel Bessa



input metrics

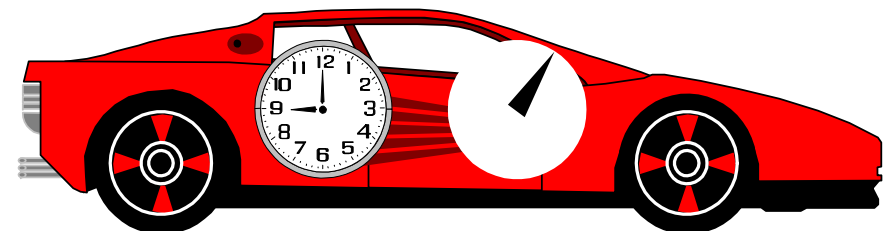
- volume of petrol in the petrol tank [l]
- oil volume [l]
- cooling water volume [l]
- water for windscreen washer [l]
- break fluid volume [l]



predictor metrics

- current time [hh:mm]
- current speed [km/h]
- current distance to target Porto [km]
- current volume of petrol in the petrol tank [l]

Porto 53 km



Example software world (1)

process goal for development (many products)

- \emptyset number of reported defects / kLOC and month ≤ 0.5 first three months after deployment
- \emptyset number of reported defects / requirement and month ≤ 0.01 first six months after deployment

result metric (single product)

- kLOC
- number of reported defects / kLOC and month
- number of reported defects / requirement and month

input metric (single product)

- number of requirements

predictor metrics (single product)

- number of defects found in reviews / requirement
- number of defects found in tests / requirement
- number of defects found in tests / kLOC

Example software world (2)

process goal for project management (many projects)

- \emptyset project duration deviation: 80% within $\pm 15\%$
- \emptyset project cost deviation: 70% within $\pm 25\%$

result metric (single project)

- project duration [month]
- project costs [kCHF]

input metric (single project)

- number of requirements

predictor metrics (single project)

- number of accepted requirements
- number of accepted requirements / month
- number of requirements ready for test
- number of requirements tested / month
- number of requirements in development
- number of requirements developed / month

Make your processes measurable



Improvement!

with reliable evaluation of the situation at hand we need 'only' to implement improvements in the areas identified to be in need of

the only problem is the 'only'!



EARTH SCARS
MARK VINCENT MÜLLER

What happens with the evaluation results?

80%
of the companies

- is happy that they know where they are (it does not matter whether they have any reason to be happy)
- don't change anything and look forward to the next evaluation

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- they identify three measures for conscious change of the way they work and implement these changes

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- they identify three measures for conscious change of the way they work and implement these changes

5%
of the companies

- is easy-going, they know there is no reason to be happy or unhappy
- they go on with business as usual and change here and there to improve their work (results)

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the only problem is the 'only'!

organisations have a great inertia

- development organisations have the biggest (individual) inertia

Armour's observation on software process:

What all software developers really want is a rigorous, ironclad, concrete, hidebound, absolute, total, definitive, and complex set of process rules

*Phillip G. Armour: The Laws of Software Process
Communications of the ACM, Vol. 44, Number. 1, 2001, pp. 15-17*

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- diagnosis is easy, therapy is harder to define and adamant to apply

