Database Tuning
Principles, Experiments, and Troubleshooting Techniques

By Dennis Shasha & Philippe Bonnet
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As our reliance on computers and computerized data has increased, we have come to expect more from our computers. We no longer expect our computers to act as large expensive calculators that merely spit out bills and paychecks. We now, additionally, expect our systems to rapidly access and interactively present us with large volumes of accurate data. In fact, our expectations have changed so much, in the past decade, that we no longer focus on what our systems are but rather on what they do. We no longer refer to our systems as computer systems but rather information systems. With these new expectations have come new responsibilities for the information systems professional. We can no longer concern ourselves merely with keeping our systems up and running. We now need to concern ourselves with subjective concepts such as response time and throughput. With current expectations what they are, performance tuning has become vitally important.

Summary of the Book

The authors begin this book with the statement that, "Tuning rests on a foundation of informed common sense." This book is not a cookbook. It does not present the reader with a set of rules which, when followed, will yield an optimally functioning database. It does not present the reader with a set of formulas into which he can plug his database statistics in the hopes of generating a recommended set of database parameters. Instead, this book focuses on lying the foundation a rationally thinking database administrator needs to analyze and improve his system's performance.

In chapter one the authors presents five basic principles they feel provide a strong foundation for analyzing database performance problems. These principles are Think Globally; fix Locally, Partitioning Breaks Bottlenecks, Start-Up Costs Are High; Running Costs Are Low, Render unto Server What Is Due unto Server and Be Prepared for Trade-Offs. Understanding these principles is the foundation for understanding the remainder of the book, as the authors continue to refer back to these five principles until the conclusion of the book. In chapter two, they provide an understanding of the guts of any system, the database management system internals, the operating system internals and the hardware. In the next two chapters, they focus on tuning the application software. This is an often-overlooked cause of database slowdowns and, by the authors' first principle, the first place to look for a problem. One poorly written query can bring a database to its knees. One poorly designed table can as well. In chapter three, the authors discuss the performance characteristics of different types of queries. In addition, they discuss the role of indexes and clusters in database design. In chapter four, they provide a brief overview of database design. They review database normalization and its role in database design. Additionally, they discuss ways of

locating and tuning poorly performing queries. In the next chapter, chapter five, the authors focus on communications issues, client server mechanisms and application interfaces. They briefly discuss relational database design in an object-oriented world. In chapter six, the authors present several case studies they feel the reader may be able to generalize in order to get a feel for how to approach a database slowdown problem. In chapter seven, they address troubleshooting, statistics gathering and drilling down into your database to locate a performance problem. Finally, in chapters eight, nine and ten they focus on specific database environments and unique database tuning considerations that apply in these environments. In chapter eight, they deal with tuning e-commerce applications and in chapters nine and ten they focus on data warehouses.

Target Audience

Although Sasha and Bonnet note that educators may find this book useful in a university database curriculum, and have provided questions and exercises that may be useful in a database course, they state that this book's target audience is the practicing professional. Hence, I will direct my comments primarily to this audience.

Reviewer's Comments

Overall, this book provides a strong foundation for database performance tuning. Its focus on general tuning principles, rather than specifics applicable to only one vendor's database management system, is a welcome change. This book will be most useful for database administrators and developers supporting or developing systems for use with more than one vendor's database management systems. In addition, it will be useful for those who are just learning the basics of relational database management systems. Often times novice database developers are so relieved to have just one design and one set of working queries that they fail to consider their system's optimization. Although, for those who consider themselves database novices, I would suggest waiting to read chapter two until after having finished reading chapter five. The authors, themselves, suggest reading chapter two out of order. For these individuals especially, this may be advisable.

There were just a few places where I found the book lacking, not in what was present, but in what was missing. First, It would have been nice if the authors had provided table and index definitions for the tables used in the examples in chapter four. Second, it would have been nice to have an appendix, summarizing the similarities and differences in the tuning possibilities available when working with different vendor's database management systems. Such an appendix would have made this book a necessity for those just selecting a database management system. Finally, although chapter nine provided a strong background in data warehousing, as a novice in the field, I felt I did not have the necessary background to fully understand some of the data warehouse tuning principles the authors presented in chapter ten.

Conclusion

In conclusion, I would recommend this book for developers and database administrators alike who wish to improve the efficiency of their database systems or just improve the quality of their database maintenance and development efforts.