

DEPLOYING NEXT GENERATION MULTICAST-ENABLED APPLICATIONS

Label Switched Multicast for MPLS VPNs, VPLS, and Wholesale Ethernet



Vinod Joseph | Srinivas Mulugu

Deploying Next Generation Multicast Enabled Applications Label Switched Multicast For Mpls Vpns Vp

Vinod Joseph,Srinivas Mulugu



Deploying Next Generation Multicast Enabled Applications Label Switched Multicast For Mpls Vpns Vp:

Deploying Next Generation Multicast-enabled Applications Vinod Joseph, Srinivas Mulugu, 2011-08-20 Deploying Next Generation Multicast Enabled Applications Label Switched Multicast for MPLS VPNs VPLS and Wholesale Ethernet provides a comprehensive discussion of Multicast and MVPN standards next generation Multicast based standards Multicast Applications and case studies with detailed configurations Focusing on three vendors Juniper Cisco and Alcatel Lucent the text features illustrations that contain configurations of JUNOS TiMOS Alcatel s OS or Cisco IOS and each configuration is explained in great detail Multiple rather than single vendor configurations were selected for the sake of diversity as well as to highlight the direction in which the overall industry is going rather than that of a specific vendor Beginning with a discussion of the building blocks or basics of IP Multicast the book then details applications and emerging trends including vendor adoptions as well as the future of Multicast The book is written for engineers technical managers and visionaries engaged in the development of next generation IP Multicast infrastructures Offers contextualized case studies for illustrating deployment of the Next Generation Multicast technology Provides the background necessary to understand current generation multi play applications and their service requirements Includes practical tips on various migration options available for moving to the Next Generation framework from the legacy **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 **MPLS-Enabled**

Applications Ina Minei, Julian Lucek, 2010-12-10 With a foreword by Yakov Rekhter Here at last is a single all encompassing resource where the myriad applications sharpen into a comprehensible text that first explains the whys and whats of each application before going on to the technical detail of the hows Kireeti Kompella CTO Junos Juniper Networks The authoritative guide to MPLS now in its Third edition fully updated with brand new material MPLS is now considered the networking technology for carrying all types of network traffic including voice telephony real time video and data traffic In MPLS Enabled Applications Third Edition the authors methodically show how MPLS holds the key to network convergence by allowing operators to offer more services over a single physical infrastructure The Third Edition contains more than 170 illustrations new chapters and more coverage guiding the reader from the basics of the technology through all its major VPN applications MPLS Enabled Applications contains up to date coverage of The current status and future potential of all major MPLS applications including L2VPN L3VPN pseudowires and VPLS A new chapter with up to date coverage of the MPLS transport profile MPLS TP MPLS in access networks and Seamless MPLS the new architecture for extending MPLS into the access discussed in depth for both the unicast and the multicast case Extensive coverage of multicast support in L3VPNs mVPNs explaining and comparing both the PIM GRE and the next generation BGP MPLS solutions and including a new

chapter on advanced topics in next generation multicast VPNs A new chapter on advanced protection techniques including detailed discussion of 50 ms end to end service restoration Comprehensive coverage of the base technology as well as the latest IETF drafts including topics such as pseudowire redundancy VPLS multihoming IRB and P2MP pseudowires MPLS Enabled Applications will provide those involved in the design and deployment of MPLS systems as well as those researching the area of MPLS networks with a thoroughly modern view of how MPLS is transforming the networking world Essential new material for those trying to understand the next steps in MPLS Adrian Farrel IETF Routing Area Director MPLS Enabled Applications takes a unique and creative approach in explaining MPLS concepts and how they are applied in practice to meet the needs of Enterprise and Service Provider networks I consistently recommend this book to colleagues in the engineering education and business community Dave Cooper Chief IP Technologist Global Crossing Ltd This Week Deploying MBGP Multicast VPNs Antonio Sánchez Monge,2011-04-15 **This Week Deploying MPLS** Tim Fiola,Jamie Panagos,2011-04-22

