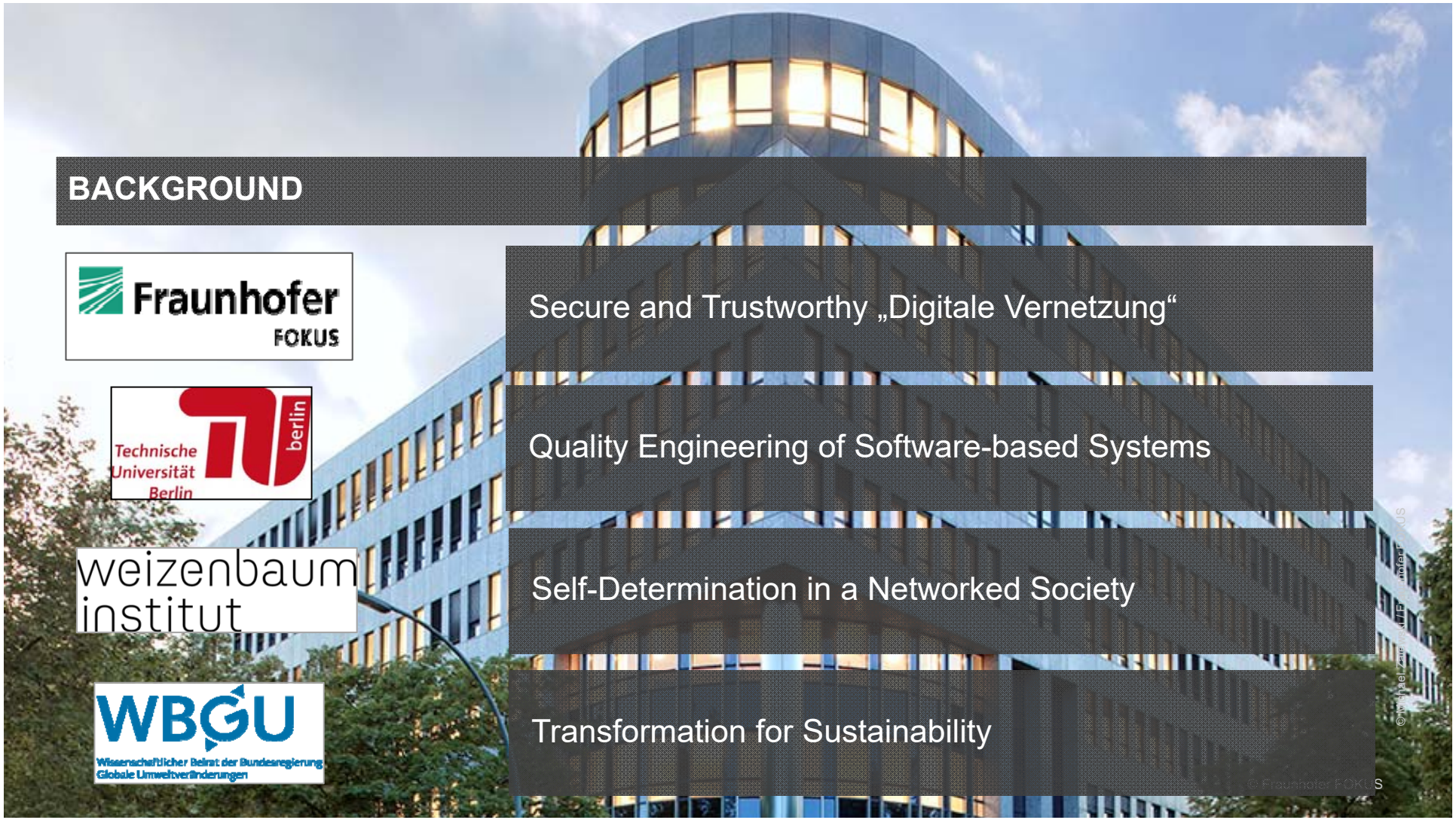
CAN SOFTWARE BE RESPONSIBLE ?!

