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Modeling and Simulation of Computer Networks and Systems: Methodologies and Applications

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Computer networks performance modeling and simulation

(Book Chapter)

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Abstract

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Modeling and simulation (M&S) is a useful tool to evaluate the performance of computer networks both at the production and developmental phases. It is widely used by researchers, practitioners and students to analyze the behavior of computer networks, since disruptions or service performance degradations are avoided. In this chapter, a brief analysis of the M&S paradigm applied to assess the performance of computer networks is presented. First, a theoretical background on performance modeling and model validation is introduced. Similarly, well-known fundamentals of event-based simulation are discussed concisely. The set of metrics that can be used at each network layer to assess the performance of a simulated computer network are also described and summarized. Since discrete-event simulation is the most common approach to perform network simulation, the most important network simulators based on such an approach are reviewed, and the architecture of a reference network simulator is also depicted. Finally, a case study of performance M&S is illustrated using an assessment of an overlay network for multimedia interactive communications. © 2015 Elsevier Inc. All rights reserved.

Author keywords

Computer networks; Modeling; Performance; Simulation; Verification

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