Performance Analysis in High-Speed Wide Area IP over ATM Networks: Top-to-Bottom End-to-End Monitoring

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Abstract

We describe an approach to the analysis of the performance of distributed applications in high-speed wide-area networks. The approach is designed to identify all of the issues that impact performance, and isolate the causes due to the related hardware and software components. We also describe the use of a distributed parallel data server as a network load generator that can be used in conjunction with this approach to probe various aspects of high-speed distributed systems from top-to-bottom of the protocol stack and from end-to-end in the network. To demonstrate the utility of this approach we present the analysis of a TCP over ATM problem that was uncovered while developing this methodology. This work was done in conjunction with the ARPA-funded MAGIC gigabit testbed.

Contents

1.0 Introduction	- 3
2.0 Monitoring Mechanisms	3
2.1 MAGIC and the Distributed Parallel Storage System (DPSS)	3
2.2 OS and Network Layer Monitoring	7
3.0 Monitoring Tools	7
3.1 Common logging format	7
3.2 Log File Analysis Tools	8
3.4 OS and Network Analysis Tools	-8
4.0 Analysis and Results	. 9
4.1 Network Tuning	9
	10
4.3 End-to-End Performance Experiments	1.1
5.0 Computer Platform-Based Performance Issues	25
6.0 Conclusions	27
7.0 Future Work	28
8.0 References	28

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Performance Analysis Of Atm Networks

Dietmar Tutsch

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Performance Evaluation and Applications of ATM Networks Demetres D. Kouvatsos, 2006-04-18 Information Highways are widely considered as the next generation of high speed communication systems These highways will be based on emerging Broadband Integrated Services Digital Networks B ISDN which at least in principle are envisioned to support not only all the kinds of networking applications known today but also future applications which are not as yet understood fully or even anticipated Thus B ISDNs release networking processes from the limitations which the communications medium has imposed historically The operational generality stems from the versatility of Asynchronous Transfer Mode ATM which is the transfer mode adopted by ITU T for broadband public ISDN as well as wide area private ISDN A transfer mode which provides the transmission multiplexing and switching core that lies at the foundations of a communication network ATM is designed to integrate existing and future voice audio image and data services Moreover ATM aims to minimise the complexity of switching and buffer management to optimise intermediate node processing and buffering and to bound transmission delays These design objectives are met at high transmission speeds by keeping the basic unit of ATM transmission the ATM cell short and of fixed length Network Performance Analysis Alan Holt, 2007-10-06 Network Calculus is a mathematical theory concerned with deriving performance bound networks and this book aims to show that it can provide useful methods for designing and engineering networks Examples are implemented in I making the subject more accessible to those that although have a mathematical background are not pure mathematicians Basic and advanced concepts of I are introduced throughout when required to illustrate different issues Topics covering Network Calculus include wide sense increasing functions mini plus algebra convolution and arrival departure and services curves Comprehensive examples in the application of Network Calculus are given models for simulating network traffic and network systems are discussed and congestion control is explored This book brings Network Calculus closer to the network professional and will equally appeal to postgraduates studying network performance by providing valuable analytical tools and using J as a means of providing a practical treatment of the subject **Performance Analysis of ATM Networks** Demetres D. Kouvatsos, 2000 **Performance Analysis of Network Architectures** Dietmar Tutsch, 2007-05-17 Three approaches can be applied to determine the performance of parallel and distributed computer systems measurement simulation and mathematical methods This book introduces various network architectures for parallel and distributed systems as well as for systems on chips and presents a strategy for developing a generator for automatic model derivation It will appeal to researchers and students in network architecture design and performance analysis Per-session

