An Integrated Decision Model For Efficient Requirement Traceability In SPICE Compliant Development

Bernhard Turban
Micron Electronic Devices AG

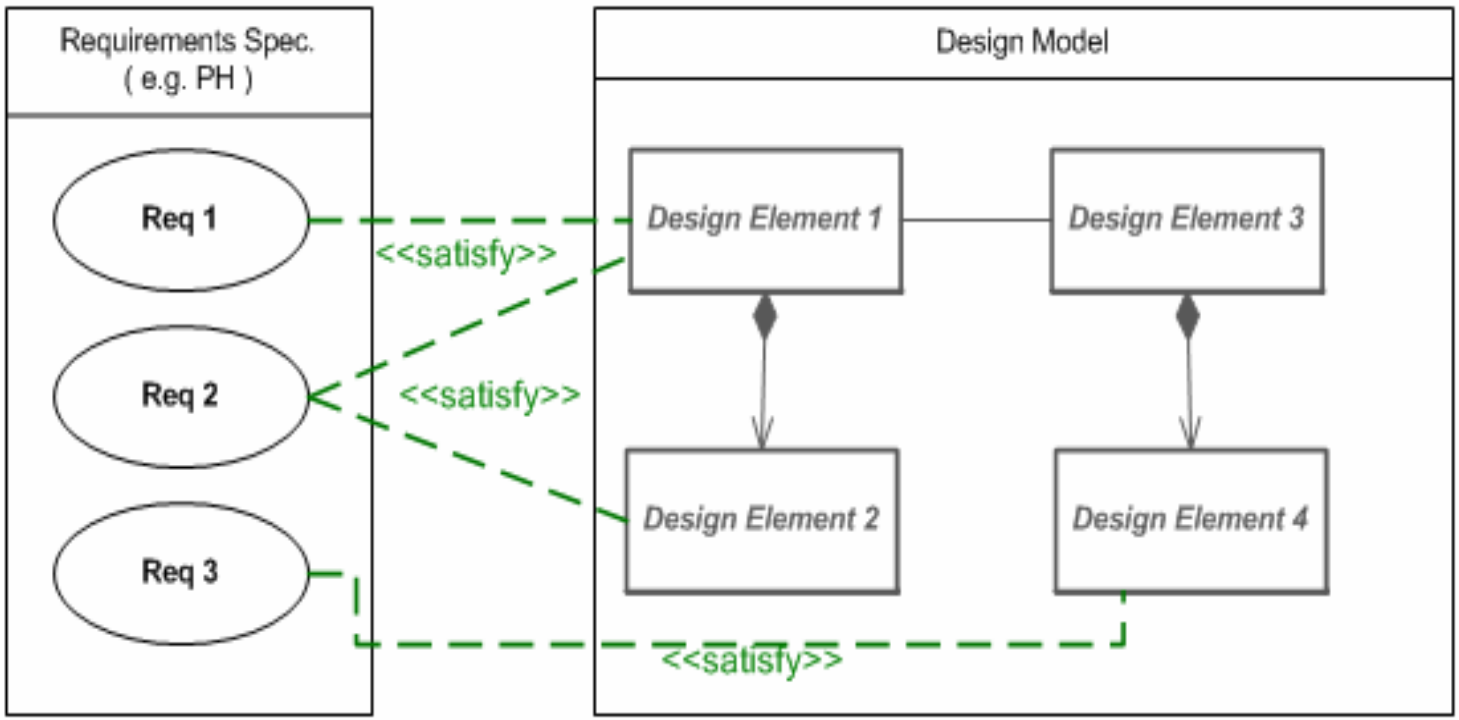
Agenda

- Introduction
- SPICE process model
- Problems
- Decision model
- Prospectives

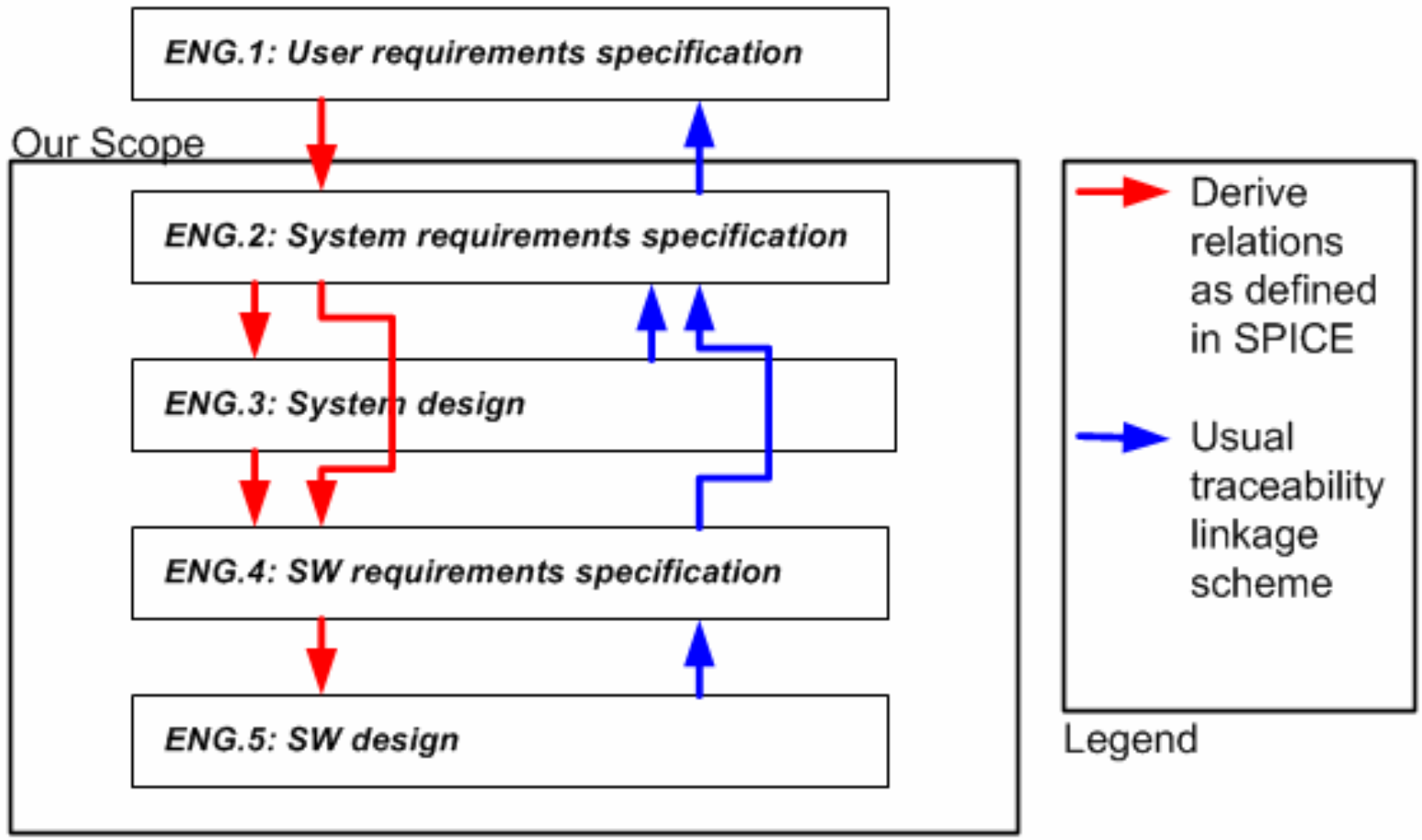
Requirement traceability to design:

- Ensures **adequate consideration** of all requirements in design
- Basis for **effort estimation** of requirement changes (Impact Analysis)
- Ensures **consistent implementation** of later requirement **changes**

Traceability as links to design:



