Technology for Co-Working on Health and Active Life

Secure and Privacy-Preserving Smart Living

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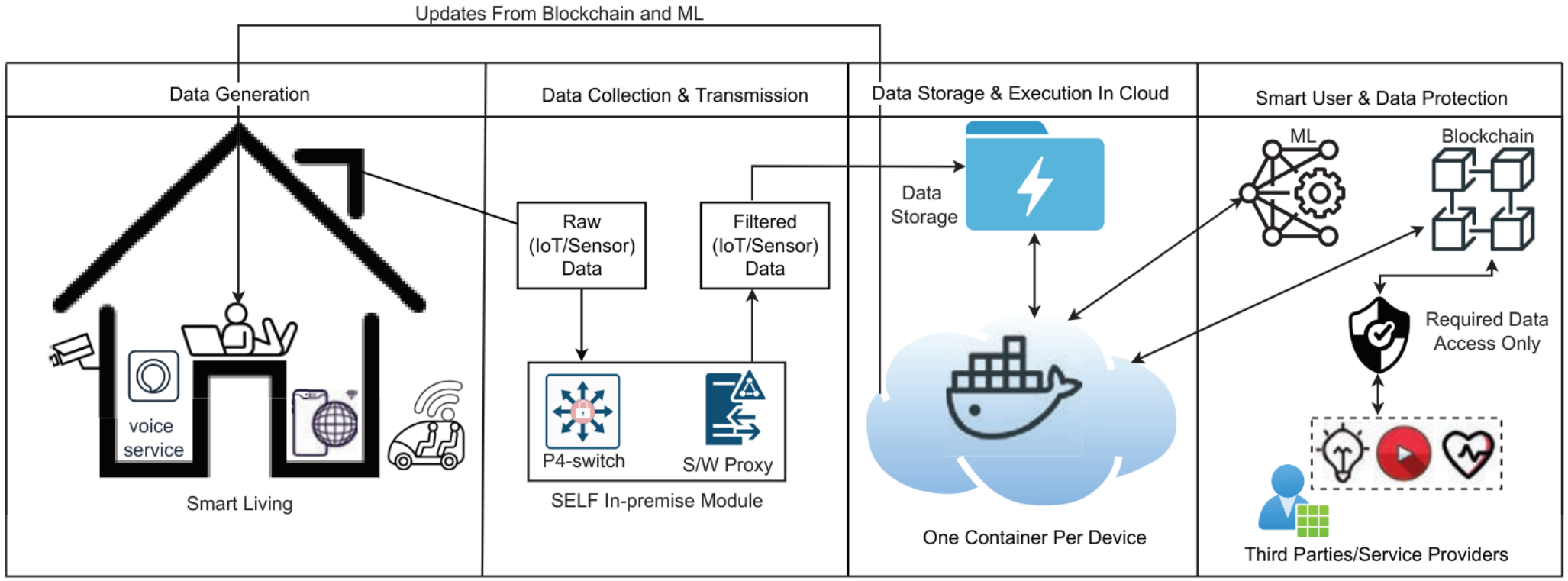
Personal Data

Image source: https://en.roth-cartoons.de/project/cartoon-caricature-privacy-data-protection/

