

Some Deficiencies of UML

[M. Glinz, "Problems and Deficiencies of UML as a Requirements Specification Language", IWSSD]

- **Deficiency 1.** A UML use case model cannot specify interaction requirements where the system shall initiate an interaction between the system and an external actor.
 - a use case by definition describes a sequence of actor stimuli and system responses *that is initiated by an actor* ([OMG99], p.2-124). Active objects are not allowed in UML use case diagrams.
- **Deficiency 2.** UML cannot model a rich system context.
 - it forbids associations between actors ([OMG99], p. 2-121).
- **Deficiency 3.** UML can neither express structure between use cases nor a structural hierarchy of use cases in an easy and straightforward way.
- **Deficiency 4.** UML provides no adequate means for dealing with use case interaction.
 - UML allows individual use cases to be modeled as state machines. However, UML cannot model states being shared between use cases, because a state machine must be allocated to a single classifier or behavioral element, but not to a subsystem ([OMG99, p. 2-141 and 2-181])
- **Deficiency 5.** A UML use case model cannot express state-dependent system behavior adequately.
 - State machines shared by a set of use cases cannot be modeled

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- **Deficiency 6.** Modeling information flow in a system consisting of subsystems is awkward in UML.
 - **Deficiency 7.** UML cannot model the behavior of high-level system components such as subsystems.
 - **Deficiency 8.** UML cannot adequately model the decomposition of a distributed system like the TRMCS (The Teleservices and Remote Medical Care System), neither with the language element **Subsystem** nor with another UML language element.
 - **Deficiency 9.** UML cannot model all aspects of a composite entity like a subsystem together in a single view.
- **Accidental** deficiencies in a language can be fixed by minor modifications that fully conform to the paradigm of the language, i.e. to its basic ideas, structures and properties.
deficiencies 1 and 2
- **Essential** deficiencies requires modifications affecting major concepts of the language.
deficiencies 3,4,5, and 7
- **Fundamental** deficiencies cannot be removed without modifying basic concepts of the language. deficiencies 6,8, and 9