

The CompSys Manifesto 2.0

A manifesto of manifestos?

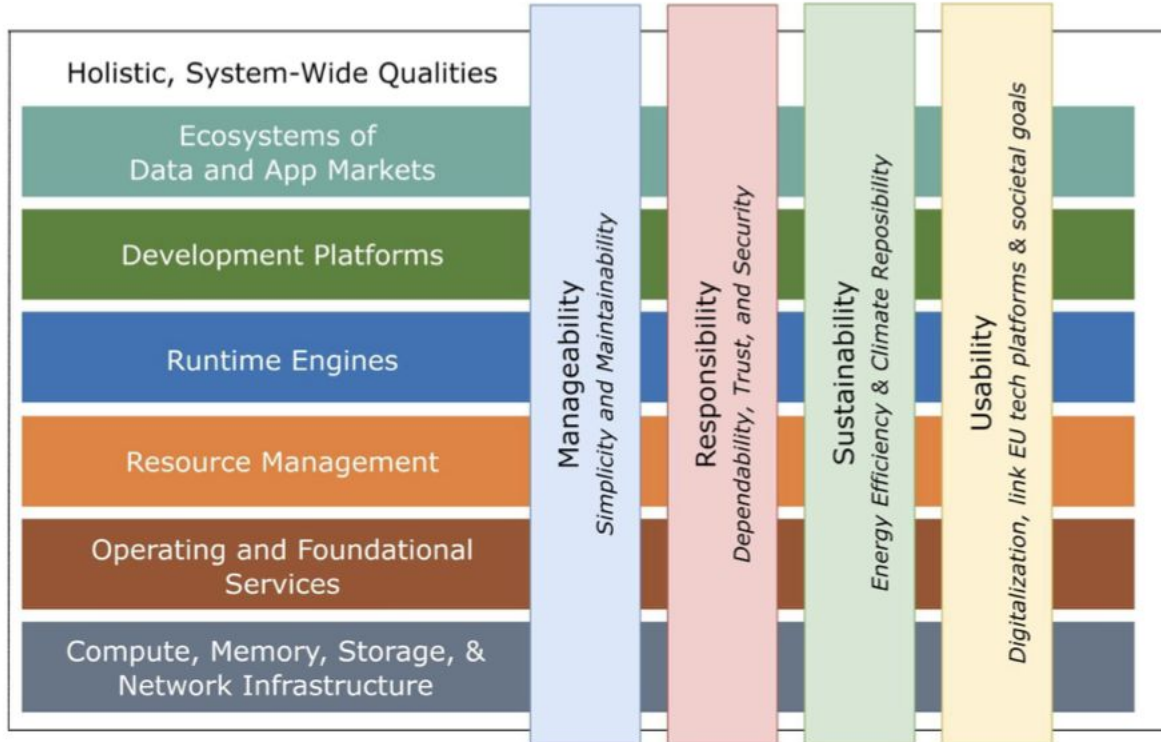
Manifesto 2022: importance of CompSys

- Computer systems and networks form society's engine for a responsible and sustainable future
 - *To out-compete is to out-compute!*
- Future-proof digitalization requires ICT research and development (R&D), now
- With the manifesto, we draw attention to CompSys as a vital part of ICT
 - Strategic autonomy in CompSys has become more important than ever

