Systems and communicating networks : traffic and performance

Fiche, Georges, Haebuterne, Gaerard

Abstrak

This book originates from the desire to perpetuate expertise in the field of performance evaluation, particularly for telecommunication systems and networks. It is obviously impossible to translate into a single work all the facets of an activity which encompasses many systems and a great variety of domains such as standardization, modelling, measurement, fields trials, observations etc. However, it rapidly becomes evident that performance study through its different aspects is the expression of a real and unique discipline: performance engineering. So it is worth writing a book whose contents is, as much as possible, the synthesis of both the theoretical and the technical knowledge which are the basis for good practice in this field. In this respect this work aims to be both a tool for education in performance engineering, and a guide to implementing performance activity, both in the research laboratory and in industrial environment. Research and industrial work are both demanding. The performance engineer will have to juggle with equations, as well as with equipment in the lab or in the field. His/her permanent search for efficiency, the necessity to use tractable approximations, and his/her natural trend to perform experimental measurements will not prevent him/her from mastering complex mathematical models. As a matter of fact, it is the complete mastering of the analytical tools together with their application to the whole set of system development phases (from design to operation), which will lead to maximum efficiency, by making possible the synthesis between theory and practice as required by market and industrial constraints. Therefore, in this book, we will deal equally with elementary calculations, such as processor occupancy, the number of messages etc. as well as with more complex computations such as multiplexer dimensioning in the case of internet traffic. In the same way, we will use elementary probability calculations or classical Markov models, as well as complex methods such as Pollaczek's method for queueing systems evaluation.