MPLS Technology and Implementation Richard Johnson,2025-06-18 MPLS Technology and Implementation MPLS Technology and Implementation offers a comprehensive methodical exploration of Multiprotocol Label Switching MPLS guiding readers from foundational architecture and core principles to advanced innovations and real world deployments The book meticulously unpacks the MPLS protocol stack elucidating the design philosophy that merges Layer 2 and Layer 3 transport and clarifies key concepts such as label switching forwarding mechanisms label distribution and protocol operations across varying network scenarios Through detailed technical breakdowns readers gain a solid understanding of MPLS components control and data plane separation scalability optimizations and packet forwarding logic laying a robust groundwork for both new learners and seasoned network professionals Building on these fundamentals the book examines essential MPLS applications spanning Layer 3 and Layer 2 VPNs Ethernet VPN EVPN multicast services and advanced traffic engineering In depth discussions on dynamic label signaling protocols resource reservation strategies hierarchical forwarding and protection switching equip practitioners to implement performant resilient and scalable MPLS solutions The book also presents contemporary MPLS advancements including segment routing SDN integration service function chaining and deployment in modern data centers and virtualized network environments offering a future proof perspective for evolving networking needs A dedicated focus on operational excellence and security rounds out this authoritative work covering network automation OAM real time monitoring troubleshooting high availability and compliance Real world deployment case studies spanning service provider enterprise 5G IoT and multi cloud networks provide invaluable insights into MPLS design patterns lessons learned and common pitfalls Concluding with a forward looking view on protocol evolution the book positions itself as an indispensable resource for network architects engineers and decision makers architecting the next generation of MPLS enabled infrastructures *Definitive MPLS Network Designs* Jim Guichard,François Le Faucheur,Jean-Philippe Vasseur,2005 Field proven MPLS designs covering MPLS VPNs pseudowire QoS traffic engineering

IPv6 network recovery and multicast Understand technology applications in various service provider and enterprise topologies via detailed design studies Benefit from the authors vast experience in MPLS network deployment and protocol design Visualize real world solutions through clear detailed illustrations Design studies cover various operator profiles including an interexchange carrier IXC a national telco deploying a multiservice backbone carrying Internet and IP VPN services as well as national telephony traffic an international service provider with many POPs all around the globe and a large enterprise relying on Layer 3 VPN services to control communications within and across subsidiaries Design studies are thoroughly explained through detailed text sample configurations and network diagrams Definitive MPLS Network Designs provides examples of how to combine key technologies at the heart of IP MPLS networks Techniques are presented through a set of comprehensive design studies Each design study is based on characteristics and objectives common to a given profile of network operators having deployed MPLS and discusses all the corresponding design aspects The book starts with a technology refresher for each of the technologies involved in the design studies Next a series of design studies is presented each based on a specific hypothetical network representative of service provider and enterprise networks running MPLS Each design study chapter delivers four elements They open with a description of the network environment including the set of supported services the network topology the POP structure the transmission facilities the basic IP routing design and possible constraints Then the chapters present design objectives such as optimizing bandwidth usage Following these are details of all aspects of the network design covering VPN QoS TE network recovery and where applicable multicast IPv6 and pseudowire The chapters conclude with a summary of the lessons that can be drawn from the design study so that all types of service providers and large enterprise MPLS architects can adapt aspects of the design solution to their unique network environment and objectives Although network architects have many resources for seeking information on the concepts and protocols involved with MPLS there is no single resource that illustrates how to design a network that optimizes their benefits for a specific operating environment The variety of network environments and requirements makes it difficult to provide a one size fits all design recommendation Definitive MPLS Network Designs fills this void This book comes as a boon to professionals who want to understand the power of MPLS and make full use of it Parantap Lahiri Manager IP Network Infrastructure Engineering MCI Includes a FREE 45 Day Online Edition This book is part of the Networking Technology Series from Cisco Press which offers networking professionals valuable information for constructing efficient networks understanding new technologies and building successful careers *MPLS* Bruce S. Davie, Yakov Rekhter, 2000 Written by two of the foremost experts on the subject who illustrate concepts with practical examples of their application The most authoritative text on MPLS Highly Recommended Daniel Awduche Distinguished Technical Member UUNET MCI Worldcom At last a comprehensive presentation of MPLS reflecting its development and usage this book is a MUST for any Network Engineering Manager contemplating the deployment of MPLS Monique Jeanne Morrow IP Engineering Manager Swisscom