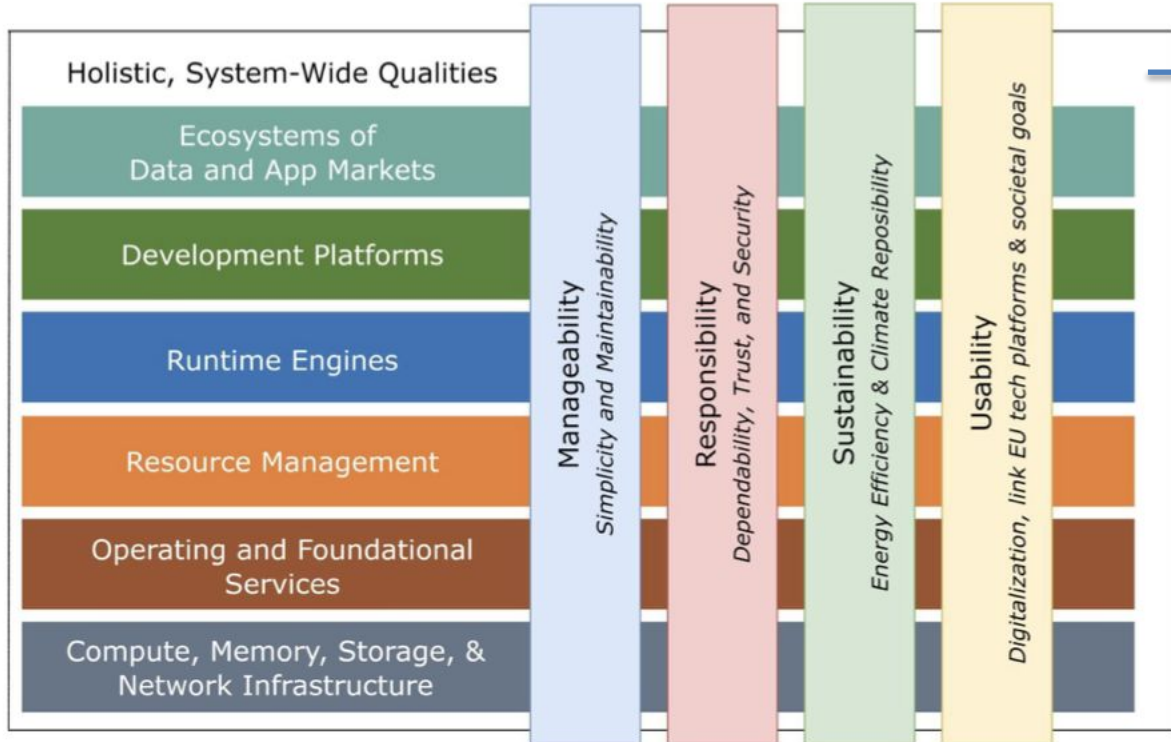
CompSys-related societal challenges

- Computer systems must be:
 - manageable,
 - responsible,
 - sustainable, and
 - usable
- Addressing these challenges requires an innovative, multi-year vision and approach...
 - ... through a groundbreaking, **holistic**, and collective technology roadmap
 - ... through renewed education, truly accessible for all
 - ... and through a concerted answer to our call to action

