



## METADATA

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### Abstract

The book analyzes in depth important aspects of modern distributed information systems. Initially, a general overview of Distributed Systems (DS) takes place, and the problems and challenges they face, their main characteristics and their relationship with Information Systems (IS) are analyzed. The basic design principles of DSs and the architecture which they follow are explained. Communication between remote processes, remote command execution, and network programming in DS are introduced. Processes are examined as well as their relationship to threads, which are presented in terms of their use, construction, communication, and synchronization. Then three important services of the DS are examined, the Name Service, the Directory Service and the Resource Locator Service. Synchronization services between communicating entities in DSs, asynchronous message communication and measurement of physical or logical time in them, as well as

the states of a DS in a distributed computation are then considered. Mutual exclusion is another serious topic that the book deals with, as well as the election of a computing node as the leader. Security in DS is examined, which concerns networks, servers, terminals, system software, and application software. Topics related to distributed applications are presented extensively, with an emphasis on the requirements that they must meet, the tools used to develop and run them, including distributed databases and files, and user roles. Then we address ubiquitous computing through three key technologies: mobile computing, cloud computing, and blockchain. In addition, the Internet of Things and the Smart Cities are featured. Then, the management of DSs is examined, based on the concepts of management domains and policies, as well as its architecture. Finally, a lab project concerning a multithreaded application server is presented.