SPICE* process model and traceability



*Software Process Improvement Capability dEtermination = Similar to CMMi

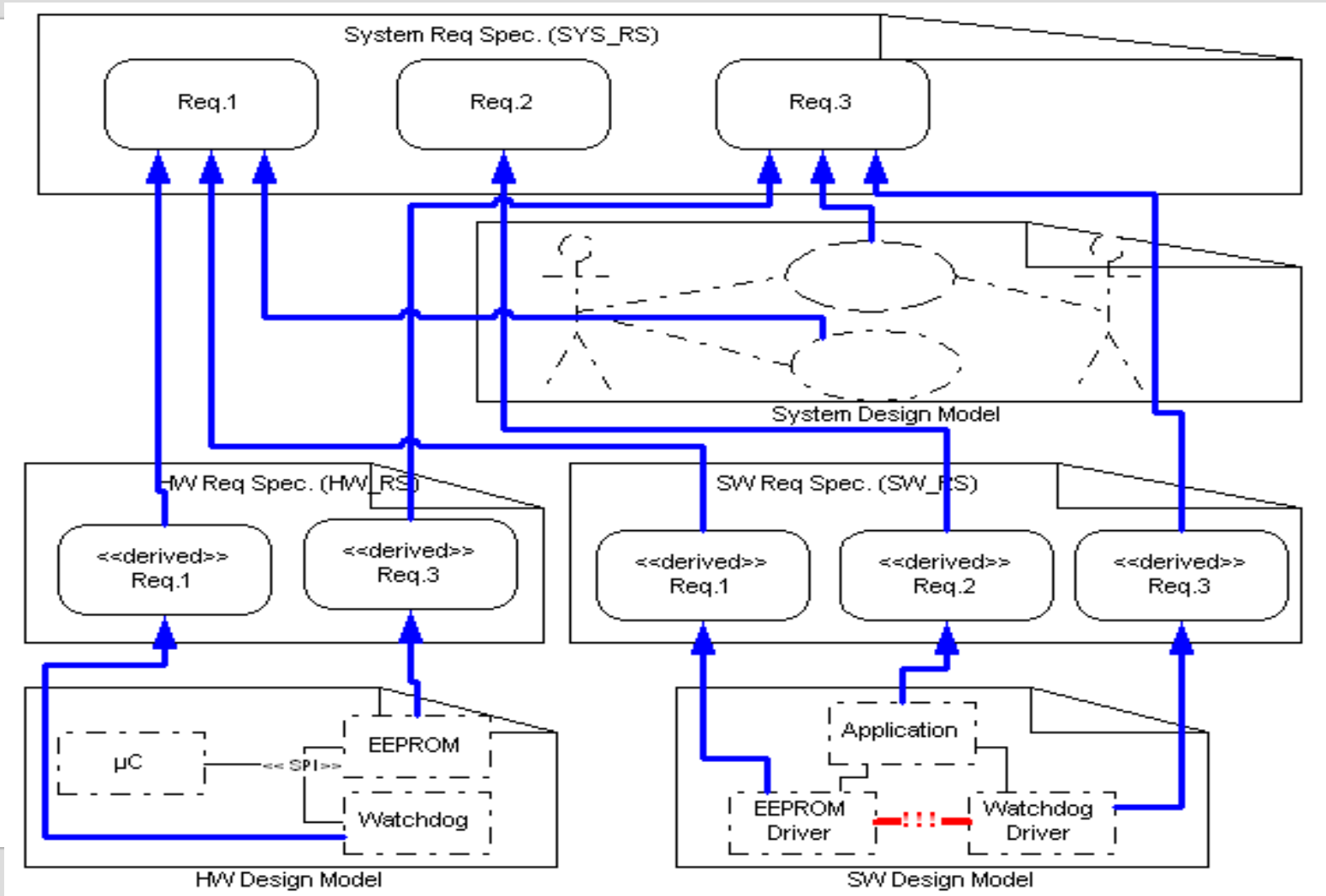
SPICE process model: What is the intention?