Seven research themes

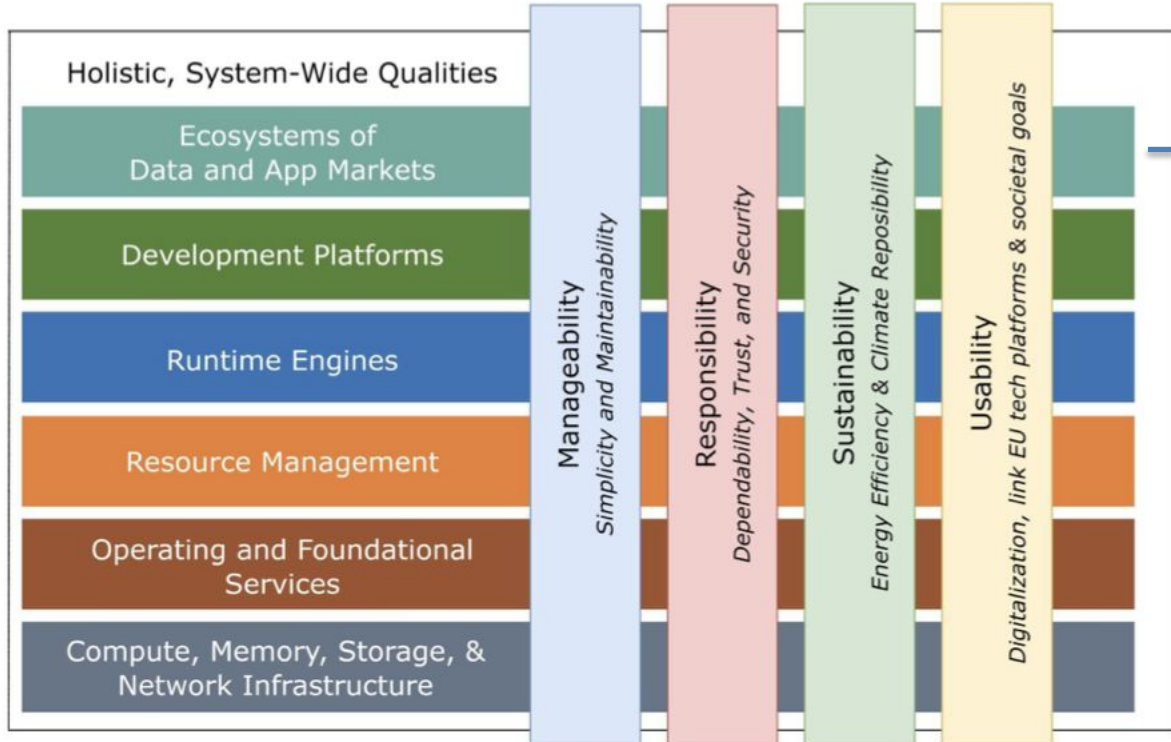


Seven research themes



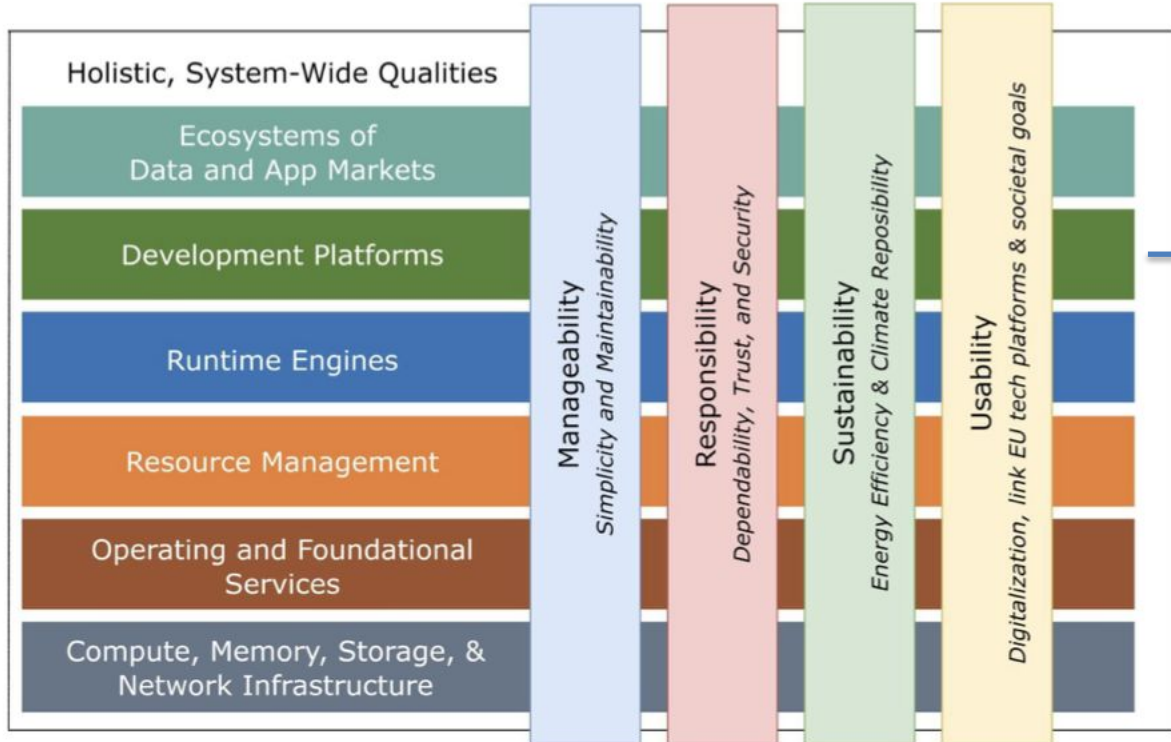
→ Providing system-wide functionals and non-functionals, and specializing for particular goals

