

Wrap-Up: Software Engineering

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*"Good, Fast, Cheap:
Pick any two (you can't have all three)."*
-- from RFC 1925

Replay: What is Software Engineering?

- Software Engineering (SE) is
multi-person construction of multi-version software [Parnas]
- SE as *Engineering* Discipline
 - Adherence to **quality** standards
 - Role model: classic engineering disciplines
 - *mechanical engineering, civil construction, ...*
- SE offers
 - management, theory, organisation, methods, tools, techniques
 - ...for constructing **large** program systems

When reporters asked astronaut Alan Shepard (Freedom 7, 1961) what he thought about as he sat atop the Redstone rocket, waiting for lift-off, he replied, 'The fact that every part of this ship was built by the low bidder'.

-- Gene Kranz, *Failure Is Not an Option*

Brief, Incomplete History of SE Paradigms

- (symbolic) machine code ("assembler")
- High-level languages ("compiler"): abstracting from architecture
- Structured programming: functions, blocks, local variables
- Object-oriented programming: encapsulation, inheritance
- Component-based architectures: reusable software components
- Service-oriented architectures (SOA): reusable service components

The Modern SE Process

■ Structured

- Data & code
...and the SE process itself

One voice out of zillions, but a good one IMHO:
www.stsc.hill.af.mil/crosstalk/2008/08/0808Weinberg.html
see also: www.geraldmweinberg.com/Site/Software.html

■ Object-oriented

- Classes, responsibilities, collaboration

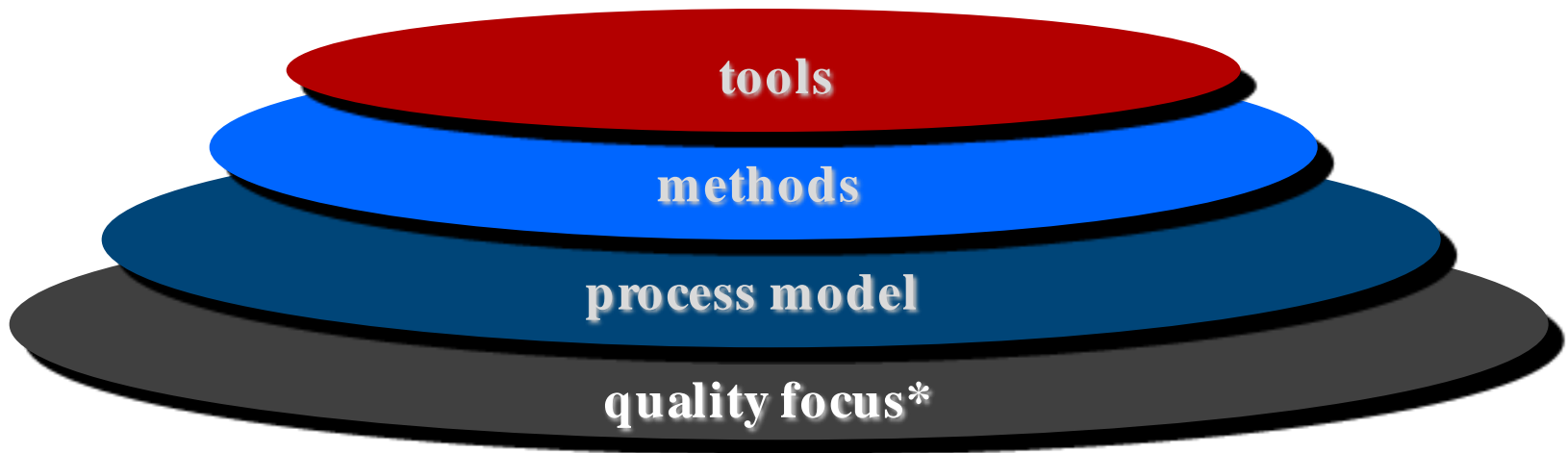
■ Incremental

- Delivery occurs in increments
- All SE activities are iterative

■ Agile

- process & people must be adaptable

A Layered View on Software Engineering



SOGETI World Quality Report
(pp 14, 28, 36 *mandatory reading for exam*)

* „quality“ is just a shorthand for „make it work – *always*“

Nothing is as stable as an interim solution

- Y2K
- rail track gauge 4 ft 8.5" : Railway builder Stevenson relied on measure ~identical to Roman chariots



- → better do it right the first time
- „quality“ is just a shorthand for „make it work – *always*“

(more discussion [here](#) and [here](#))

Your Goal as a Professional?



What Does Industry Expect From You?

Marion Berkmann, Senior Manager HR Germany, NetApp:

- Flexibility, motivation, ability to work on your own.
- Basic technology know-how, in-depth market knowledge, a customer oriented approach, and willingness to learn.
- IT experts increasingly take over consulting and management tasks!

Programmer: A red-eyed, mumbling mammal capable of conversing with inanimate objects.

Programmer's Professionalism

- **knowledge**
 - tools, methods, best practice – *keep on learning!*
- **+ diligence**
 - documentation, testing, and all the other 'ugly' duties – *make it your habit!*
- **+ anticipation**
 - what constellations can occur? Worst case? – *feeling for machine + circumstances*
- **= craftsmanship**
- *...plus responsibility & ethics*

Best success!
*...for your sake
& that of your users*