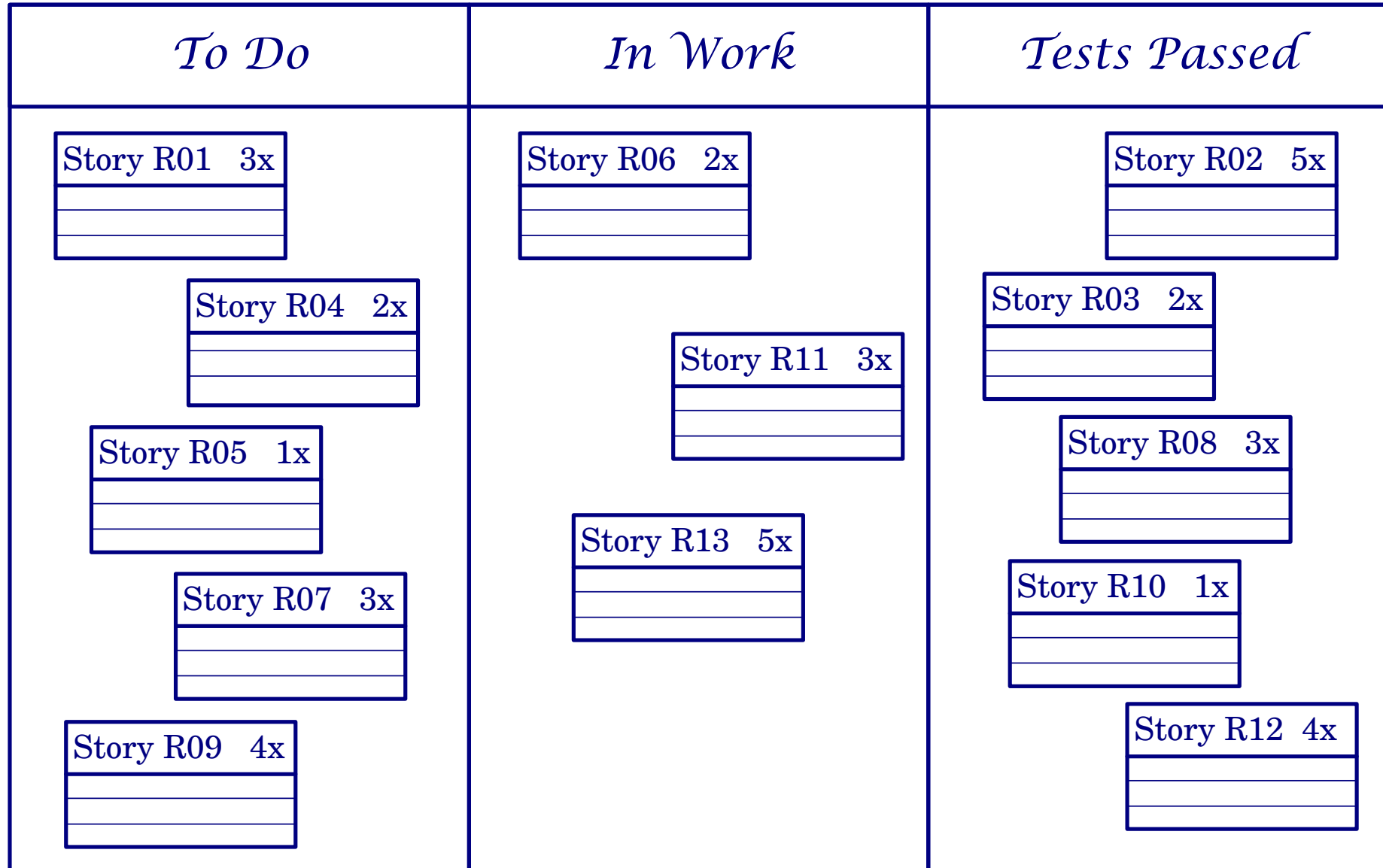
Make improvements instantly ...



Make improvements instantly ...

... but only one at a time

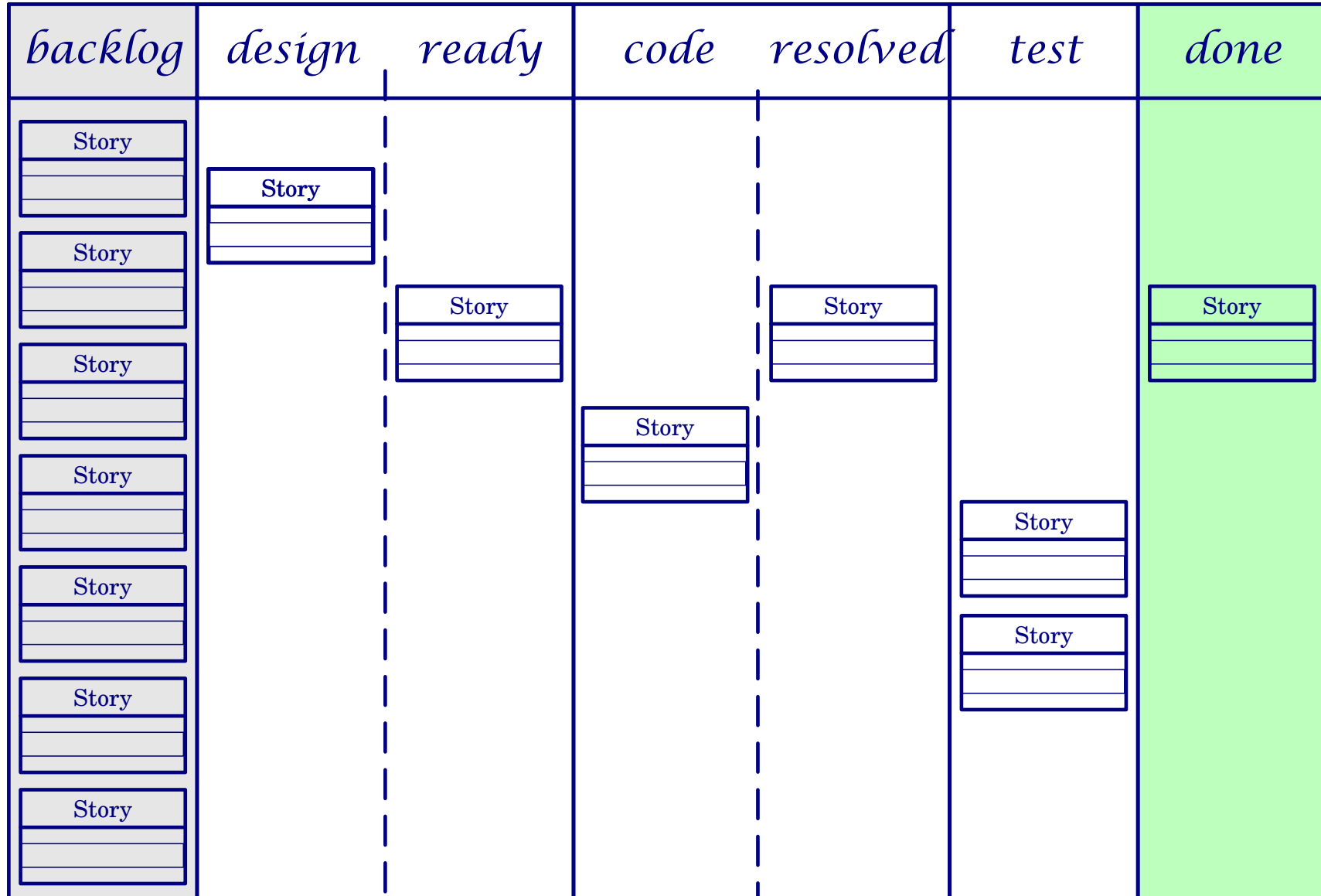
From snapshot to 'continuous' overview (agile)