AG Davie and Rekhter provide a detailed and unbiased chronology of the evolution of MPLS. Their scientific approach to decomposing various protocols into their fundamental elements is interwoven with a more pragmatic compilation of diagrams, typical networking scenarios and applications. Provides a solid knowledge base for researchers and operators dedicated to MPLS and its future. Eric Dean, Senior Director, Internetwork Engineering, Global One. Multiprotocol Label Switching (MPLS) is now a widely deployed technology which addresses a variety of issues including traffic engineering, Quality of Service, Virtual Private Networks and IP/ATM integration. MPLS Technology and Applications is the first book that provides a detailed analysis of the architecture, protocols and application of MPLS. Written by experts who personally authored key parts of the standard, this book will enable network operators and designers to determine which aspects of networks would benefit from MPLS. It is also a definitive reference for engineers implementing MPLS based products. Features: Covers major applications of MPLS, traffic engineering, VPNs, IP/ATM integration and QoS. Describes all the major protocols that comprise MPLS, including LDP, RSVP and CR LDP. Goes beyond the RFCs to explain how and why key design decisions were made. Provides a complete discussion of constraint based routing. Label Assignment and Failure Recovery Approaches for IP Multicast Communication in MPLS Networks Omar Qasem Banimelhem, 2005. Multiprotocol Label Switching (MPLS) is an Internet Engineering Task Force (IETF) framework that provides for the efficient designation, routing, forwarding and switching of traffic flows through the network. MPLS is widely used for multicast traffic engineering. However, integrating MPLS with IP multicast communication is difficult. This thesis proposes solutions for two problems: label assignment and failure recovery. When a set of multicast flows/sessions is deployed in an MPLS network, each multicast entry for the sessions consumes an MPLS label. However, MPLS labels are significant resources in MPLS networks as the 20-bit field of the MPLS header limits the number of available labels. It is advantageous if different multicast sessions can share the same multicast tree in the network and re-use the MPLS label. In the first part of the thesis, we propose two algorithms to do this. The first one is called State Encoding (SE) in which a code is calculated for every tree built in an MPLS network. The second algorithm is called Tree Numbering (TN) where a number represents each tree. If the IP packets of different multicast sessions are delivered over the same tree, all those packets are then classified to the same Forwarding Equivalence Class (FEC) and only one label is used instead of using a number of labels equal to the number of those sessions. The second part of this thesis contributes to this area. To trade off between the large amount of bandwidth required for reserving backup paths in local recovery and the large recovery time taken in global recovery, a new tree division approach is proposed. In this approach, a multicast tree is divided into several domains where each domain represents a local stand-alone sub-tree of the original one. Two MPLS-based methods are then proposed to set up the backup paths inside the domains. A comparison is made among the local recovery approach, the global recovery approach, a method that sets up the backup paths between the branching points and the proposed approach. The comparison is based on three metrics: the total backup capacity, the maximum and the average

notification times and the average number of the notification messages that are produced as a result of a failure In terms of the reserved capacity the results have shown that our architecture consumes backup capacity close to that consumed by the global recovery

Deploying IP Multicast in the Enterprise Thomas Maufer,1998 All readers need to know to deploy IP Multicasting now and optimize it tomorrow is found within these pages This is one of the first books to closely examine the protocols which make Multicasting possible and the thorny routing issues that arise in enterprise Multicasting

