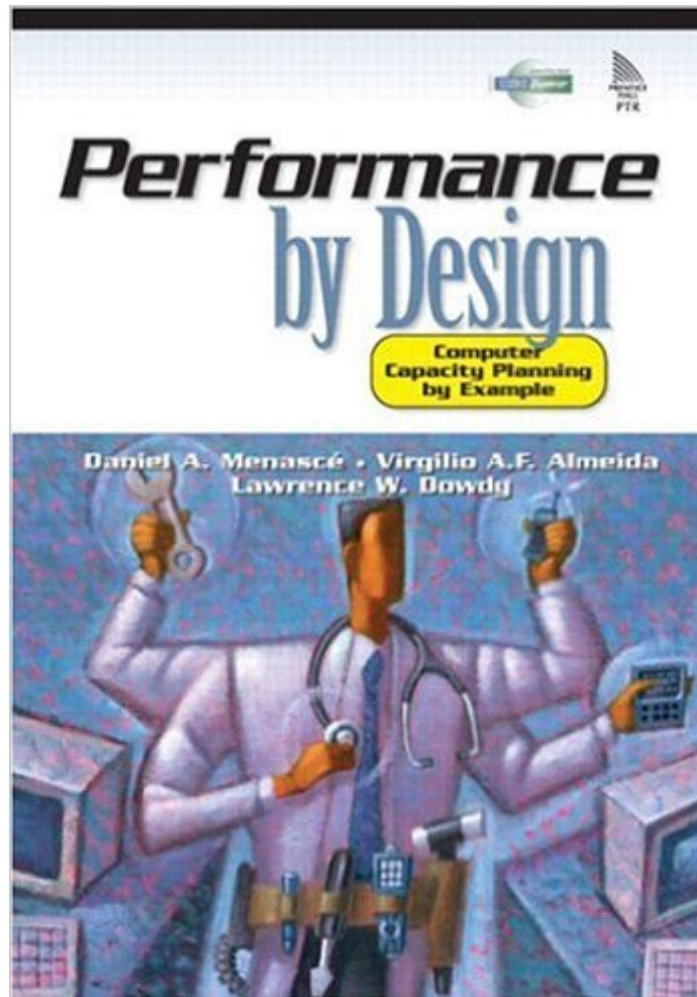# Performance By Design: Computer Capacity Planning By Example

Synopsis

Computing systems must meet increasingly strict Quality of Service (QoS) requirements for performance, availability, security, and maintainability. To achieve these goals, designers, analysts, and capacity planners need a far more thorough understanding of QoS issues, and the implications of their decisions. Now, three leading experts present a complete, application-driven framework for understanding and estimating performance. You'll learn exactly how to map real-life systems to accurate performance models, and use those models to make better decisions--both up front and throughout the entire system lifecycle. supported by extensive numerical examples and exercises; QoS issues in requirements analysis, specification, design, development, testing, deployment, operation, and system evolution; specific scenarios, including e-Business and database services, servers, clusters, and data centers; techniques for identifying potential congestion at both software and hardware levels; performance engineering concepts and tools; detailed solution techniques including exact and approximate MVA and Markov Chains; modeling of software contention, fork-and-join, service rate variability, and priority.

Book Information

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Customer Reviews

This team of authors has produced yet another invaluable book for practitioners who perform capacity and performance planning, as well as students who are introduced to this topic for the first time. Unlike earlier works by the authors, which addressed performance in specific systems