From snapshot to measured 'continuous' overview

<i>To Do</i>	<i>In Work</i>	<i>Tests Passed</i>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Story R01 3x</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Story R04 2x</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Story R05 1x</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Story R07 3x</div> <div style="border: 1px solid black; padding: 5px;">Story R09 4x</div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Story R06 2x</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Story R11 3x</div> <div style="border: 1px solid black; padding: 5px;">Story R13 5x</div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Story R02 5x</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Story R03 2x</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Story R08 3x</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Story R10 1x</div> <div style="border: 1px solid black; padding: 5px;">Story R12 4x</div>
<p>5 stories 13 story points</p>	<p>3 stories 10 story points</p>	<p>5 stories 15 story points</p>

From overall view to workflow (lean)



Product structure and the workflow, in figures

System		<i>backlog</i>	<i>design</i>	<i>ready</i>	<i>code</i>	<i>resolved</i>	<i>test</i>	<i>done</i>
SuSy A	Comp A1	8	0	1	1	2	2	2
	Comp A2	10	1	1	1	1	3	3
	Comp A3	7	1	2	1	1	1	1
SuSy B	Comp B1	11	2	0	1	2	3	3
	Comp B2	8	0	1	1	1	3	2
SuSy C	Comp C1	10	1	1	2	1	3	2
	Comp C2	12	1	1	1	2	3	4
	Comp C3	7	1	1	1	1	2	1
	Comp C4	9	1	1	2	2	1	2

Process signals

stage	<i>req</i>	<i>specified</i>	<i>design</i>	<i>ready</i>	<i>code</i>	<i>resolved</i>	<i>test</i>	<i>done</i>
healthy	3	1	3	1	2	1	1	1
design?	1	3	3	1	2	0	1	2
design??	3	3	3	0	1	1	1	3
design!	3	3	3	0	0	1	1	4
paralysis	3	3	3	0	0	0	0	6

time ↓

Make process execution
visible, continuously

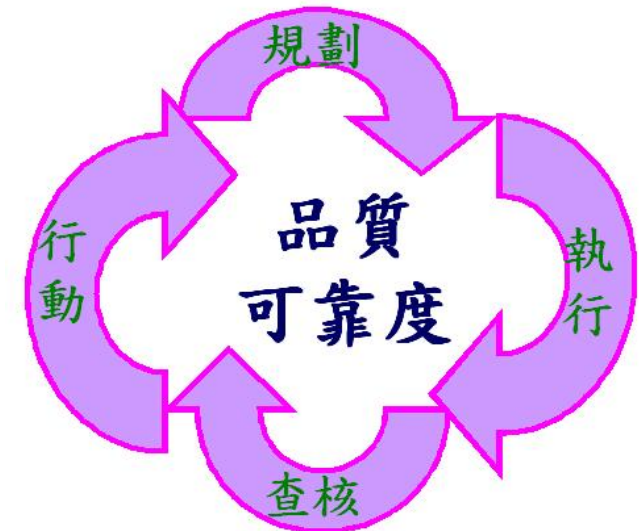
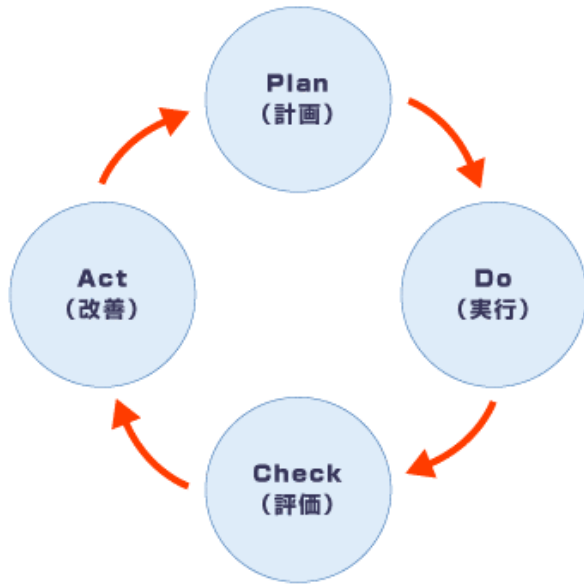


