

Eric Rosenberg

# A Primer of Multicast Routing



Springer

# A Primer Of Multicast Routing Springerbriefs In Computer Science

**Eric Rosenberg**



## **A Primer Of Multicast Routing Springerbriefs In Computer Science:**

A Primer of Multicast Routing Eric Rosenberg, 2012-01-18 Whereas unicast routing determines a path from one source node to one destination node multicast routing determines a path from one source to many destinations or from many sources to many destinations We survey multicast routing methods for when the set of destinations is static and for when it is dynamic While most of the methods we review are tree based some non tree methods are also discussed We survey results on the shape of multicast trees delay constrained multicast routing aggregation of multicast traffic inter domain multicast and multicast virtual private networks We focus on basic algorithmic principles and mathematical models rather than implementation level protocol details Many historically important methods even if not currently used are reviewed to give perspective on the evolution of multicast routing      *Advances in Artificial Systems for Logistics Engineering* Zhengbing Hu, Qingying Zhang, Sergey Petoukhov, Matthew He, 2022-04-28 The book comprises high quality refereed research papers presented at the Second International Conference on Artificial Intelligence and Logistics Engineering ICAILE2022 held in Kyiv Ukraine on February 20 22 2022 organized jointly by the National Technical University of Ukraine Igor Sikorsky Kyiv Polytechnic Institute Wuhan University of Technology Nanning University National Aviation University and the International Research Association of Modern Education and Computer Science The topics discussed in the book include state of the art papers in artificial intelligence and logistics engineering It is an excellent source of references for researchers graduate students engineers management practitioners and undergraduate students interested in artificial intelligence and its applications in logistics engineering      **Solutions for Sustaining Scalability in Internet Growth** Boucadair, Mohamed, Binet, David, 2013-07-31 An ever increasing thirst for information in recent years among consumers researchers and the general population has necessitated continuous growth of internet architecture and accessibility an issue which if not addressed properly may inhibit the growth of the internet as a whole Solutions for Sustaining Scalability in Internet Growth investigates current issues impeding the growth of information architecture and explores methods for developing a wider reaching and ever evolving internet The book presents viable solutions to some of the current threats to robust and pervasive information systems enabling internet actors such as network providers service providers vendors and regulatory bodies to ensure the creation of a more accessible and balanced internet      **A Survey of Fractal Dimensions of Networks** Eric Rosenberg, 2018-05-29 Many different fractal dimensions have been proposed for networks In A Survey of Fractal Dimensions of Networks the theory and computation of the most important of these dimensions are reviewed including the box counting dimension the correlation dimension the mass dimension the transfinite fractal dimension the information dimension the generalized dimensions which provide a way to describe multifractals and the sandbox method for approximating the generalized dimensions The book describes the use of diameter based and radius based boxes and presents several heuristic methods for box counting including greedy coloring random sequential node burning and a method for computing a lower

bound We also discuss very recent results on resolving ambiguity in the calculation of the information dimension and the generalized dimensions and on the non monotonicity of the generalized dimensions Anyone interested in the theory and application of networks will want to read this Brief This includes anyone studying e g social networks telecommunications networks transportation networks ecological networks food chain networks network models of the brain or financial networks

**Multicasting on the Internet and its Applications** Sanjoy Paul,1998-06-30 IP Multicast 29 4 29 4 1 Reverse Path Forwarding 4 2 Internet Group Management Protocol 31 Truncated Broadcasting 32 4 3 4 4 Distance Vector Multicast Routing Protocol DVMRP 34 4 5 Summary 35 5 Multicast Extensions to Open Shortest Path First MO SPF 39 5 1 High level Description 39 Architecture 40 5 2 5 2 1 Design Goals 41 Protocol Data Structures 41 5 2 2 5 3 Protocol 44 52 5 4 Summary 6 Protocol Independent Multicast PIM 53 6 1 High Level Description 53 54 6 2 Architecture 6 2 1 Design Goals 54 6 2 2 Components and Functions 55 6 3 Protocol 57 6 3 1 Creating the PIM framework 58 6 3 2 Creating a specific multicast tree for a group 59 6 3 3 Multicast data forwarding 64 6 3 4 Operation in a multi access network 65 6 3 5 List of PIM messages 68 6 3 6 A complete example 69 6 4 Summary 69 7 Core Based Tree CBT 73 7 1 High level Description 73 7 2 Architecture 74 7 2 1 Design Goals

**Routing for Wireless Multi-Hop Networks** Sherin Abdel Hamid,Hossam S. Hassanein,Glen Takahara,2013-01-18 The focus of this brief is to identify what unifies and what distinguishes the routing functions in four wireless multi hop network paradigms The brief introduces a generic routing model that can be used as a foundation of wireless multi hop routing protocol analysis and design It demonstrates that such model can be adopted by any wireless multi hop routing protocol Also presented is a glimpse of the ideal wireless multi hop routing protocol along with several open issues