Ina Schieferdecker, 22. Mai 2019, Tübingen

Fraunhofer FOKUS



BACKGROUND

Fraunhofer FOKUS

Technische Universität Berlin

weizenbaum institut

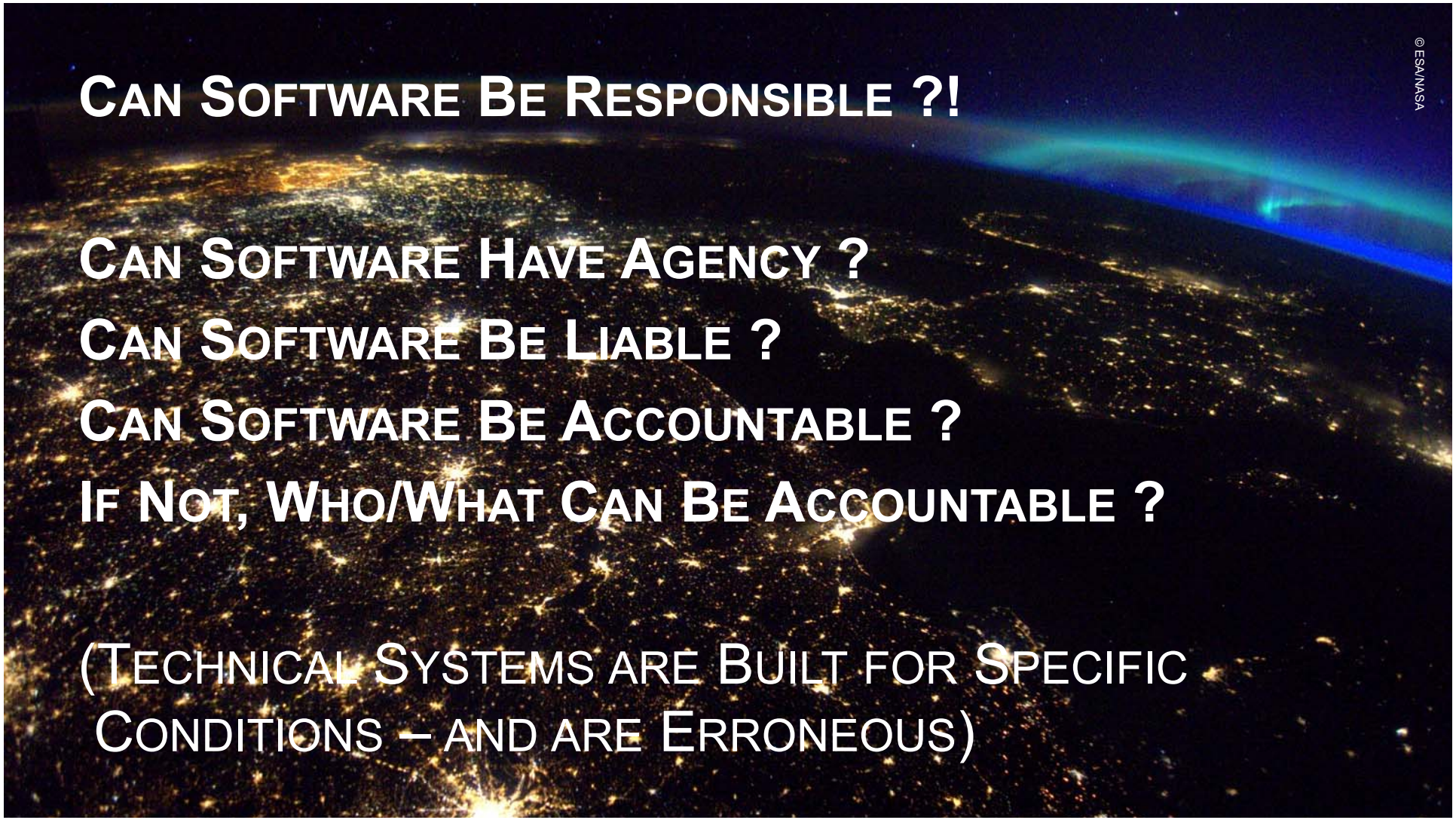
WBGU
Wissenschaftlicher Beirat der Bundesregierung Globale Umweltveränderungen

Secure and Trustworthy „Digitale Vernetzung“

Quality Engineering of Software-based Systems

Self-Determination in a Networked Society

Transformation for Sustainability



Can Software Be Responsible ?!

Can Software Have Agency ?

Can Software Be Liable ?

Can Software Be Accountable ?

If Not, Who/What Can Be Accountable ?

(Technical Systems are Built for Specific Conditions – and are Erroneous)