- **Requirements drive design**

- New requirements **also derive from former design** processes

  (*BUT:* rather incremental and evolutionary than top down!)

Traceability Example: Real life



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Universität Regensburg

General Problems:

- **Requirements** for System, HW and SW are **strongly interwoven**.

  System, HW and SW **design, too!**
- A lot of **redundancy** in reqs. and links
  - → **Changes difficult** (deviation)
  - → **Linking** is an **unproductive** and **error prone activity**
- **Scattered views** of Customers, System, HW and SW engineers

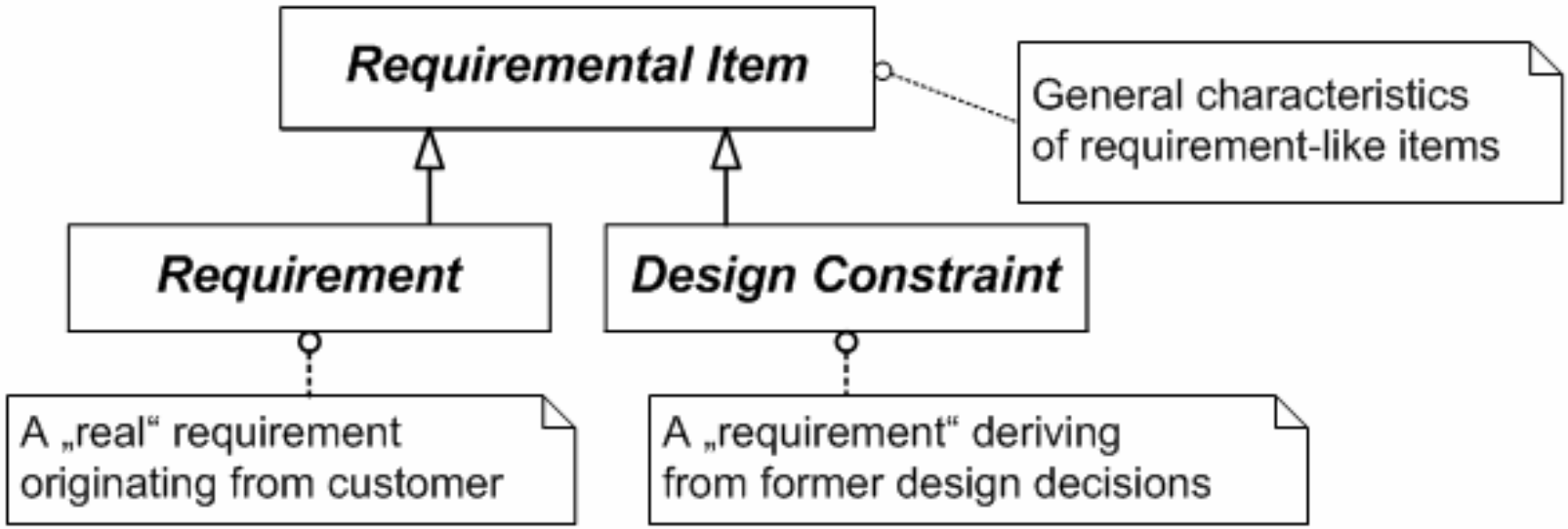
How can we solve these problems?

- **One central document** for real requirements **as one common view**!
- An attribute preselects scope types of req.: System, HW, SW

ModelScope	ReqType
System HW SW	System Constraint
System HW SW	Quality
System SW	Functional Req.
HW SW	Functional Req.
System SW	Functional Req.
☐ BD ☐ System ☐ HW ☑ SW	Functional Req.
System	Management Constraint