**A Primer of Multicast Routing** ,2012 Multimedia Multicast on the Internet Abderrahim Benslimane,2013-03-01 This book examines multicast technology and will be a key text for undergraduate engineering students and master students in networks and telecoms However it will be equally useful for a wide range of professionals in this research field Multicast routing was introduced with the advent of multiparty applications for example videoconferencing on the Internet and collaborative work for example distributed simulations It is related to the concept of group communication a technique introduced to reduce communication costs The various problems of multicast routing on the Internet are examined in detail They include group membership management quality of service reliability safety scalability and transport Throughout the text several protocols are introduced in order to analyze compare and cover the various aspects of multicast routing

**Multicast Routing with Reservation in Wide Area Networks** Shishir K. Ramam,Deepankar Medhi,1999 Interdomain Multicast Routing Brian M. Edwards,Leonard A. Giuliano,Brian R. Wright,2002 This guide to multicasting routing explains the complexities of this growing technology It provides an overview of the current state of development analyzes its relevant protocols and shows how they work together Real world examples illustrate key concepts Specific topics include PIM SM and MSDP Any Source and Source Specific delivery models building

dedicated multicast environments and IGMP and its various versions A glossary defines key terms and important acronyms The authors are engineers and technical writers Annotation copyrighted by Book News Inc Portland OR

**Multicast Communication** Ralph Wittmann, Martina Zitterbart, 2000-06-16 The Internet is quickly becoming the backbone for the worldwide information society of the future Point to point communication dominates the network today however group communication using multicast technology will rapidly gain importance as digital audio and video transmission push technology for the Web and distribution of software updates to millions of end users become ubiquitous Multicast Communication Protocols and Applications explains how and why multicast technology is the key to this transition This book provides network engineers designers and administrators with the underlying concepts as well as a complete and detailed description of the protocols and algorithms that comprise multicast Presents information on the entire range of multicast protocols including PIM SM MFTP and PGM and explains their mechanisms trade offs and solid approaches to their implementation Provides an in depth examination of Quality of Service concepts including RSVP ST2 IntServ and DiffServ Discusses group address allocation and scoping Discusses multicast implementation in ATM networks Builds a solid understanding of the Mbone and surveys the successes and current limitations of real multicast applications on the Internet such as videoconferencing whiteboards and distance learning

**Agent-based Multicast Routing** International Business Machines Corporation. Research Division, Stefan G. Hild, Jörg H. Bischof, 1997 Abstract Agent systems are elegant but it is difficult to find applications of practical importance that gain from being implemented with agent technology as opposed to conventional means the prevailing opinion is that agents are a solution in search of a problem In this short paper we state our definition of agents briefly describe the Aglet agent system and give details of an application that we believe is of practical importance and is more easily implemented with agent technology than other techniques we introduce an agent that roams a network of arbitrary topology and configures a multicast network equivalent to the minimum spanning tree between the sender and the receivers

*A Reliable and Scalable Multicast Model RSM2* Ruchi Gupta, 2013-05-02 Master s Thesis from the year 2012 in the subject Computer Science Internet New Technologies grade 9 course M TECH Algo Networks language English abstract Abstract Multicasting is the ability of a communication network to accept a single message from an application and to deliver copies of the message to multiple recipients at different locations Our research in Multicasting as to design a Multicast Model which provides reliability scalability with best path for data delivery Reliability means guaranteed Delivery of packets Scalability means capability to serve growing needs In this context a few concepts of Proactive Routing technique are used to make available this model in Infrastructure wireless also Minimum Spanning path and combo casting is used to reduce the cost delay and thus to deliver the packets The main characteristic of RSM2 model is to provide complete multicasting i e at the same time more than one node can act as sender This model provides one to many communications as well as many to many communications The goal of thesis is to design an algorithm describing the function