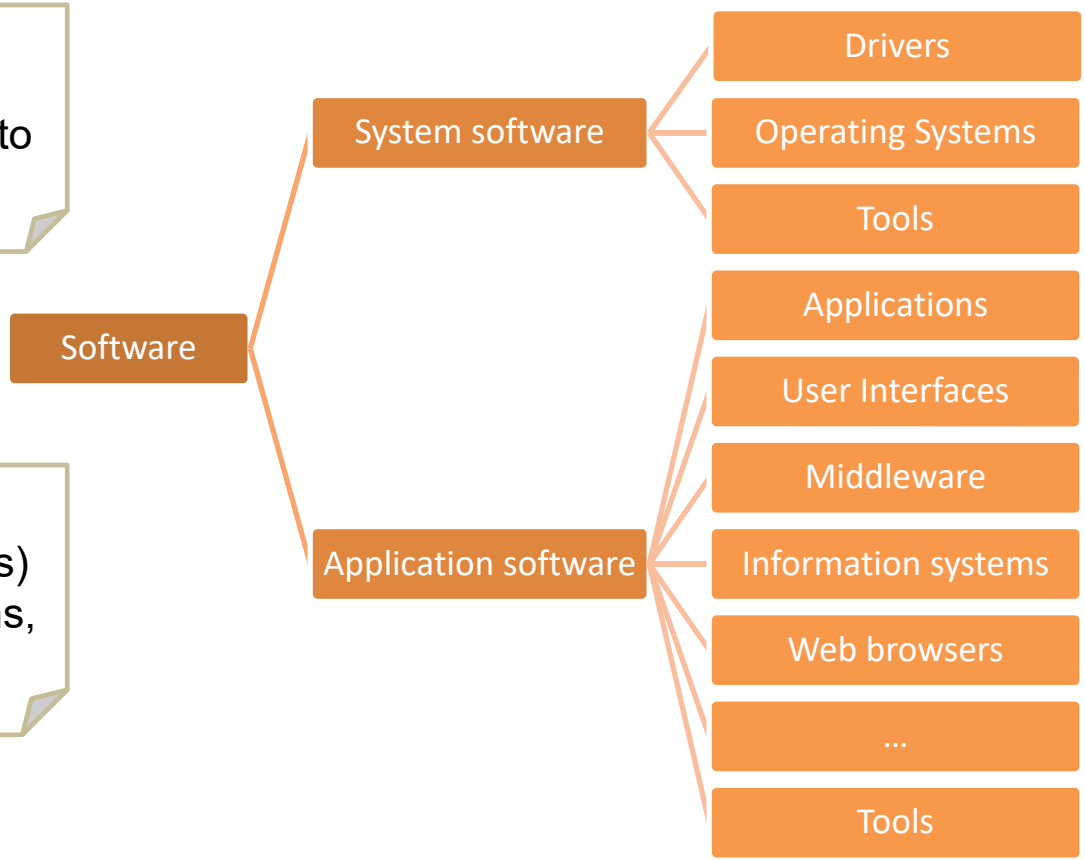
“*A computer will do what you tell it to do, but that may be much different from what you had in mind.*”

Joseph Weizenbaum

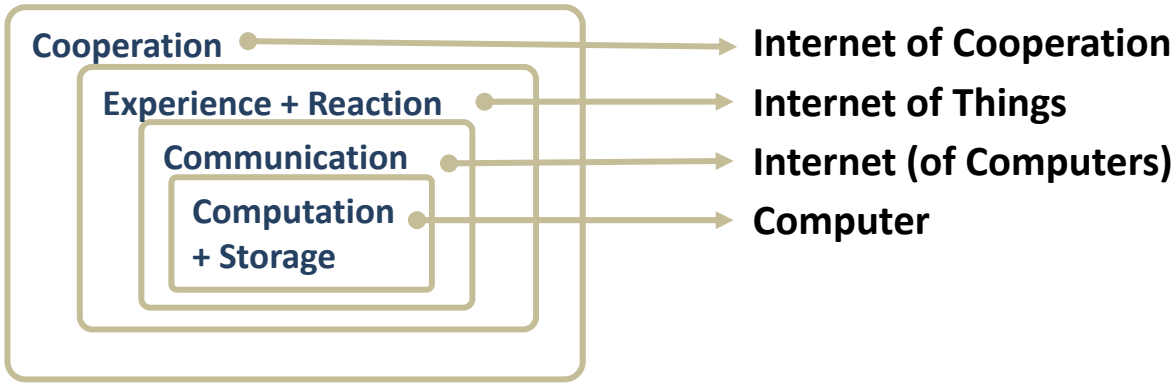
Software is …

Software is the set of instructions that tells the computer what to do and how to do it.