**Make process improvement
to rule, not to exception**

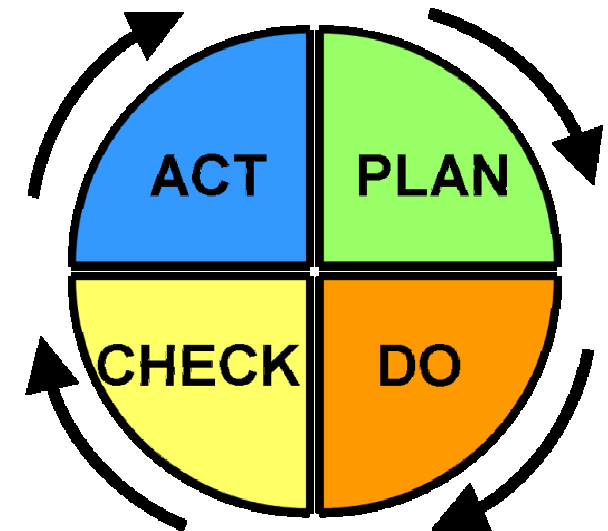
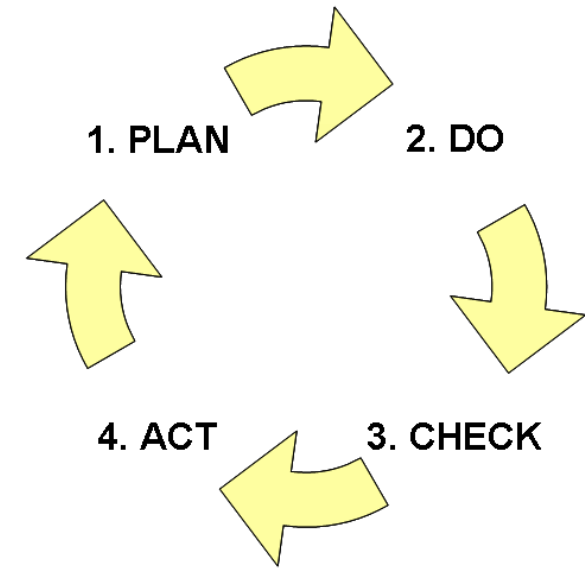
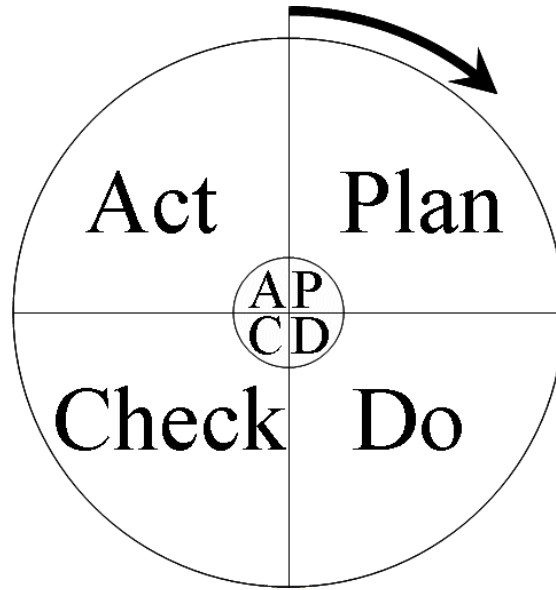
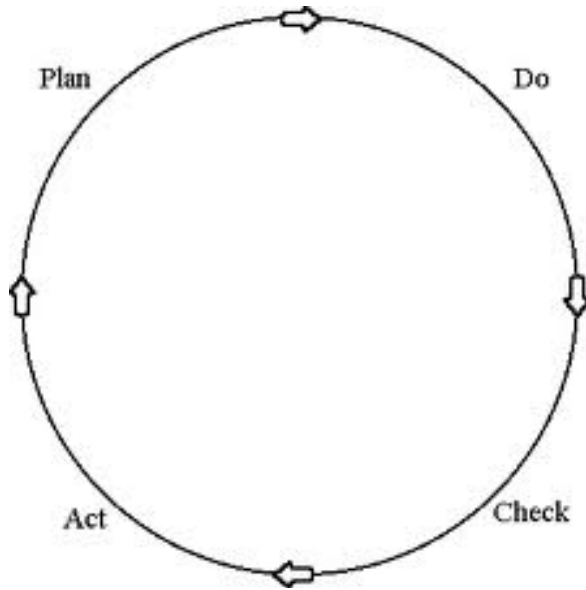
PDCA – surprising search results



