



UFSC

Call for Participation

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From Smart Buildings to Smart Chips

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On the pursuit of building the infrastructure for a Trustful Internet of (Cyber-Physical) Things in the scope of EPOS, my group came across several challenges along the past 10 years or so. From the very beginning, we have put a gateway between the ordinary People's Internet and the IoT, thus bring forth a kind of Intranet of Things. This enabled us to break free from the design limitations of the original TCP/IP protocol stack and the disorderliness of the associated middlewares that renders them so vulnerable to cyber-attacks and so difficult to deploy in time-critical scenarios. Along the way, we have investigated protocol design at several levels, including MAC, routing, location, energy-awareness, timing, synchronization, security, API, data storage, and data processing. Eventually, the Embedded Parallel Operating System (EPOS) was furnished with all components we needed to instrument real cyber-physical system, including a Smart Boat, an Environmental Monitoring System, and a Solar Smart Building. A careful refactoring of these components resulted in the cross-layered Trustful Space-Time Protocol (TSTP) and the Smart Data construct. At the same time, Cloud integration enabled us to apply Machine Learning techniques to improve on the Smartness of the Things we interconnect and control. More recently, a partnership with Prof. Nikil Dutt's research group at UCI brought about the possibility of deploying the same concepts and infrastructure in the realm of Self-Aware MPSoCs. This talk recalls the most relevant elements in the design of the proposed infrastructure as well as some of the major open issues concerning the realization of a plentiful Internet of Smart Things, including Smart Chips.

Dr. Antonio Augusto Fröhlich is currently an Associate Professor at the Federal University of Santa Catarina (UFSC), where he also serves as the Chief Scientist of the Software/Hardware Integration Lab (LISHA). With a PhD degree in Computer Engineering from the Technical University of Berlin, he has coordinated a number of R&D projects on embedded systems, including the ALTATV Open, Free, Scalable Digital TV Platform and the CIA² research network on Smart Cities and the Internet of Things. Major contributions from these projects materialized within the Brazilian Digital Television System (SBTVD) and Wireless Sensor Network technology for energy distribution, smart cities, and precision agriculture. Dr. Fröhlich is a senior member of ACM, IEEE, and SBC.

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