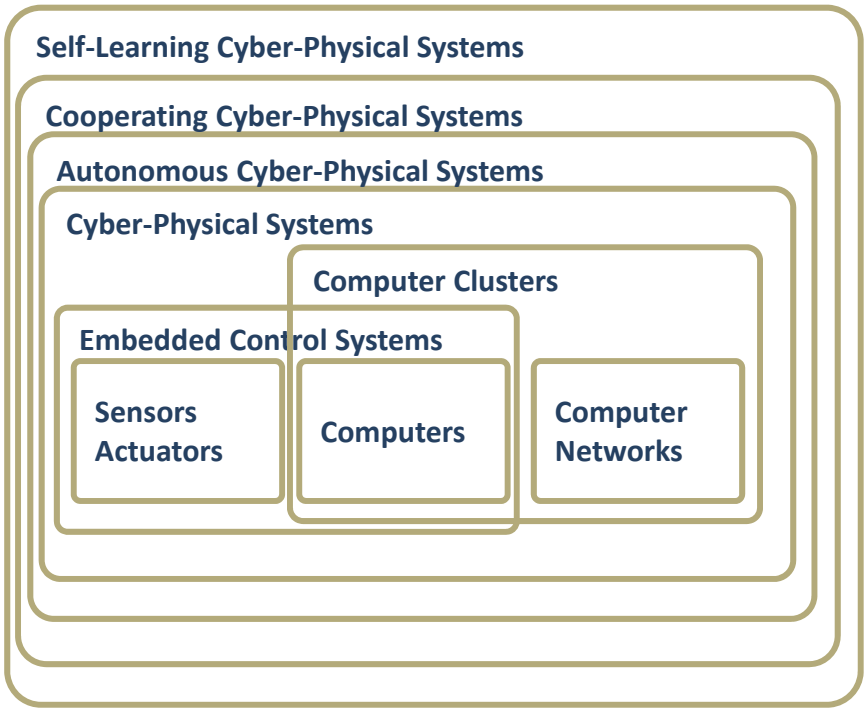
Software includes
- code (→ algorithms, decisions)
- data (→ digital representations, models, documentation)



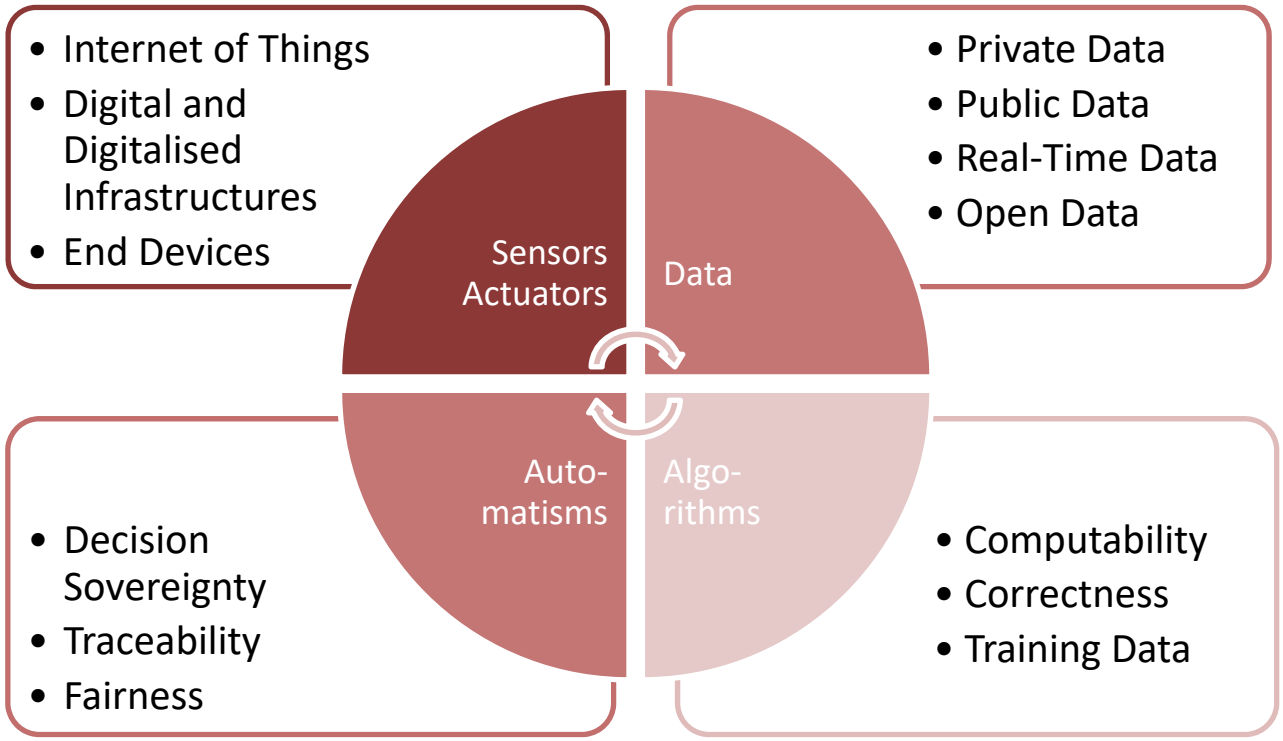
Basic Functions of Software-based Systems



