

## Efficient Synchronization on Multiprocessors with Shared Memory (Classic Reprint) (Paperback)



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## EFFICIENT SYNCHRONIZATION ON MULTIPROCESSORS WITH SHARED MEMORY (CLASSIC REPRINT) (PAPERBACK)



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Forgotten Books, United States, 2015. Paperback. Book Condition: New. 229 x 152 mm. Language: English . Brand New Book \*\*\*\*\* Print on Demand \*\*\*\*\*.Excerpt from Efficient Synchronization on Multiprocessors With Shared Memory Shared memory provides convenient communication between processes in a tightly coupled multiprocessing system. Shared variables can be used for data sharing, information transfer between processes, and, in particular, for coordination and synchronization. Constructs such as the semaphore introduced by Dijkstra inDi, and the many variants that followed, provide convenient solutions to many synchronization problems involving arbitrary number of processes. These constructs are supported in hardware by machine instructions that atomically execute a Read-Modify-Write cycle. Such instructions exist on most modern CPUs. An atomic Read-Modify-Write operation only requires that it be semantically atomic, although it is often processed atomically also. The serial bottleneck created by this atomic processing, while acceptable for small scale parallelism, can seriously impair the performance of a system with thousands of processors. Frequent accesses to a shared variable not only slow down those processes performing the access, but may cause the entire machine to thrash. Large-scale shared memory parallel processors are likely to use multistage packet switched interconnection networks for processor to memory traffic. These networks provide high bandwidth and short latency time when memory accesses are distributed randomly, but, if even a small percentage of the memory requests are directed to one specific spot, the network becomes congested and performance quickly degrades. A recent study of Pfister and Norton Pn shows that not only those processors attempting to access the same hot spot are delayed, but also the remaining processors. Although replication of data can often be used to circumvent the hot spot problem for read-only data, it cannot be used for synchronization variables. About the Publisher Forgotten Books publishes hundreds of thousands of...



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