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such as nuclear reactor control and air transportation systems With its particular emphasis on network performance for wireless networks the Internet and ATM networking System Performance Evaluation becomes the ideal vehicle for professionals in computer architecture networking and software engineering to stay up to date and proficient in this essential aspect of information technology Computer Performance Evaluation Ramon Puigjaner, Nunzio N. Savino, Bartomeu Serra, 2003-06-26 The need to evaluate computer and communication systems performance and dependability is continuously growing as a consequence of both the increasing complexity of systems and the user requirements in terms of timing behaviour The 10th International Conference on Modelling Techniques and Tools for C puter Performance Evaluation held in Palma in September 1998 was organised with the aim of creating a forum in which both theoreticians and practitioners could interchange recent techniques tools and experiences in these areas This meeting follows the predecessor conferences of this series 1984 Paris 1988 Palma 1994 Wien 1985 Sophia Antipolis 1991 Torino 1995 Heidelberg 1987 Paris 1992 Edinburgh 1997 Saint Malo The tradition of this conference series continued this year where many high quality papers were submitted The Programme Committee had a di cult task in selecting the best papers Many ne papers could not be included in the program due to space constraints All accepted papers are included in this volume Also a set of submissions describing performance modelling tools was transformed into tool presentations and demonstrations A brief description of these tools is included in this volume The following table gives the overall statistics for the submissions New Solution Techniques for Performance Analysis of ATM Networks Qinglin Wang,1992 Principles of Secure Network Systems Design Sumit Ghosh, 2012-12-06 As e commerce becomes the norm of business transactions and information be comes an essential commodity it is vital that extensive efforts be made to examine and rectify the problems with the underlying architectures processes methods that are involved in providing and and tools as well as organizational structures utilizing services relating to information technology Such a holistic view of the relevant structures is required in order to identify all of the key aspects that can affect network security Unfortunately today's systems and practices although they have proved to be useful and become widespread contain significant unnecessary complexity This complexity provides many loopholes that make systems and practices vulnerable to malicious attacks by hackers as well as by individual and organized criminals FUrther there are enormous risks due to malfunction of the systems The holes in the network system cannot simply be plugged up by the use of cryptography and firewalls While many changes need to be made in operating systems and system software with respect to security this alone does not solve the problem The problems cannot be solved by addressing only a single key aspect of network security A holistic approach is required Sumit Ghosh has provided in this book such a holistic view of the area of network security Thus it is a most welcome contribution **Performance Evaluation of Computer and Communication Systems** Lorenzo Donatiello, Randolph Nelson, 1993-09-15 This volume contains the complete set of tutorial papers presented at the 16th IFIP International Federation for Information Processing Working Group 7 3 International Symposium on

Computer Performance Modelling Measurement and Evaluation and a number of tutorial papers presented at the 1993 ACM Association for Computing Machinery Special Interest Group METRICS Conference on Measurement and Modeling of Computer Systems The principal goal of the volume is to present an overview of recent results in the field of modeling and performance evaluation of computer and communication systems. The wide diversity of applications and methodologies included in the tutorials attests to the breadth and richness of current research in the area of performance modeling The tutorials may serve to introduce a reader to an unfamiliar research area to unify material already known or simply to illustrate the diversity of research in the field The extensive bibliographies guide readers to additional sources for further Fundamentals of Performance Evaluation of Computer and Telecommunication Systems Mohammed S. Obaidat, Noureddine A. Boudriga, 2010-01-26 The only singular all encompassing textbook on state of the art technical performance evaluation Fundamentals of Performance Evaluation of Computer and Telecommunication Systems uniquely presents all techniques of performance evaluation of computers systems communication networks and telecommunications in a balanced manner Written by the renowned Professor Mohammad S Obaidat and his coauthor Professor Noureddine Boudriga it is also the only resource to treat computer and telecommunication systems as inseparable issues The authors explain the basic concepts of performance evaluation applications performance evaluation metrics workload types benchmarking and characterization of workload This is followed by a review of the basics of probability theory and then the main techniques for performance evaluation namely measurement simulation and analytic modeling with case studies and examples Contains the practical and applicable knowledge necessary for a successful performance evaluation in a balanced approach Reviews measurement tools benchmark programs design of experiments traffic models basics of gueueing theory and operational and mean value analysis Covers the techniques for validation and verification of simulation as well as random number generation random variate generation and testing with examples Features numerous examples and case studies as well as exercises and problems for use as homework or programming assignments Fundamentals of Performance Evaluation of Computer and Telecommunication Systems is an ideal textbook for graduate students in computer science electrical engineering computer engineering and information sciences technology and systems It is also an excellent reference for practicing engineers and scientists High-Performance Backbone Network Technology Naoaki Yamanaka, 2020-04-01 Compiling the most influential papers from the IEICE Transactions in Communications High Performance Backbone Network Technology examines critical breakthroughs in the design and provision of effective public service networks in areas including traffic control telephone service real time video transfer voice and image transmission for a content delivery network CDN and Internet access The contributors explore system structures experimental prototypes and field trials that herald the development of new IP networks that offer quality of service QoS as well as enhanced security reliability and function Offers many hints and guidelines for future research in IP and photonic backbone network technologies