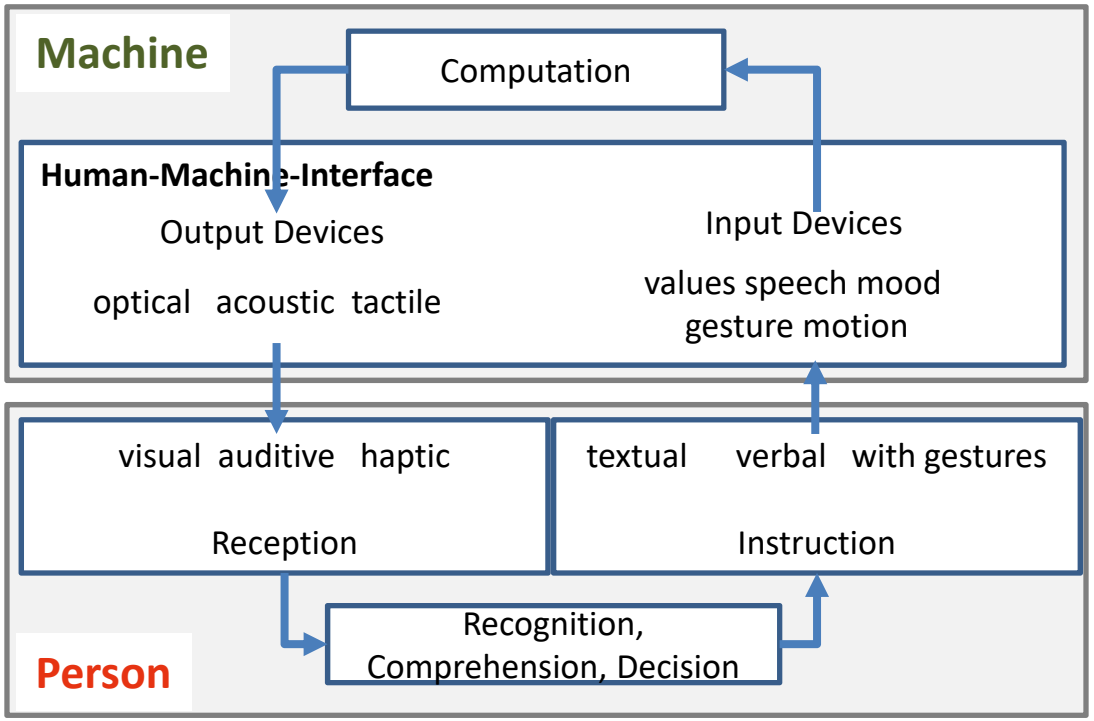
Software-based Systems



Software-based Systems and Automation



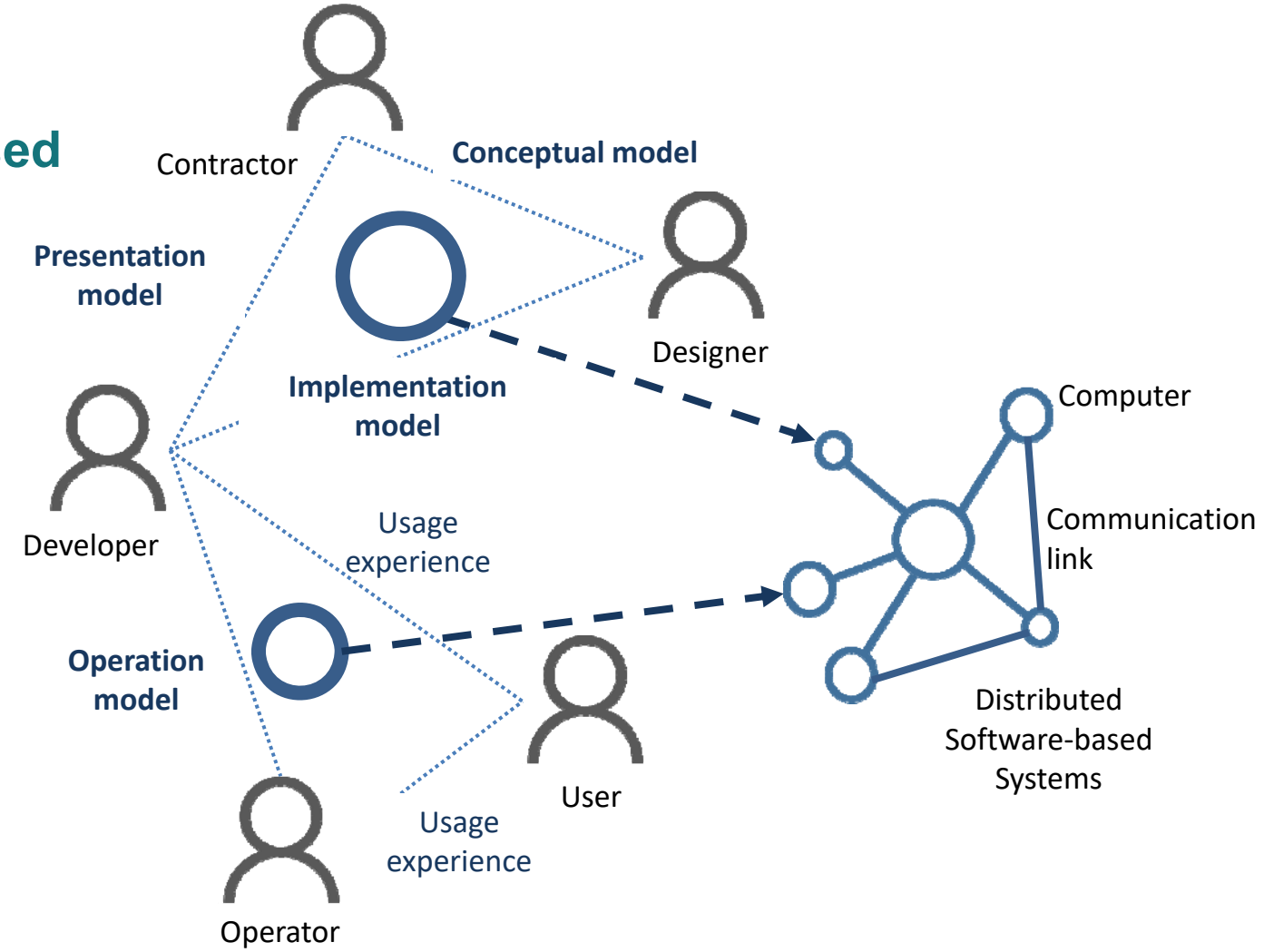