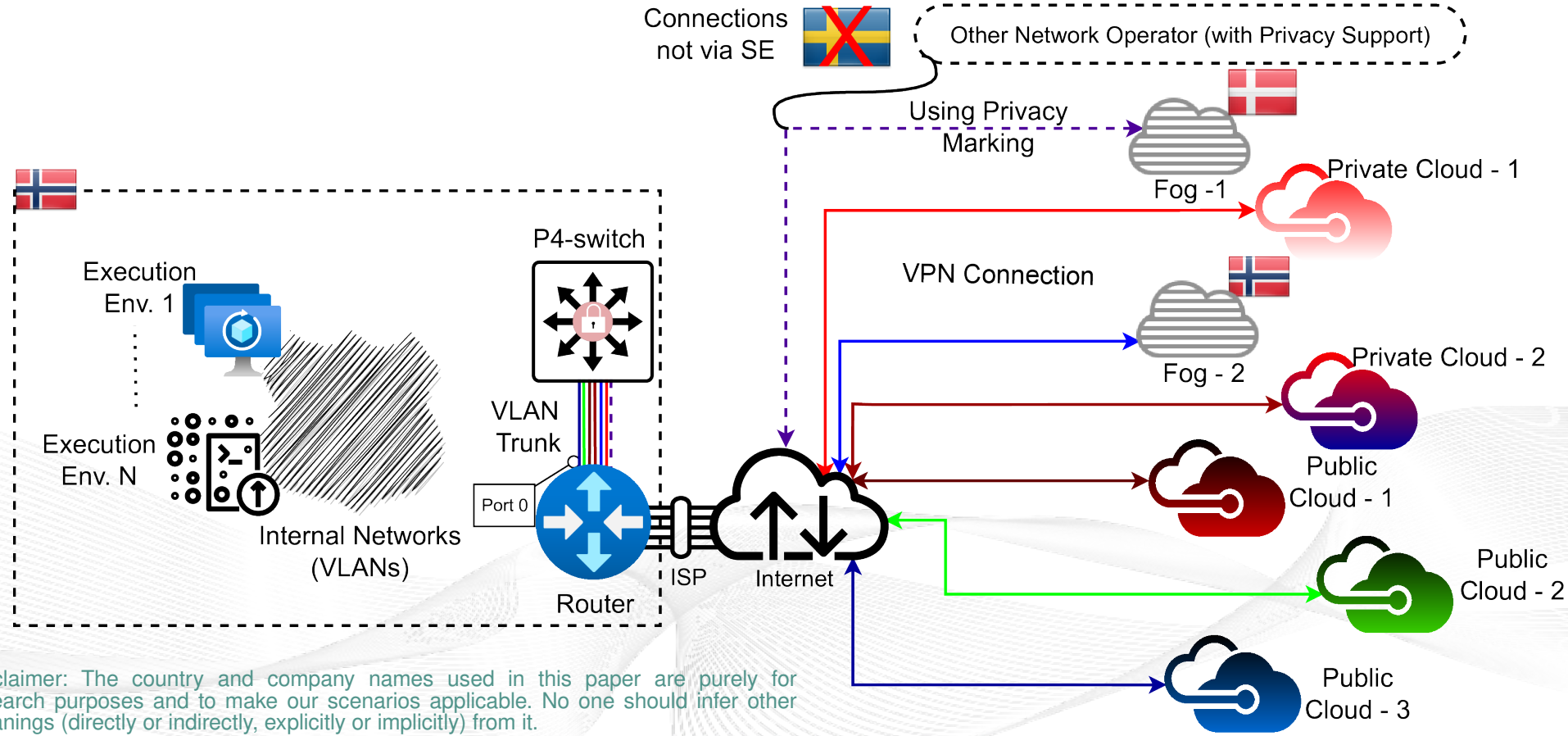
Secure Embedded Living Framework (SELF)

- Aim: Is it possible to protect your privacy?
  - It is possible via control the data packet flow?
  - Smart Homes
- Technologies:
  - Data Communication (IP packets) → To embed rules.
  - Blockchain → To improve data protection.
  - Cloud/fog platform
  - Machine Learning → Better insights.