Seven research themes



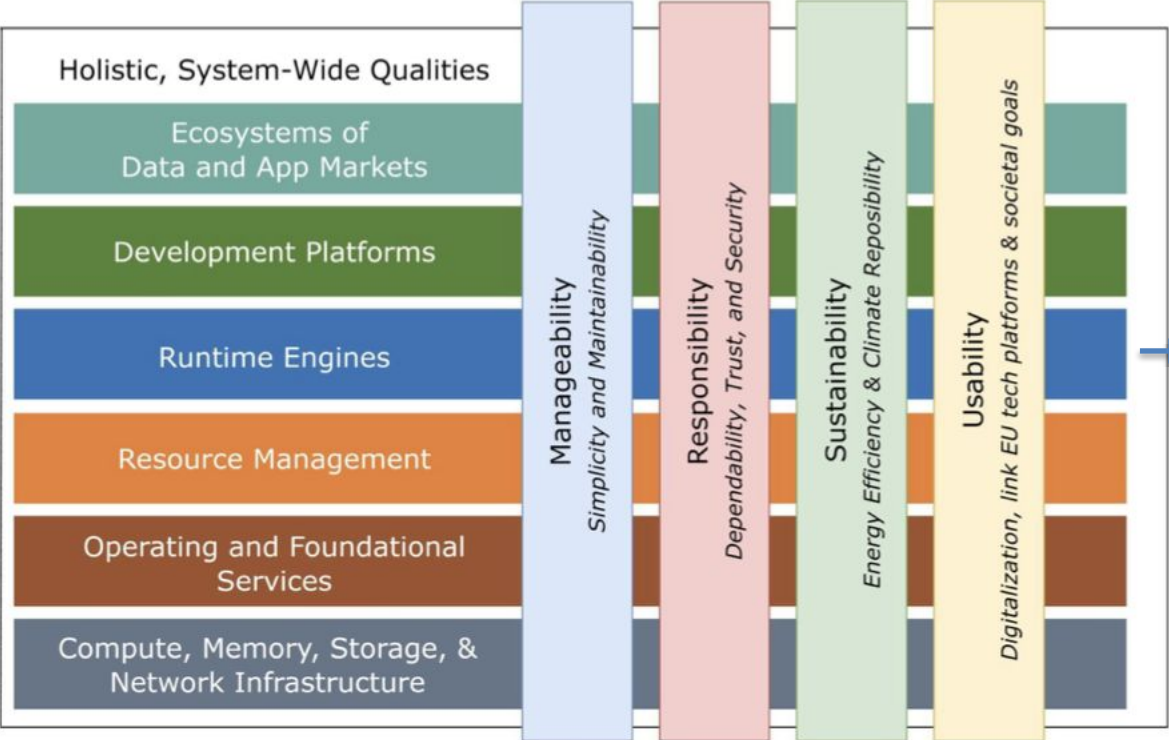
Designing and massivizing distributed ecosystems, that is, composites of interconnected (distributed) systems