environments such as client/server, e-business and web services, this book is more general. Therein lies the true value - it teaches the fundamentals and will not be soon outdated.The book is structured into two parts - Part I consists of four chapters that lay the foundation. Chapter 1 covers system life cycles, Chapter 2 moves the reader from systems to descriptive models of the systems, and Chapters 3 and 4 delve into the essence of performance - quantifying performance models and giving a performance engineering methodology. This material is reinforced with five chapters, each of which is a case study of a specific performance problem. These include database services, web servers, data center, e-business services and help-desk services.Part II, The Theory of Performance Engineering, addresses the underlying knowledge that performance and capacity planners will need in order to approach their tasks using true quantitative methods. The six chapters in this part of the book cover the following topics in detail, and are clearly and succinctly written: Markov models, single queue systems, single class MVA (Mean Value Analysis), queuing models with multiple classes, queuing models with load dependent devices, and non product-form queuing models. Armed with a knowledge of these fundamentals you should be able to tackle complex performance and capacity problems, both in the software engineering domain when a system is being designed, and in the operational support domain when service level management and availability are the goals. In addition to the way the authors step you through complex math in a clear, easy-to-understand manner, this material is augmented by Microsoft Excel workbooks that bring the material to life. Nearly every chapter has associated workbooks and spreadsheets that can be downloaded from the web site that supports this book, adding considerably to the value of the material.If you are new to performance planning as a discipline this should be the first book you read on the subject. If you teach performance planning, this is an ideal text around which you can base a curriculum that will prepare your students for real world challenges.

"Performance by Design" provides both a conceptual and a practical framework for experienced software developers that want to get started building quality applications using performance engineering techniques.Performance engineering is a discipline that attempts to integrate concerns about the responsiveness of computer applications and their capacity requirements into standard application development practices, which otherwise focus almost exclusively on meeting functional requirements. Just like not getting the functional spec right in the early stages of the application development lifecycle can lead to a cascading series of design and implementation decisions that are difficult to reverse in later stages of the development process, neglecting performance considerations until after the applications has met its functional requirements is often too late to

tackle them effectively.The first part of the book surveys a wide range of performance modeling and capacity planning techniques, served up in clear, concise language with a minimum of mathematics. It is a gentle introduction to analytic queuing networks written at the level that any advanced undergraduate Computer Science student ought to be able to master. The heart of the book, representing Chapters 5 through 9, is a series of Case Studies that rounds out and concludes Part 1. Each of the case studies deftly illustrates another analytic technique that a performance engineer needs to understand how to apply. Chapter 5, for instance, steps through descriptive statistics and cluster analysis as it discusses what is involved in deriving model parameters for a simple database transaction workload. Chapter 6 builds upon this discussion by solving a simple multi-class model, delving into confidence limits and the use of a factorial design to limit the number of trials of a benchmark experiment. Finally, Chapter 9 illustrates using software performance engineering techniques to model a new application during its initial development phases, beginning with the database design.The first half of the book is designed to stand alone if the Reader doesn't have the stomach for the rigorous mathematical treatment of analytic queuing models that characterizes Part 2. The second half of the book should be familiar territory to readers of Menasce's other books on performance modeling, beginning with Markov chains and proceeding through Mean Value Analysis. The final two chapters describe approaches to modeling serialization delays and servers that have load-dependent performance characteristics, two topics that are essential to accurate models of application-level performance.The great challenge of the performance engineering approach is how to persuade experienced applications developers to adopt these techniques. "Performance by Design" is aimed at getting software developers to pay closer attention to performance concerns throughout the application development life cycle. Compared to other books on the subject, this may be the best attempt yet to promote the practice of performance engineering as a discipline that deserves to be integrated into the wider context of application development.

Capacity and Performance management is a very complex subject. I have read a couple of books. Most of them had dry theory without supporting examples. In some cases, I abruptly stopped reading. These type of books may be good to people who are quite fresh from the academic world. Having worked for sometime, one would desire a book with simple but strong fundamentals and more of relating examples.This book stood out to my quest. The pace of the coverage was gradual from Gear 1 to Overdrive. Every ounce of theory was supported with examples. Normally I would skip theory and look for examples. But here I enjoyed reading theory. Well Written!The Case Studies were real world examples. I gained a lot reading this book. Would recommend this book for

Technology professionals who want to switch to Capacity and Performance Management.I would definitely want Mr Menasce and his team to write books on the same topic to address real world end-to-end and new challenges like Petri Nets, Technology Consolidation, Data Warehousing, GRID, Utility Computing, Virtualisation etc. This should definitely help the Technology Community at large.

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