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Simulation methods, techniques and tools of computer systems and networks (Book Chapter)

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Abstract

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In this chapter, we present some methods, techniques and tools for simulating computer systems, with special emphasis on discrete-event systems such as wired/wireless networks of computer systems. Simulation is an efficient tool that provides detailed description and behavior analysis of real complex systems. The success of a simulation method basically depends on the accuracy obtained in modeling the system within the simulation tool, the computational resources required and the time elapsed to complete the simulation. For simple systems, sequential simulations, consisting of executing events in a unique queue in a non-decreasing temporal order, is sufficient. As the amount of memory required increases, parallelism, achieved either with multiple replications of a simulation or by model decomposition along either the spatial dimension or the temporal dimension, can be used to speed up the simulation. For systems requiring interaction of nodes with their environment, multi-agent-based simulations are appropriate. © 2015 Elsevier Inc. All rights reserved.

Author keywords

Discrete event simulation; GPU-based simulation; Multi-agent-based simulation; Parallel simulation; Sequential simulation

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