Seven research themes



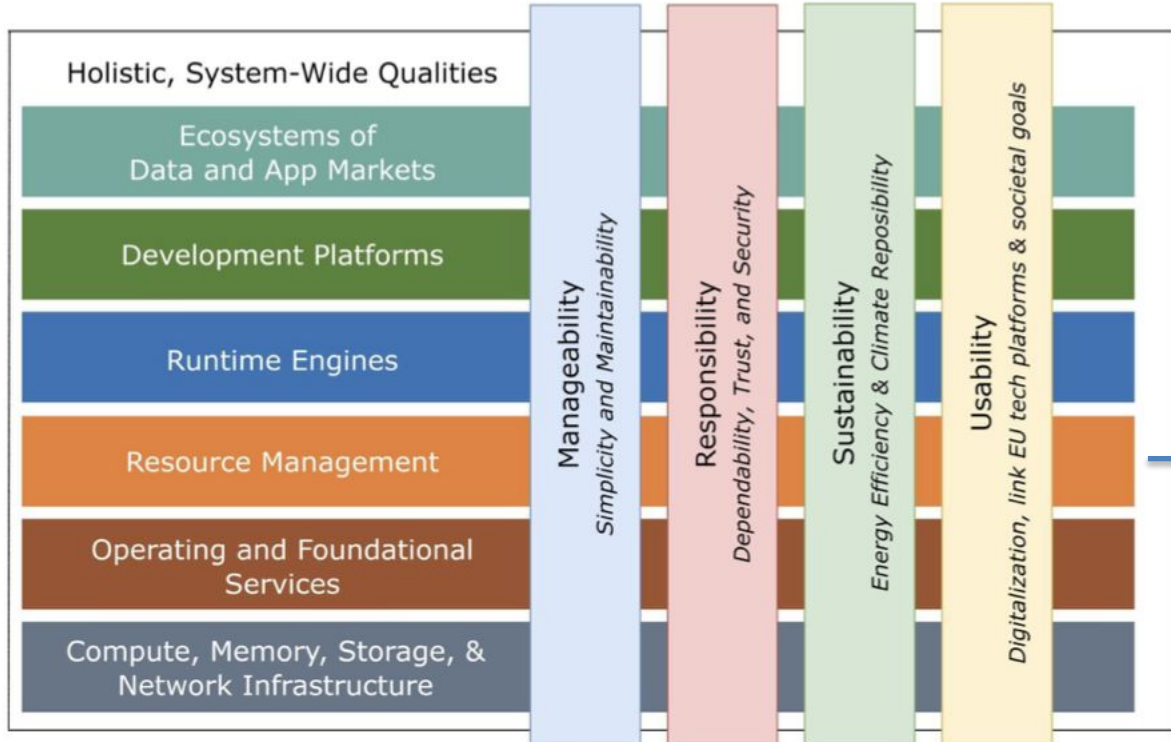
Providing specialized tools for the development, testing, and deployment of (complex) applications that need to run over multiple machines and multiple tiers of devices