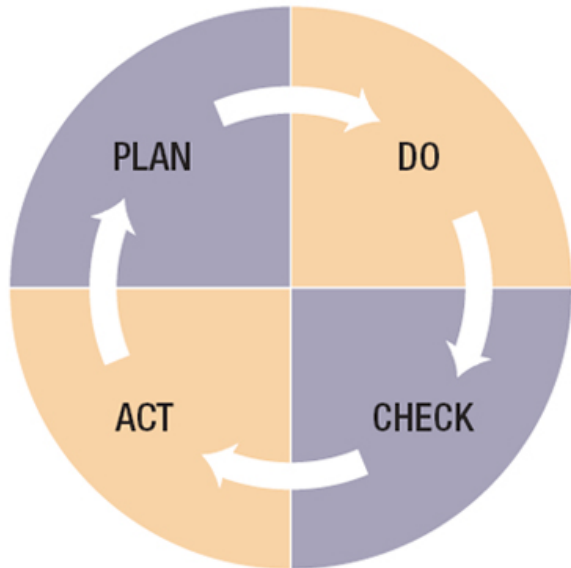
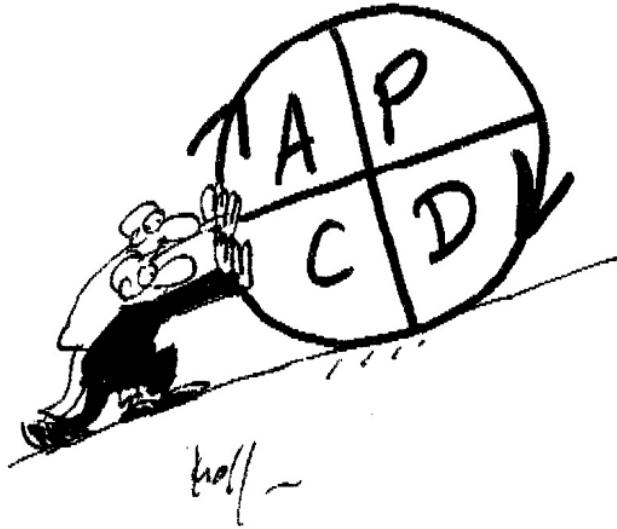
PDCA – many shapes and letters