Interaction of Humans and Software-based Systems



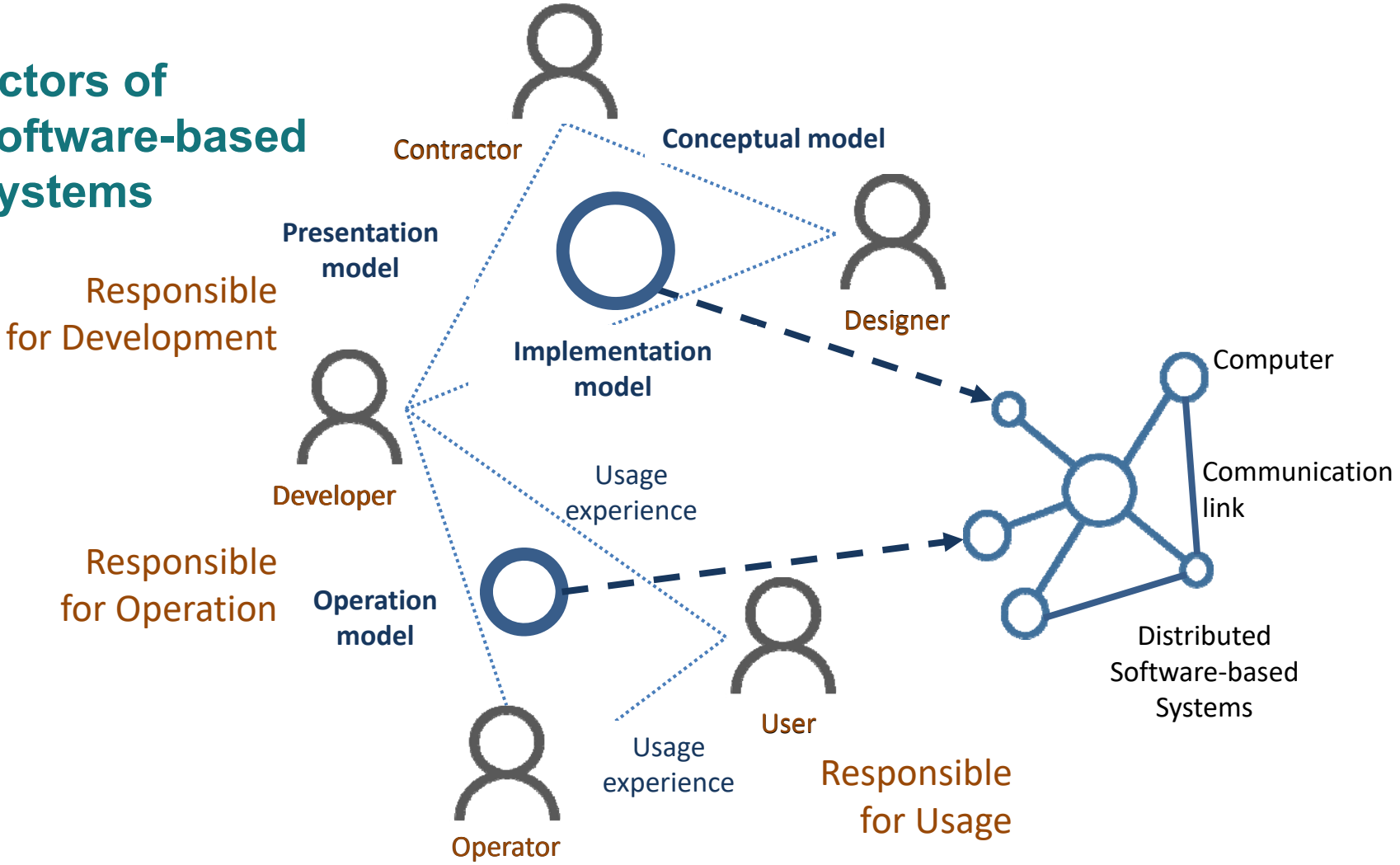
Machine
Reactive
(Partially) autonomous
Neither responsible
nor accountable