Network Performance Engineering Demetres D. Kouvatsos, 2011-04-12 During recent years a great deal of progress has been made in performance modelling and evaluation of the Internet towards the convergence of multi service networks of diverging technologies supported by internetworking and the evolution of diverse access and switching technologies The 44 chapters presented in this handbook are revised invited works drawn from PhD courses held at recent HETNETs International Working Conferences on Performance Modelling and Evaluation of Heterogeneous Networks They constitute essential introductory material preparing the reader for further research and development in the field of performance modelling analysis and engineering of heterogeneous networks and of next and future generation Internets The handbook aims to unify relevant material already known but dispersed in the literature introduce the readers to unfamiliar and unexposed research areas and generally illustrate the diversity of research found in the high growth field of convergent heterogeneous networks and the Internet The chapters have been broadly classified into 12 parts covering the following topics Measurement Techniques Traffic Modelling and Engineering Queueing Systems and Networks Analytic Methodologies Simulation Techniques Performance Evaluation Studies Mobile Wireless and Ad Hoc Networks Optical Networks QoS Metrics and Algorithms All IP Convergence and Networking Network Management and Services and Overlay Networks

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Table of Contents Performance Analysis Of Atm Networks

- 1. Understanding the eBook Performance Analysis Of Atm Networks
 - The Rise of Digital Reading Performance Analysis Of Atm Networks
 - Advantages of eBooks Over Traditional Books
- 2. Identifying Performance Analysis Of Atm Networks
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
- 3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Performance Analysis Of Atm Networks
 - User-Friendly Interface
- 4. Exploring eBook Recommendations from Performance Analysis Of Atm Networks
 - Personalized Recommendations
 - Performance Analysis Of Atm Networks User Reviews and Ratings

- Performance Analysis Of Atm Networks and Bestseller Lists
- 5. Accessing Performance Analysis Of Atm Networks Free and Paid eBooks
 - Performance Analysis Of Atm Networks Public Domain eBooks
 - Performance Analysis Of Atm Networks eBook Subscription Services
 - Performance Analysis Of Atm Networks Budget-Friendly Options
- 6. Navigating Performance Analysis Of Atm Networks eBook Formats
 - o ePub, PDF, MOBI, and More
 - Performance Analysis Of Atm Networks Compatibility with Devices
 - Performance Analysis Of Atm Networks Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Performance Analysis Of Atm Networks
 - Highlighting and Note-Taking Performance Analysis Of Atm Networks
 - Interactive Elements Performance Analysis Of Atm Networks
- 8. Staying Engaged with Performance Analysis Of Atm Networks
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Performance Analysis Of Atm Networks
- 9. Balancing eBooks and Physical Books Performance Analysis Of Atm Networks
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Performance Analysis Of Atm Networks
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Performance Analysis Of Atm Networks
 - Setting Reading Goals Performance Analysis Of Atm Networks
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Performance Analysis Of Atm Networks
 - Fact-Checking eBook Content of Performance Analysis Of Atm Networks
 - Distinguishing Credible Sources

- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
- 14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

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