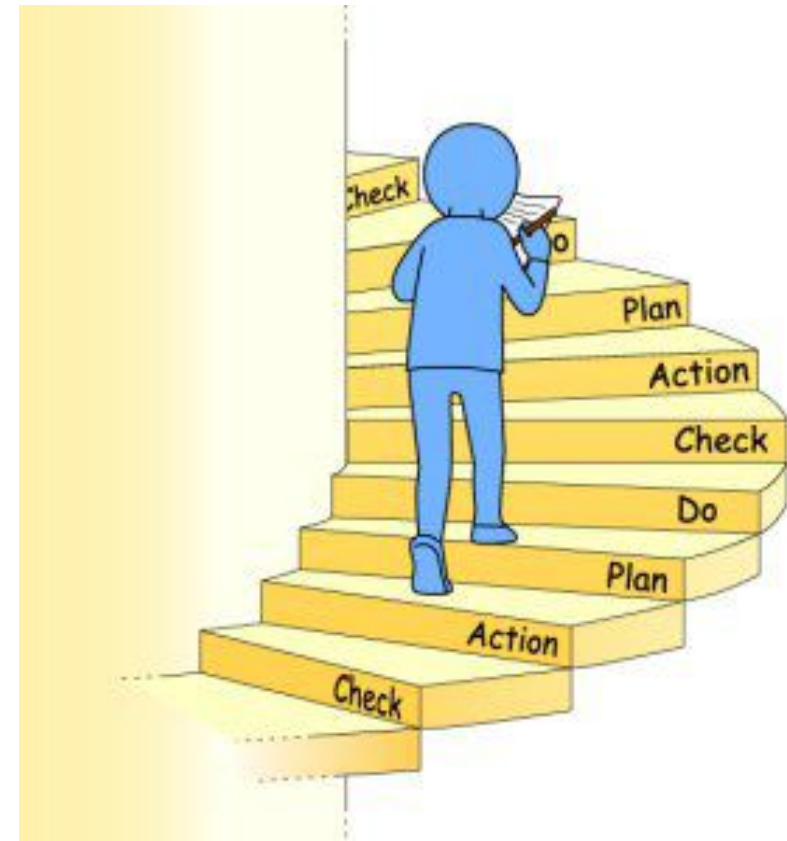
PDCA – many shapes and colours



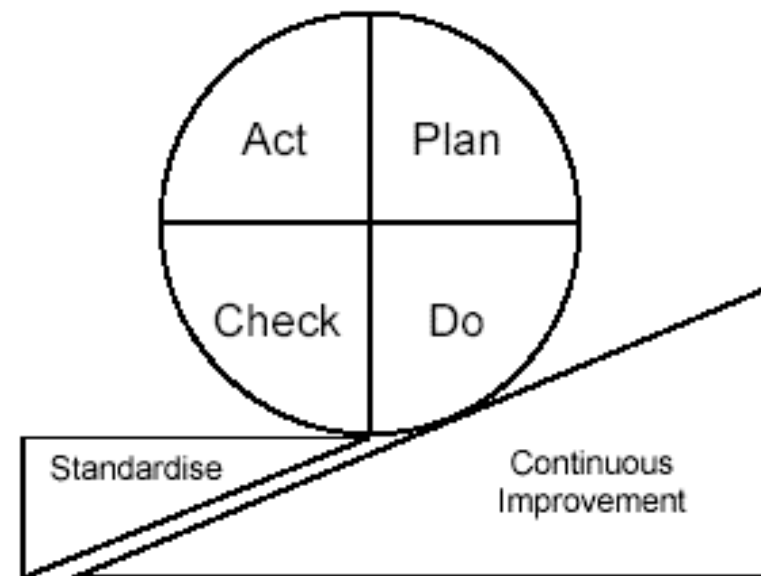
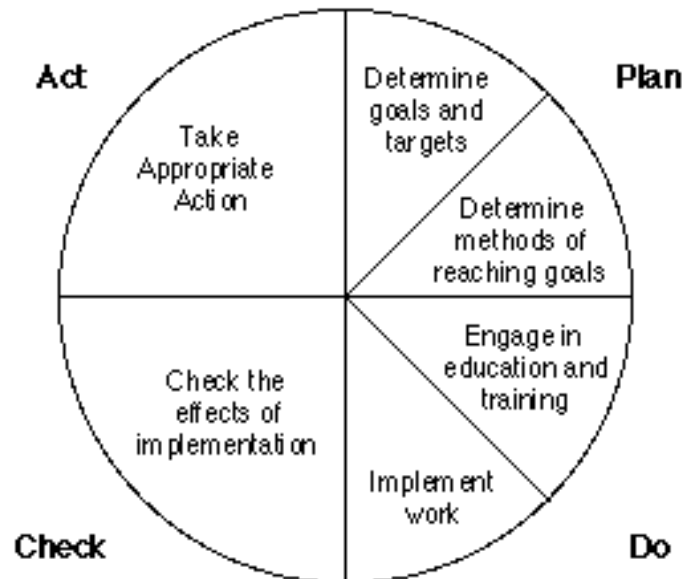
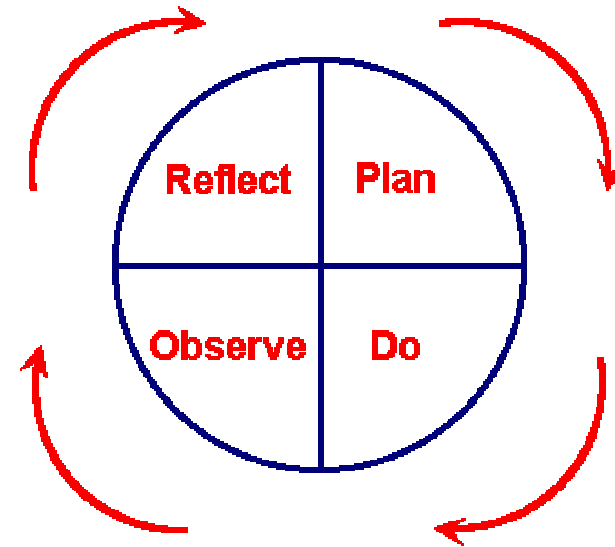
PDCA – many shapes .. directions