Identity
Acting on its own
Responsible
Accountable

Actors of Software-based Systems



Actors of Software-based Systems



Perspectives on Software Accountability

Competent People
- Professional ethics
- Professional profiles

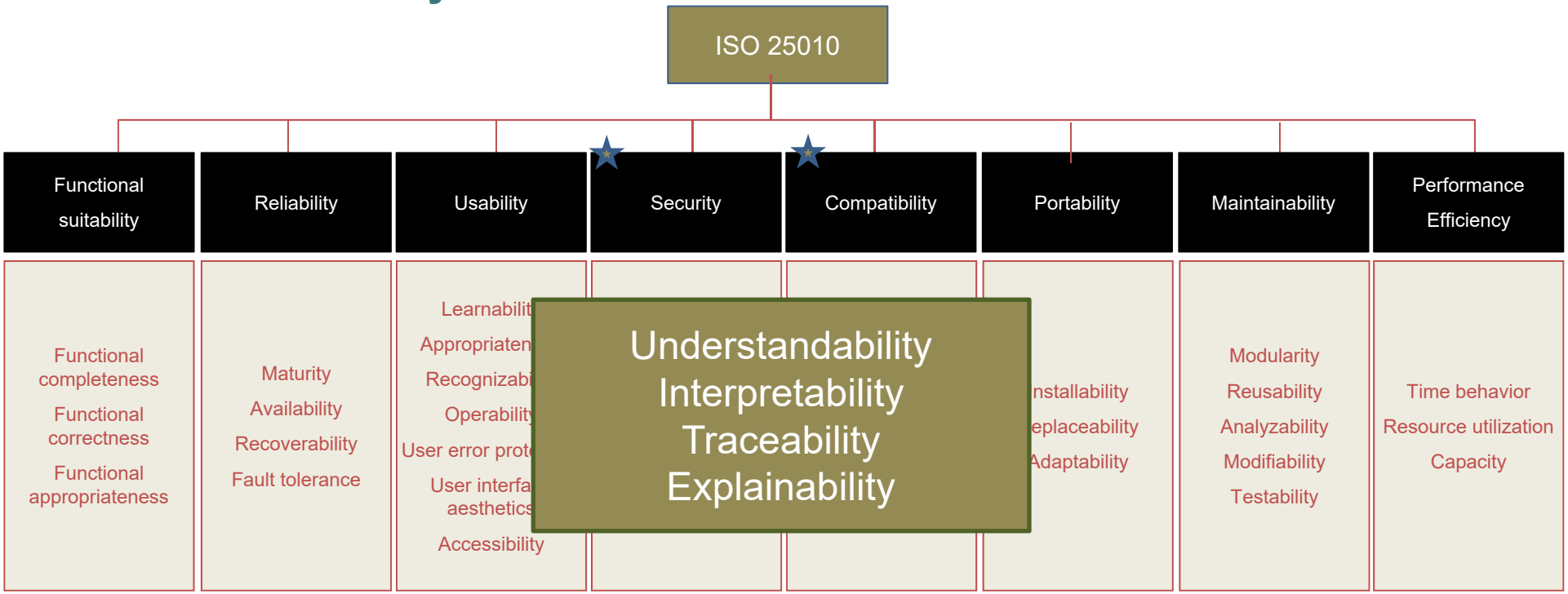
Robust Processes
- Error culture

Yielding Regulation
- Rigour

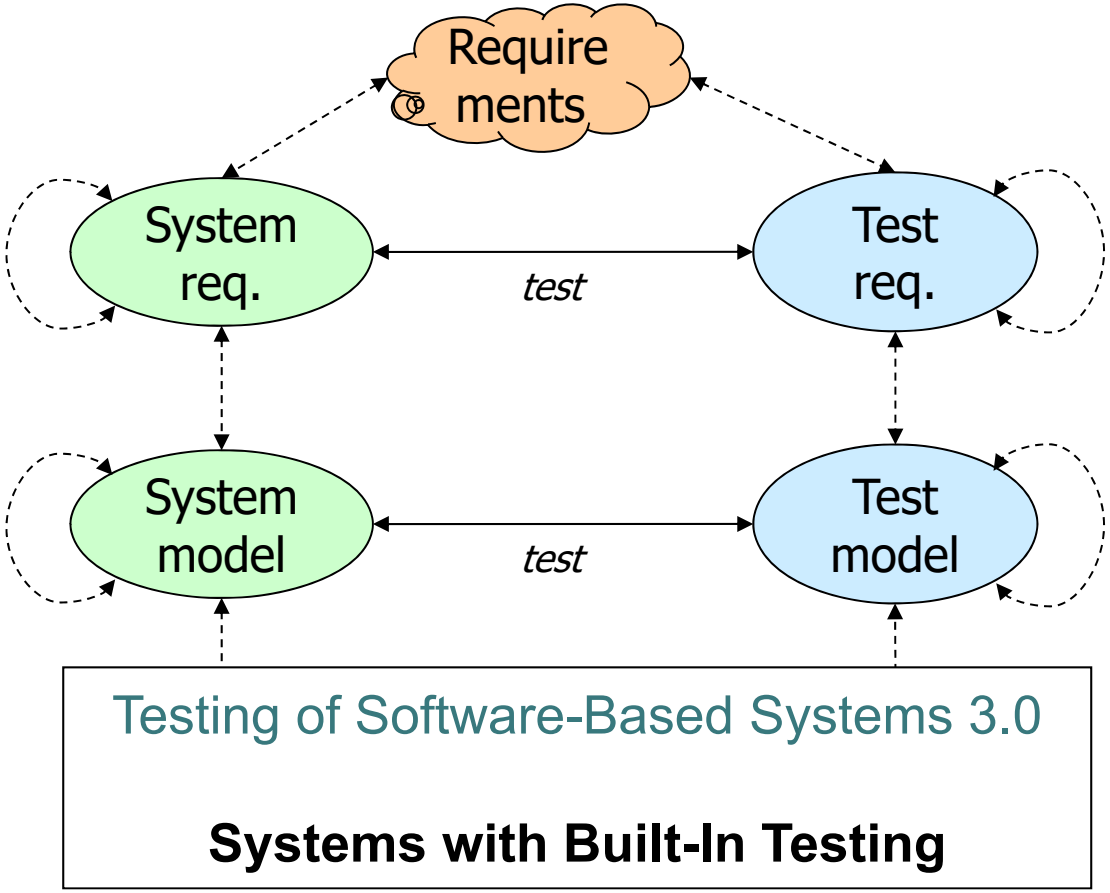
Dependable Techniques
- **Development and (!) Validation & Verification**

Software Quality

Software Quality



Testing of Software-Based Systems 2.0



V&V
mind set

Common methods,
concepts, language

Testing and Explainability of AI

Testing is not only V&V (and the basis for certification):

Black-box testing is the V&V approach to black-boxes of any kind, including AI black-boxes

Test scenarios can be scenarios for explaining AI:

preconditions, inputs, outputs, postconditions
in observable and controllable setups
with precise coverage criteria

Test data can become well-designed training data:

with dedicated quality criteria
with precise coverage criteria

(to be noted: up to quality of assumptions, specifications, documentations, etc.)

Can Software Be Responsible ?!

Software Has No Agency.

It Is Neither Responsible Nor Accountable.

Actors of Software-Based Systems are Accountable.

Education Including a „Weizenbaumic Oath“ In Combination with Leading Edge Development And V&V, Robust Processes and Rigorous Regulation Offers the Required Portfolio For Trustworthy Software-Based Systems.

Statistics-Based Software requires other V&V Methods Than Logic-Based Software.

How Can Software-Based Systems Become Trustworthy ?!