and behavior of Multicast Model RSM2      IP MULTICAST ROUTING Part -3 Ummed Singh,2023-07-23 IP multicast routing is a technique used in computer networks to efficiently deliver data packets from a single sender to multiple recipients. It is specifically designed for applications where data needs to be distributed simultaneously to a group of interested receivers. In traditional unicast communication, a sender sends packets to individual receivers using their unique IP addresses. This creates a point-to-point connection between the sender and each receiver, resulting in duplicate transmissions if multiple receivers are interested in the same data. Unicast is inefficient for one-to-many or many-to-many communication scenarios. Multicast routing, on the other hand, allows a sender to transmit a single copy of a packet, and network routers replicate and forward it to all interested receivers. This saves network bandwidth and processing resources as the data is distributed only once. Multicast routing uses special IP multicast addresses, typically in the range of 224.0.0.0 to 239.255.255.255, to identify multicast groups. To enable IP multicast routing, routers in the network need to support multicast routing protocols such as Protocol Independent Multicast (PIM). These protocols enable routers to exchange information about multicast groups and determine the optimal path for forwarding multicast traffic. Routers maintain multicast routing tables that specify the outgoing interfaces and next-hop routers for forwarding multicast packets. When a sender wants to send data to a multicast group, it encapsulates the data in a multicast packet and sets the appropriate multicast IP destination address. The routers along the path use the multicast routing tables to determine how to forward the packet to all interested receivers. Receivers interested in receiving multicast data join the multicast group by sending a membership request to the nearest router. The router adds the receiver to the multicast distribution tree, and subsequent multicast packets are forwarded.

**Scalable Multicasting over Next-Generation Internet** Xiaohua Tian, Yu Cheng, 2012-07-17 Next generation Internet providers face high expectations as contemporary users worldwide expect high quality multimedia functionality in a landscape of ever-expanding network applications. This volume explores the critical research issue of turning today's greatly enhanced hardware capacity to good use in designing a scalable multicast protocol for supporting large scale multimedia services. Linking new hardware to improved performance in the Internet's next incarnation is a research hot spot in the computer communications field. The methodical presentation deals with the key questions in turn from the mechanics of multicast protocols to current state-of-the-art designs and from methods of theoretical analysis of these protocols to applying them in the ns2 network simulator, known for being hard to extend. The authors' years of research in the field inform this thorough treatment, which covers details such as applying AOM application-oriented multicast protocol to IPTV provision and resolving the practical design issues thrown up in creating scalable AOM multicast service models.

*On-demand Multicast Routing in Ad Hoc Networks with Unidirectional Links* Jorjeta G. Jetcheva, David B. Johnson, 2004 Abstract Many techniques used by routing protocols for ad hoc networks assume that links in the network can be used equally well in both directions between the two endpoint nodes of the link. However, there are many real-world situations in which wireless links may physically work

in only one direction resulting in degradation of routing performance in the network In this paper we present the first study of the effect of unidirectional links on the performance of on demand multicast routing protocols for ad hoc networks and present mechanisms that enable such protocols to route efficiently over unidirectional links We evaluate these mechanisms in the context of the Adaptive Demand Driven Multicast Routing protocol ADMR and simulate the extended protocol ADMR U in a wide range of mobile and static network scenarios with unidirectional links In networks with only bidirectional links the unidirectional extensions do not get activated and cause no overhead in networks with unidirectional links ADMR U matches or outperforms ADMR in terms of packet delivery ratio and lowers ADMR's packet overhead

*Multicast Communication in Distributed Systems* Mustaque Ahamad,1990      **Multicast Routing in Internetworks and Extended LANs** Stephen E. Deering,Stanford University. Computer Science Department,1988 Multicasting is used within local area networks to make distributed applications more robust and more efficient The growing need to distribute applications across multiple interconnected networks and the increasing availability of high performance high capacity switching nodes and networks leads us to consider providing LAN style multicasting across an internetwork In this paper we propose extensions to two common internetwork routing algorithms distance vector routing and link state routing to support low delay datagram multicasting We also suggest modifications to the single spanning tree routing algorithm commonly used by link layer bridges to reduce the costs of multicasting in large extended LANs Finally we show how different link layer and network layer multicast routing algorithms can be combined hierarchically to support multicasting across large heterogeneous internetworks RH      **Multicast Routing Algorithms for Multimedia Traffic** Vachaspathi Peter Kompella,1993

**Deploying Next Generation Multicast-enabled Applications** Vinod Joseph,Srinivas Mulugu,2011-07-15 Deploying Next Generation Multicast Enabled Applications provides detailed information on existing Multicast and MVPN standards referred to as Next Generation Multicast based standards Multicast Applications and case studies with detailed configurations

## Whispering the Secrets of Language: An Mental Quest through **A Primer Of Multicast Routing Springerbriefs In Computer Science**

In a digitally-driven earth wherever screens reign great and quick conversation drowns out the subtleties of language, the profound strategies and psychological nuances hidden within words often get unheard. However, situated within the pages of **A Primer Of Multicast Routing Springerbriefs In Computer Science** a interesting literary treasure pulsing with raw feelings, lies a fantastic quest waiting to be undertaken. Written by a talented wordsmith, that wonderful opus encourages viewers on an introspective journey, gently unraveling the veiled truths and profound affect resonating within the very cloth of each word. Within the mental depths of the emotional evaluation, we will embark upon a sincere exploration of the book is primary themes, dissect its charming writing design, and succumb to the effective resonance it evokes heavy within the recesses of readers hearts.

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