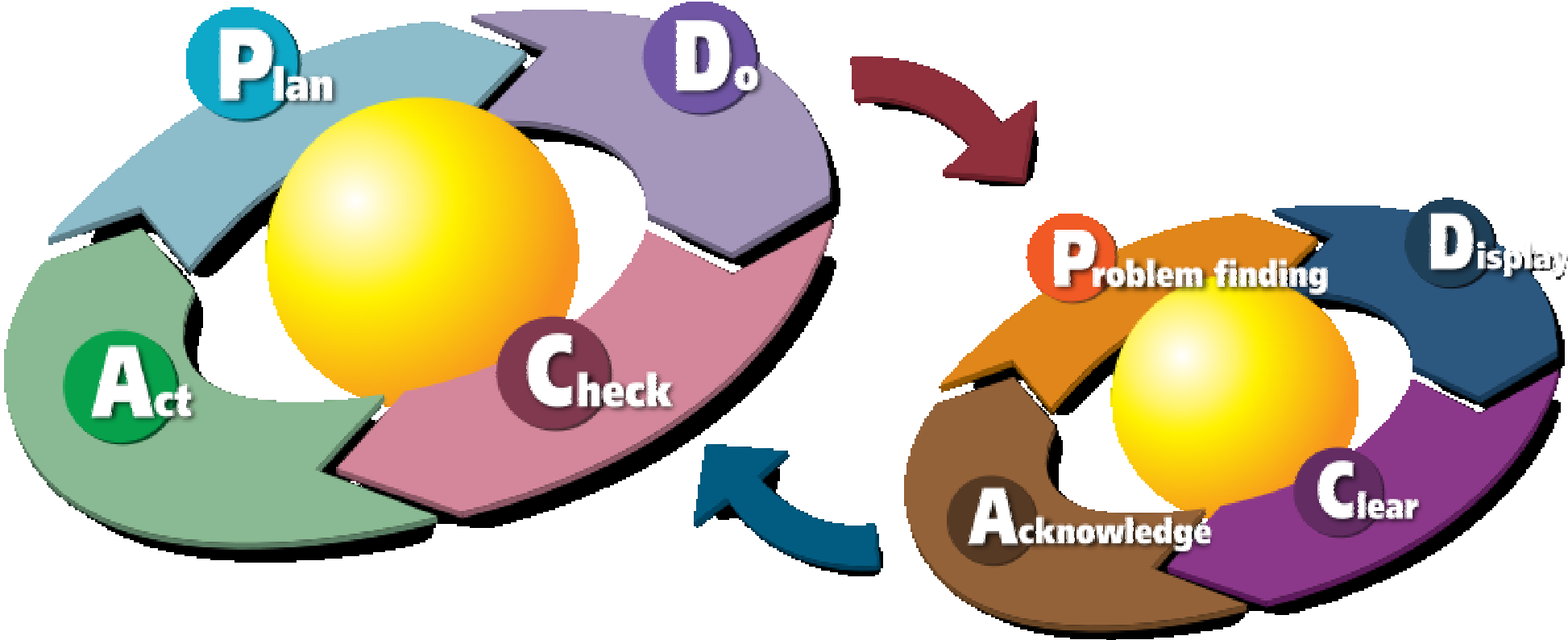
PDCA – the cycle is not always round



PDCA – variations



PDCA – extension



PDCA career

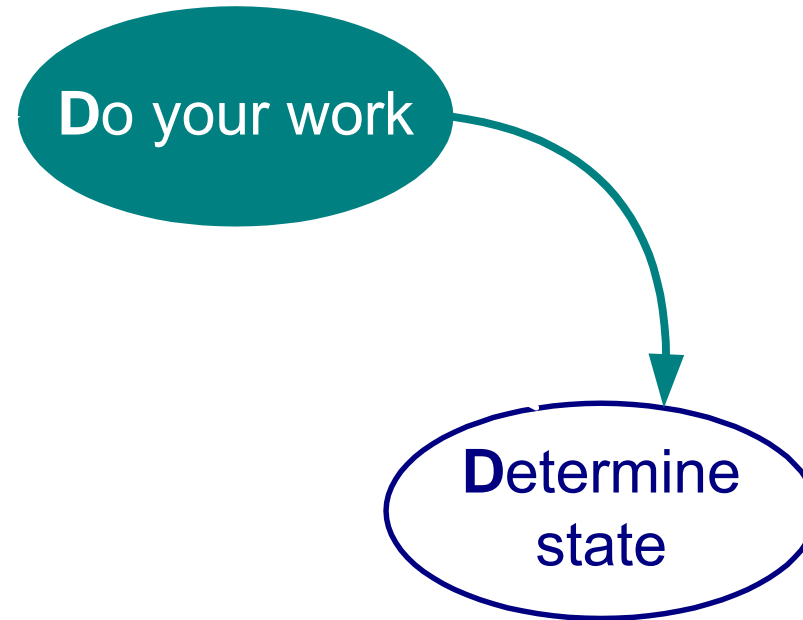
PDCA



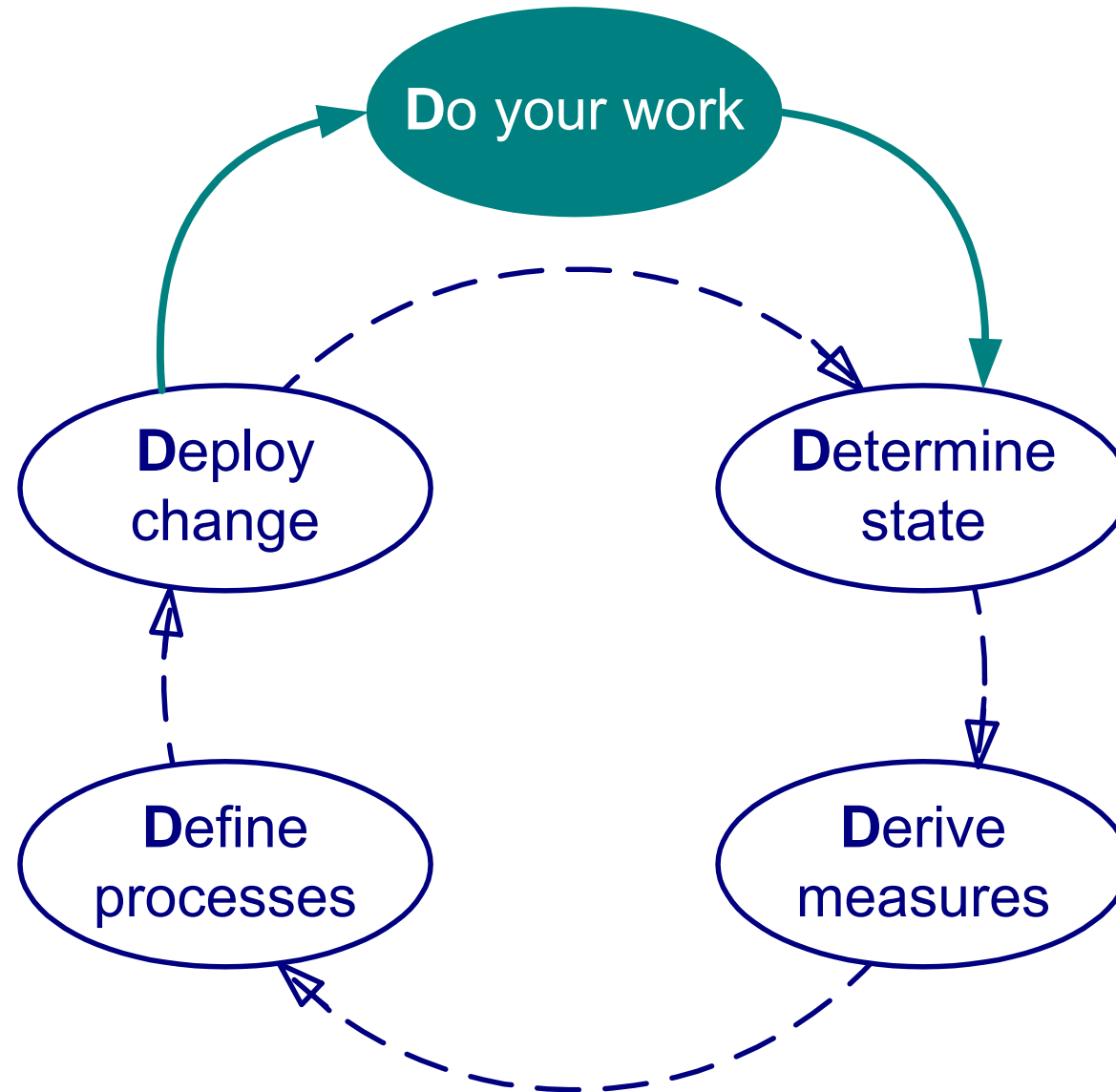
4D + D cycle

Do your work

4D + D cycle



4D + D cycle



Sorry ...

OUT OF THE CRISIS

W. Edwards Deming

*My best greetings to Mr. K. Trühauf
W. Edwards Deming
27 June 1989*



A kind of conclusion ...

P rocess improvement is the use of
O pportunities you have to discover
R ound are the improvement cycles
T ough to drive them anyway and
O nce to move is not enough

P rocess improvement is the use of
O pportunities you have to discover
R obust processes are
T ough to change
U nder continuous observation there is a
G reater chance for timely improvement
A gile can be made even
L ean but never mean