



A New On-Line Diagnosis Protocol for the Spider Family of Byzantine Fault Tolerant Architectures

By Alfons Geser

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 30 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. This paper presents the formal verification of a new protocol for online distributed diagnosis for the SPIDER family of architectures. An instance of the Scalable Processor-Independent Design for Electromagnetic Resilience (SPIDER) architecture consists of a collection of processing elements communicating over a Reliable Optical Bus (ROBUS). The ROBUS is a specialized fault-tolerant device that guarantees Interactive Consistency, Distributed Diagnosis (Group Membership), and Synchronization in the presence of a bounded number of physical faults. Formal verification of the original SPIDER diagnosis protocol provided a detailed understanding that led to the discovery of a significantly more efficient protocol. The original protocol was adapted from the formally verified protocol used in the MAFT architecture. It required $O(N)$ message exchanges per defendant to correctly diagnose failures in a system with N nodes. The new protocol achieves the same diagnostic fidelity, but only requires $O(1)$ exchanges per defendant. This paper presents this new diagnosis protocol and a formal proof of its correctness using PVS. This item ships from La Vergne, TN. Paperback.



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