The SELF Architecture Overview



Execution Environments Example



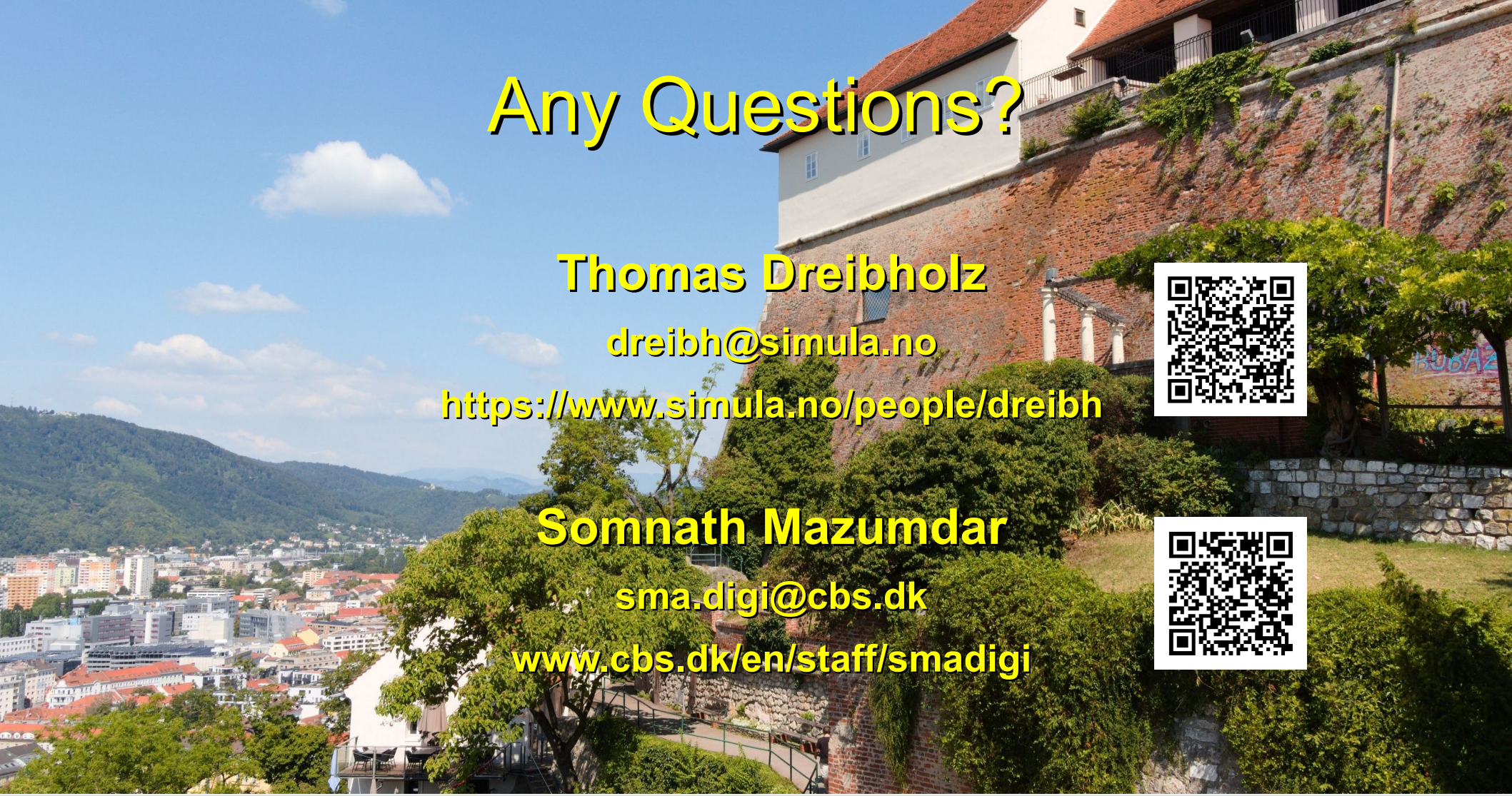
Disclaimer: The country and company names used in this paper are purely for research purposes and to make our scenarios applicable. No one should infer other meanings (directly or indirectly, explicitly or implicitly) from it.

Control over Network Traffic

- Control connectivity of each execution environment individually
  - Regions (e.g. EU, EEA, US, BRICS, …)
  - Countries (e.g. NO, DK, DE, AT, HR, …)
  - Used hardware (e.g. Cisco, Huawei, ZTE, ...)
  - Networks (by Autonomous System number, e.g. Telenor, Optus, A1, ...)
- Ideal: support by the network providers
- Realistic: Dynamic setup of Virtual Private Networks (VPN)
  - Multiplexing of traffic to hide traffic patterns
  - Traffic shaping + dummy traffic to camouflage traffic patterns

Further Reading

- **Mazumdar, S. and Dreibholz, T.**: "Towards A Data Privacy-Aware Execution Zone Creation on Cloud/Fog Platform", in *Proceedings of the 49th Euromicro Conference Series on Software Engineering and Advanced Applications (SEAA)*, pp. 140–149, Durrës/Albania, September 2023.
- **Mazumdar, S. and Dreibholz, T.**: "Proactive Resource Orchestration Framework for Cloud/Fog Platform", in *Proceedings of the 28th IEEE Symposium on Computers and Communications (ISCC)*, pp. 259–265, Gammarth, Tunis/Tunisia, July 2023.
- **Dreibholz, T. and Mazumdar, S.**: "Towards a Lightweight Task Scheduling Framework for Cloud and Edge Platform ", in *Internet of Things*, vol. 21, Elsevier, April 2023.
- **Mazumdar, S. and Dreibholz, T.**: "Towards a Privacy Preserving Data Flow Control via Packet Header Marking", in *Proceedings of the 24th IEEE International Conference on High Performance Computing, Data, and Analytics (HPCC)*, pp. 1509–1516, Chengdu, Sichuan People's Republic of China, December 2022.
- **Mazumdar, S. and Dreibholz, T.**:" Towards a Blockchain and Fog-Based Proactive Data Distribution Framework for ICN", in *Proceedings of the International Conference on Parallel and Distributed Computing, Applications and Technologies (PDCAT)*, pp. 175–186, Sendai, Miyagi/Japan, December 2022.
- **Mazumdar, S. and Dreibholz, T.**: " Secure Embedded Living: Towards a Self-contained User Data Preserving Framework", in *IEEE Communications Magazine*, vol. 60, pp. 74–80, November 2022.
- **Dreibholz, T. and Mazumdar, S.**: "Find Out: How Do Your Data Packets Travel?", in *Proceedings of the 18th IEEE International Conference on Network and Service Management (CNSM)*, pp. 359–363, Thessaloniki, Greece, November 2022.


Any Questions?
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