Distributed Real-Time Systems: Monitoring, Visualization, Debugging, and Analysis by Ross A. W. Smith

Review

Distributed real-time systems (DRTSs) are used in a wide range of applications, including command and control systems, flight control systems, robotics, patient monitoring systems, and many others. This volume provides an overview of various systematic approaches to the testing and debugging of DRTSs—tasks that typically consume 50% to 70% of a new systems development costs. Distributed Real-Time Systems covers both the theoretical and practical issues involved in monitoring, visualization, and analysis methodology for verifying and debugging DRTSs. It describes in detail how to overcome timing verification difficulties and improve system performance and reliability. Complete with many carefully worked-out examples, as well as dozens of illustrations, this timely and accessible work explains real-world debugging approaches—proposed or tested—using static analysis or dynamic analysis with or without monitoring. Features step-by-step instructions for design implementation in hardware and software, detecting timing errors and their causes, graphical debugging methods, and more. Covers numerous analytical techniques, including timed Petri nets, temporal logic, timed state transition systems, timed process algebra, and synchronous programming languages. Makes distributed systems analysis accessible through examples such as a distributed telephone switching system and a fault-tolerant distributed system. Reviews many relevant professional papers and current research work. The joint product of four leaders in the field, Distributed Real-Time Systems is an important text and reference for electrical and software engineers, graduate students, and anyone involved in computer and data processing technology.

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