Naming problem: *Negotiability*

- Difference in requirement ***negotiability:***



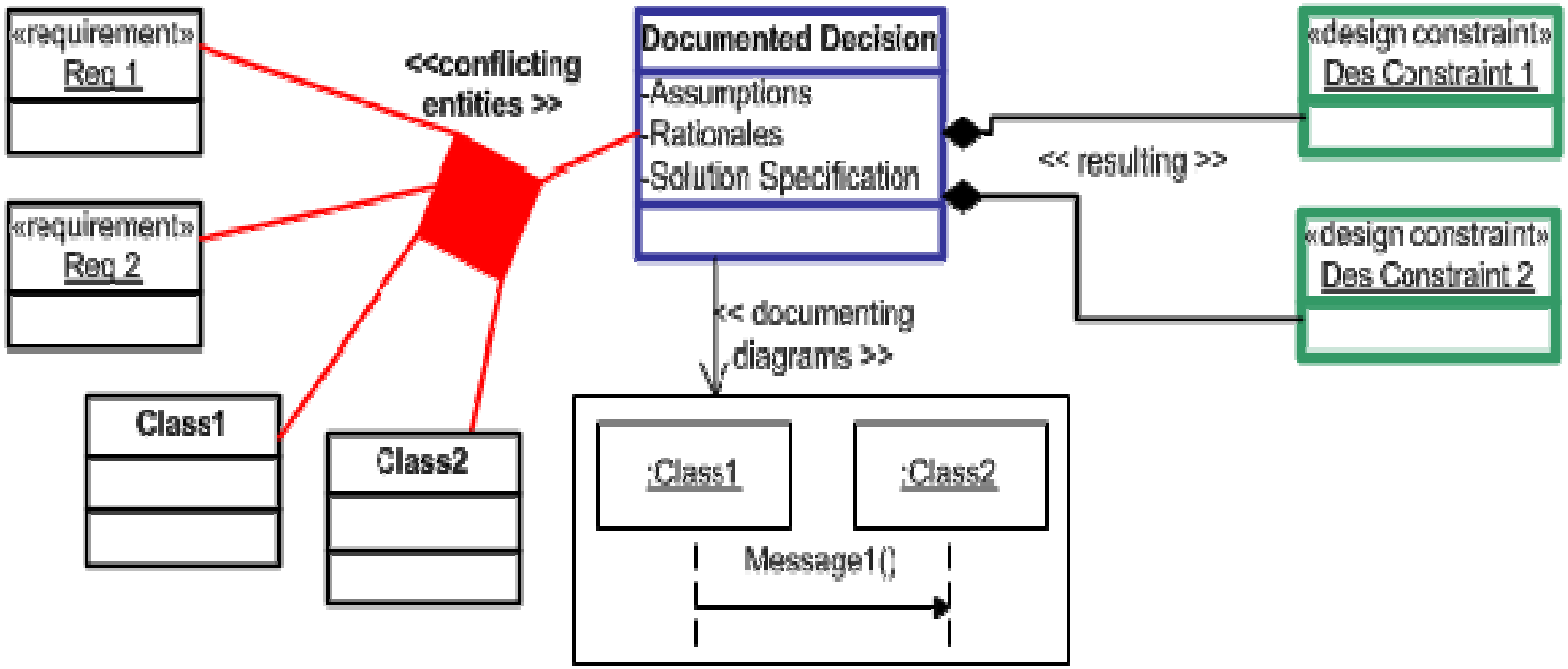
Design inherent problem:
Design problems are "wicked"

- Design processes are ***creative and complex* transfers** of …
- **unique problem constellations** into a sustainable solution.