Seven research themes



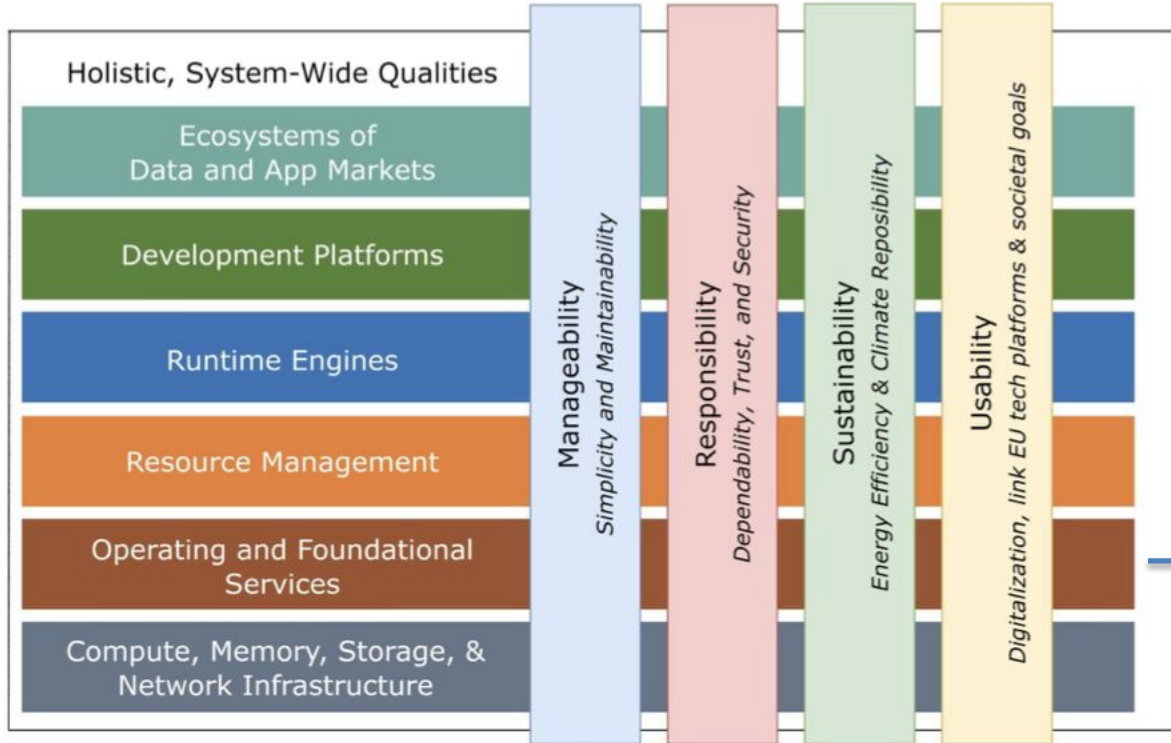
→ Translating digital applications into smaller units of computation easily understood and executed by modern computer systems

Seven research themes



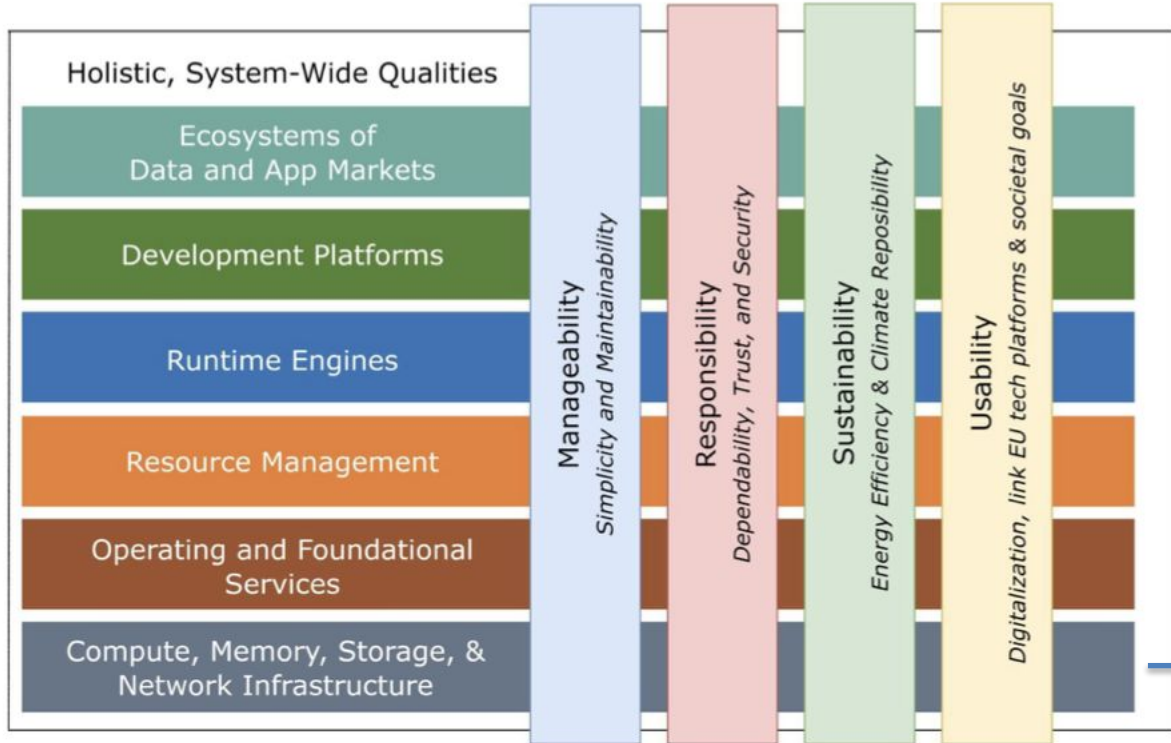
Provisioning and allocating resources and services to ensure a specialized, distributed and parallel, environment

