



Agents & Dependability

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Context



40 + years of dealing with computers and software taught me to be skeptic

- with regard to reliability and dependability
 - too many cases of human errors with dramatic consequences
 - while specifying
 - while developing
 - while using
 - too many cases of software that crashes
 - too many cases of software that does not do what we expect
- with regard to the “ultimate and best solution”
 - too many proposals that did not prove themselves
 - too many changes of terminology apparently for the sake of change
 - do computers really have mental states?



Can we trust computers?



Some examples

- OS360 and many many others
- Telephone system outage
 - programming error
- Ariane
 - standard missing or not obeyed
- Mars explorer
 - interface error

We are not alone !!!

- Comet
- Shuttle
- Bridge
- Titanic



Would you fly?



Would you fly in a MAS controlled airplane?

- every plane contains agents that
 - sense the proximity of obstacles and other planes
 - are able to determine the possibility of collision in the next n minutes
 - take action to avoid collision
- the collection of airplanes form a society of agents
- planes and obstacles enter and leave the space of interest of the society or of a specific plane

Seems to be a nice MAS application doesn't it?

Would you dare to propose this solution?

Once implemented would you rather take a bus?

But ...

- remember the lake Constance accident



Can we validate?



Can we prove the correctness of MAS?

- do we really know how to specify them?
- do we have adequate models?
- do we correctly understand all subtle timing problems? etc.

Do we have adequate processes?

- do we correctly understand all interface problems?
- can we trust separately (incrementally) developed components?
- can we trust integration?

Can we test them?

- acceptance test => system does what the user expects
- functional tests, etc.



Risk



What kind of risk does the mal-functioning of present day MAS's present?



Conclusion 1



Although several systems are working apparently in an adequate way

- we must still be very humble when proposing this kind of solution
- Nice example: Google
- A nice proposal:
 - Tim Berners-Lee, James Hendler and Ora Lassila; *The Semantic Web: A new form of Web content that is meaningful to computers will unleash a revolution of new possibilities*; Scientific American; May 17, 2001



Conclusion 2



Lots of research is still required

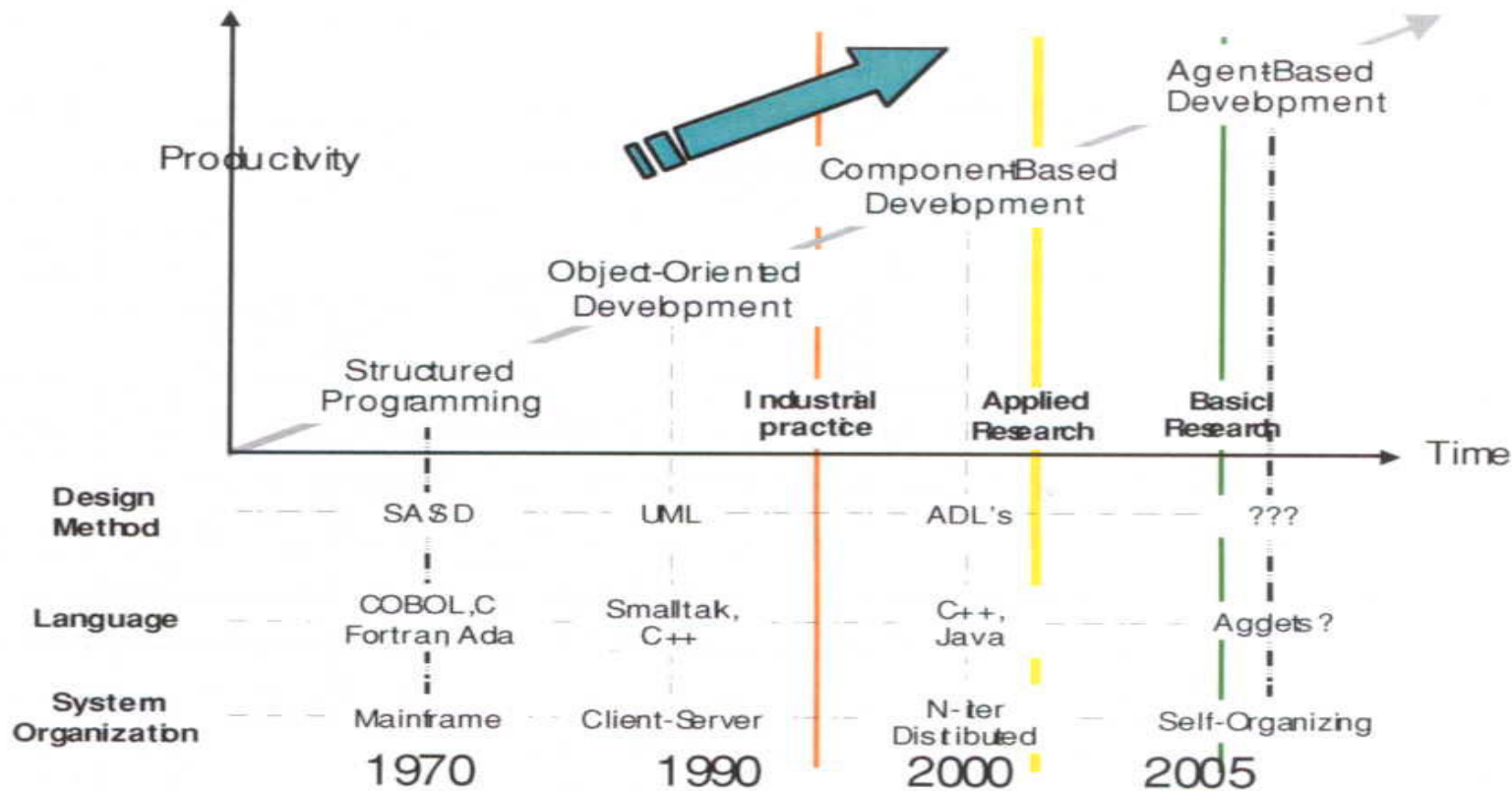
- that is in fact a good thing!

May be we conclude that high risk applications should not be MAS

- that would be not so good :(



IT- Research 2006: Softwareengineering



Software-Paradigmenwechsel (*Quelle: 2001 ITEA Office Association*)



Eggs and tomatoes



Ready them

Aim them

Throw them

While throwing, please speak loud and slow. I have hearing problems.