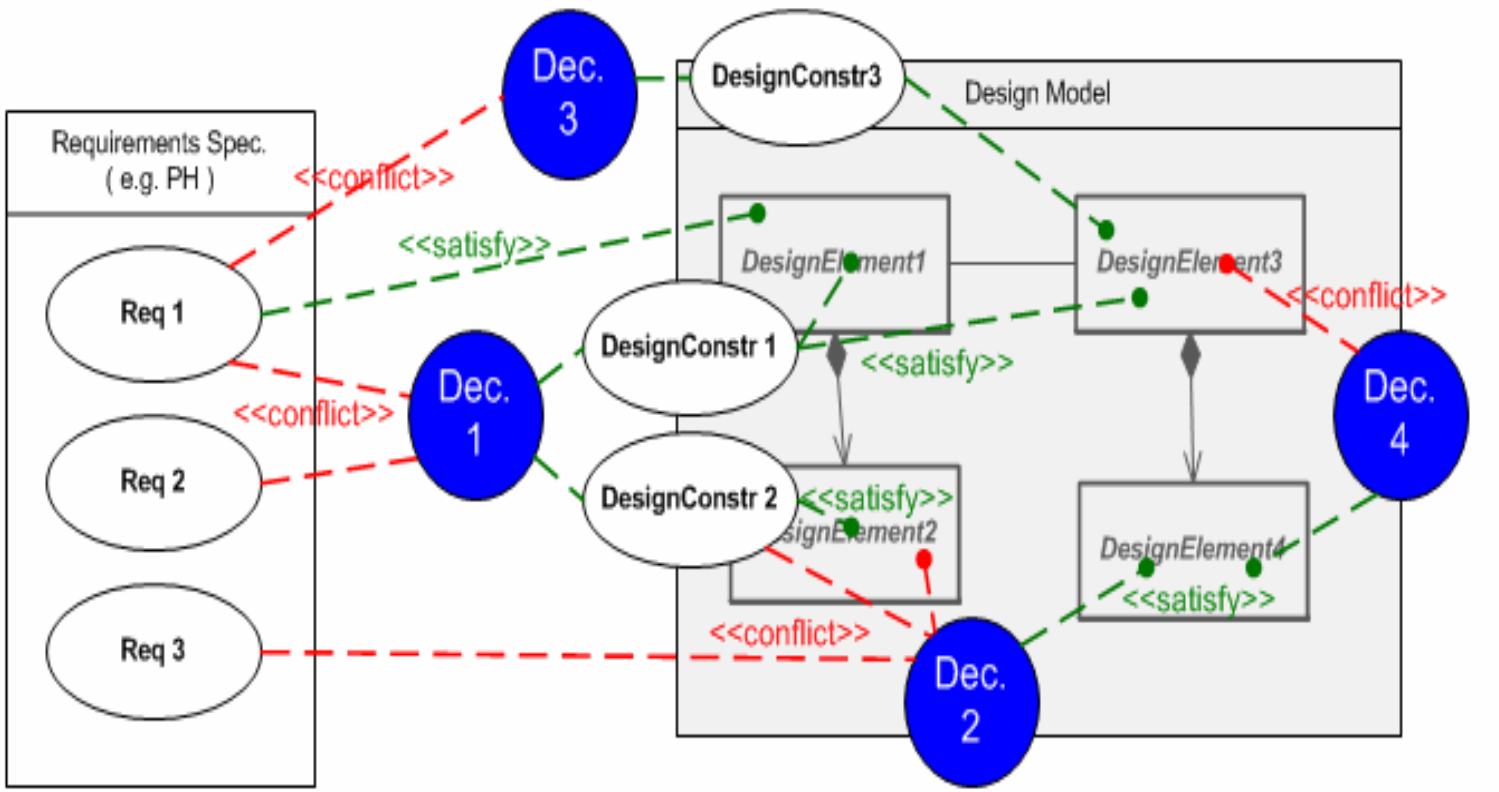
→ ***Substantial gap*** between requirements and design!!