QoS Multicast for DiffServ on MPLS and IP Platforms Abdullah Ahmed Al Wehaibi,2003 Multicasting has become increasingly important with the emergence of Internet based applications such Internet protocol IP telephony audio video conferencing distributed databases and software upgrading IP Multicasting is an efficient way to distribute information from a single source to multiple destinations at different locations One of the challenges the Internet is facing today is to keep the packet forwarding performance up with the skyrocketing demand for bandwidth On the other hand the MultiProtocol Label Switching MPLS which is an Internet Engineering Task Force IETF framework combines the flexibility of layer 3 routing and layer 2 switching which enhances network performance in terms of scalability computational complexity latency and control message overhead Besides MPLS offers a vehicle for enhanced network services such as Quality of Services QoS Class of Service CoS Traffic Engineering and Virtual Private Networks VPNs In this thesis we present a new Fair Share Policy FSP which is a traffic policing mechanism that utilizes Differentiated Services DiffServ to solve the problems of QoS and congestion control We compare the QoS performance of IP and MPLS multicasting given their particular constraints In order to achieve the required QoS different techniques of reliable multicasting are adapted such as Forward Error Correction FEC Automatic Repeat Request ARQ or Hybrid FEC ARQ with multicast or unicast repairs mechanisms so as to mitigate the effect of errors as well as packet loss This reliable multicast is for both IP and MPLS platforms with Diffserv Analytical and simulation models are suggested and employed The results provide insights into the comparisons between IP multicast in MPLS networks using FSP and plain IP multicasting using the same policy when DiffServ is adopted and when reliable multicast is considered This comparison will be based on the following QoS measures total packet delay delay jitter and residual packet loss probability Analysis and simulation tools are used to evaluate our fair share policy FSP for different homogeneous when all routers are identical in their capabilities and heterogeneous when routers have different capabilities network scenarios

Multicast Networking and Applications C. Kenneth Miller,1999 A tutorial and complete description of the core concepts and real world applications of IP multicast one of the most effective solutions alleviating network congestion The author one of the key technologists in multicasting describes a series of multicast applications and shows how they can be used to improve business processes and information dispersal without causing network infrastructure overload

Building Switched Networks Darryl P. Black,1999 Building Switched Networks provides a comprehensive technical survey of the networking technologies that comprise the core of evolving LAN and WAN infrastructures This book

gives you essential background information clear descriptions of relevant technologies and an understanding of how those technologies will be employed throughout networks in the near future In particular the text focuses on developments that support our increasing demand for network bandwidth multilayer switching delivery guarantees and multicasting and examines performance issues resource allocation network policy and network services

MPLS for Metropolitan Area Networks Nam-Kee Tan,2004-11-15 Metro Service Providers are increasingly turning to Multi Protocol Label Switching MPLS to converge disparate networks and services into a unified core maintain quality and deliver additional value added capabilities MPLS for Metropolitan Area Networks addresses service providers challenges by demonstrating solutions provided by MPLS features such as traffic engineering TE fast reroute VPNs virtual private LAN services VPLS and QoS The text opens with an overview of metro networks and MPLS describing business opportunities and challenges and how mission critical applications can be deployed within Metropolitan Area Networks MANs It then examines traffic engineering issues focusing on fundamental TE concepts network control trunk attributes constraint based routing CBR Resource Reservation Protocol with TE extensions RSVP TE and resource optimization Following a discussion on how MPLS can bring increased reliability to MANs the author then concludes the book with a detailed analysis of the service aspect of MANs Topics reviewed include L3 and L2 MPLS VPNs geographically dispersed Ethernet multipoint services virtual private LAN services VPLS and the integrated services IntServ and differentiated services DiffServ QoS models with respect to MPLS The entire book adopts a simplify and exemplify approach containing a series of real life case studies and using representative topologies as a basis for illustrating the concepts discussed in each chapter This learning by example approach helps you to remember and understand the complex MPLS concepts and technologies You can then apply what you have learned from these examples and scenarios to your specific networking environments

A Traffic Engineering Approach to Differentiated Multicast Services Over MPLS Networks Toni Barabas,2012

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