Seven research themes



Co-designing software and hardware for efficient operation within a single machine and over distributed setups

Seven research themes



Providing compute, memory, storage, and network resources, both physical and virtual, for specific purposes

10 recommendations

1. Invest in CompSys research personnel in the Netherlands
2. Establish and maintain a coalition for CompSys
3. Invest in CompSys infrastructure for research, demonstrations, proof-of-concepts, and pilots
4. Recognize and fund cross-disciplinary translational CompSys research, and open ICT science
5. Harmonize the national curriculum on CompSys topics
6. Extend CompSys education and training to all levels of our society
7. Link investment in research to hiring from under-represented groups, to foster diversity
8. Ensure alignment with and integration into EU technology platforms and societal goals
9. NWO should introduce an ICT (infrastructure) plan in every NWO proposal that relies for its success on ICT infrastructure, matching the existing requirement for a data plan, to be evaluated by experts
10. Align strategic investments in computing and networking in the Netherlands

The world has changed

- CompSys remains of vital importance
- 2022: Focus on "big data" and cloud scalability
- 2026: Focus on "big models" (LLMs) and resource constraints
- Due to AI, a big increase in compute demand since the original manifesto
- Due to geopolitics, Digital Open Strategic Autonomy (DOSA) now prominently on the Dutch and EU agenda (e.g., EuroStack)
- Should we update our manifesto?

From one to several manifestos?

- 2022 manifesto was high-level
- Two options:
 1. Updating and expanding the 2022 version
 2. We create topical manifestos, possibly aligned with our working group
- With option 2, we position ourselves in various ways, setting the stage for future project proposals
- We write a paper positioning CompSys, summarizing past 5 years, and (iff. 2) summarizing the main aspects from the topical manifestos

Possible topics

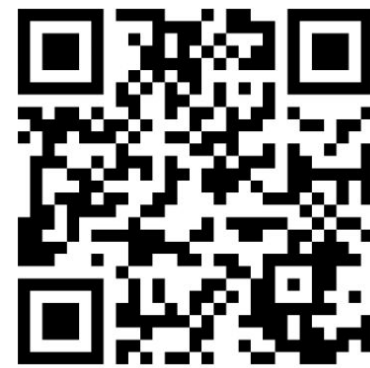
- **6G:** Already much has been done within the context of the FNS growthfund project.
- **DAS-7:** A vision for the Distributed ASCI Supercomputer 7 (DAS-7). Simulating the “System of Systems”, possibly linked to Digital Twinning and translational research.
- **Embedded AI:** Small Language Models (SLMs) on-device. Intelligently splitting local/cloud compute. Link to “chips”. E.g., software-defined silicon & chiplets.
- **Neuromorphic:** Computing and communications. Mimicking the brain’s efficiency. Link to sustainability.

Wrap-up – Plenary discussion of topics

To discuss:

- Share your topics
- Timeline:
 - By end of Feb., topics & groups set
 - By end of June, worked-out topics
 - After summer, (CACM?) position paper

Your input, please 😊



- Title + short description topic: ...
- Main CompSys-related challenges: ...
- Names proposers: ...