→ **Not** really **manageable by linear linking**

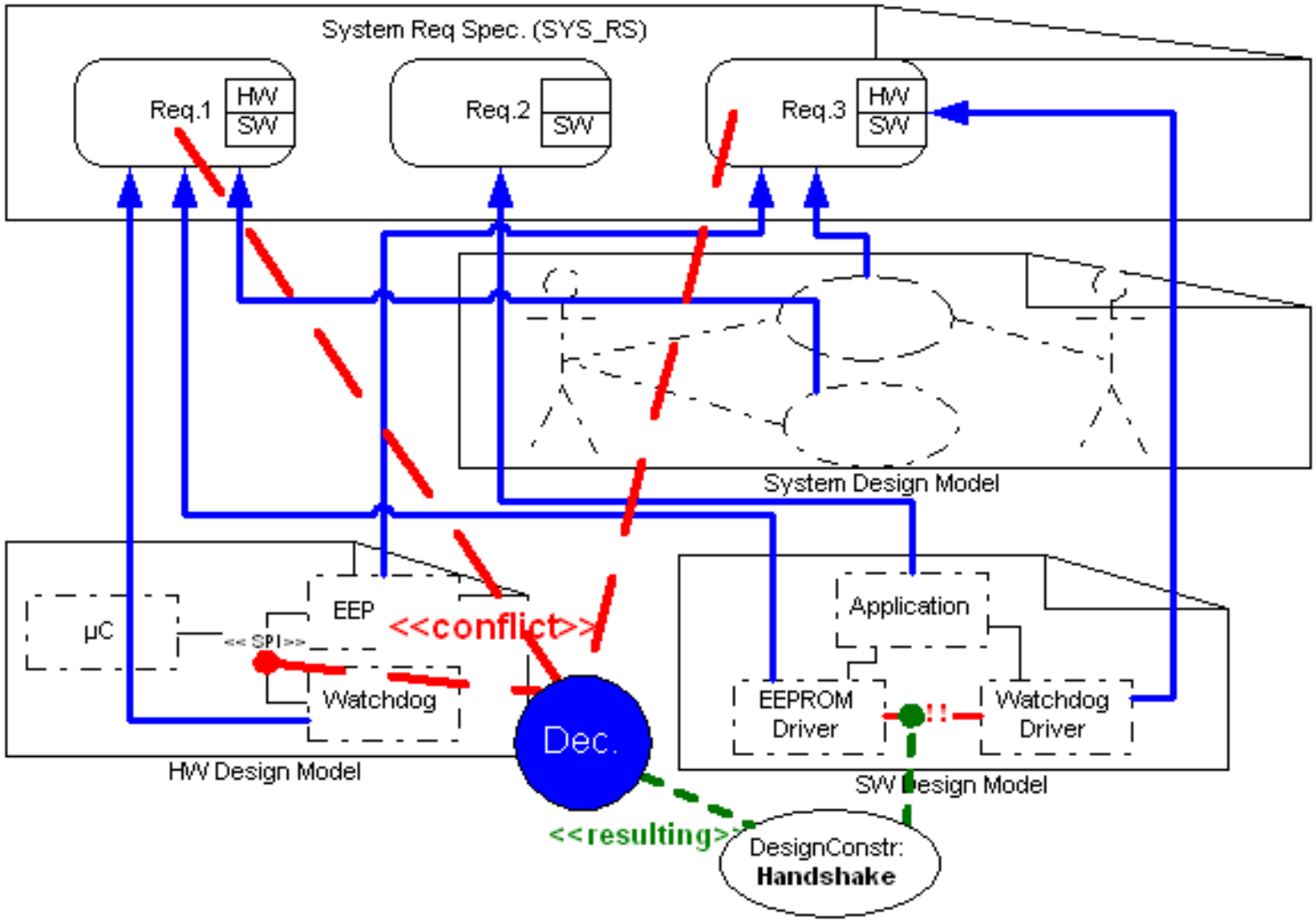
Solution: *Integrated* decision model



Consequences of the decision model



The former example, the new style:



Prospects

Implementation via tool extension:

- **Extension** of previous traceability schemes with decision model.
- **Lightweight semiformal model**
- **Visualization** in a relationship tree
- Dedicated **process support**

Thank you for your attention!

Feel welcome to ask any questions !!

Bernhard Turban

Embedded System Engineering

Neugablonzer Str. 13
D - 93073 Neutraubling

Telefon: +49 (9401) 9309 -349

Fax: +49 (9401) 9309 -100

Bernhard.Turban@micron-ag.com

www.micron-ag.com

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