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SAFETY ASPECTS IN UBIQUITOUS SYSTEMS

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Safety Aspects in Ubiquitous Systems Investigate and propose efficient solutions to the distributed agreement problem, focused almost asynchronous and highly dynamic systems, to tolerate different types of faults and/or attacks on the processes and communication links, for conformed by a wide range of heterogeneous devices, and that can be restricted connectivity and computing systems. Whereby, we have begun working with the Paxos consensus to the approach of TrustedPals in order to cope with a broader spectrum of omissions and also tolerate crash-recovered processes. TrustedPals is a smartcard-based security framework which allows to implement security policies. Within the adaptation we investigate the problem of solving consensus in a crash-recovery failure model enriched with an eventual leader election mechanism provided by the Omega failure detector. The ultimate goal of the proposed approach is to facilitate the development of dependable ubiquitous applications in highly dynamic and heterogeneous environments. Ubiquitous computing systems are intelligent environments where reliability and security are critical aspects, both in terms of communication and computation. Similarly to other types of distributed computing systems, ubiquitous systems are prone to failures. As a consequence, parts of the system can behave in an arbitrary and unpredictable manner, affecting the dependability of the whole system. For this reason, providing a high degree of fault-tolerance and security to the system is a key aspect in the design and development of ubiquitous applications in scenarios where a potentially large set of interconnected devices cooperate. More precisely, it is essential to follow approaches that ensure security and privacy, failure detection and resilience, distributed agreement and leader election, all of them in nearly asynchronous and highly dynamic systems. These basic services will enable the development of dependable applications in ubiquitous systems composed of heterogeneous devices, most of which may have limitations regarding availability, computing power or connectivity.