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YQLM46 - ELLISON LILIAN

Design, configure, and manage MPLS TE to optimize network performance Almost every busy network backbone has some congested links while others remain underutilized. That's because shortest-path routing protocols send traffic down the path that is shortest without considering other network parameters, such as utilization and traffic demands. Using Traffic Engineering (TE), network operators can redistribute packet flows to attain more uniform distribution across all links. Forcing traffic onto specific pathways allows you to get the most out of your existing network capacity while making it easier to deliver consistent service levels to customers at the same time. Cisco(r) Multiprotocol Label Switching (MPLS) lends efficiency to very large networks, and is the most effective way to implement TE. MPLS TE routes traffic flows across the network by aligning resources required by a given flow with actual backbone capacity and topology. This constraint-based routing approach feeds the network route traffic down one or more pathways, preventing unexpected congestion and enabling recovery from link or node failures. Traffic Engineering with MPLS provides you with information on how to use MPLS TE and associated features to maximize network bandwidth. This book focuses on real-world applications, from design scenarios to feature configurations to tools that can be used in managing and troubleshooting MPLS TE. Assuming some familiarity with basic label operations, this guide focuses mainly on the operational aspects of MPLS TE-how the various pieces work and how to configure and troubleshoot them. Additionally, this book addresses design and scalability issues along with extensive deployment tips to help you roll out MPLS TE on your own network. Understand the background of TE and MPLS, and brush up on MPLS forwarding basics Learn about router information distribution and how to bring up MPLS TE tunnels in a network Understand MPLS TE's Constrained Shortest Path First (CSPF) and mechanisms you can use to influence CSPF's path calculation Use the Resource Reservation Protocol (RSVP) to implement Label-Switched Path setup Use various mechanisms to forward traffic down a tunnel Integrate MPLS into the IP quality of service (QoS) spectrum of services Utilize Fast Reroute (FRR) to mitigate packet loss associated with link and node failures Understand Simple Network Management Protocol (SNMP)-based measurement and accounting services that are available for MPLS Evaluate design scenarios for scalable MPLS TE deployments Manage MPLS TE networks by examining common configuration mistakes and utilizing tools for troubleshooting MPLS TE problems "Eric and Ajay work in the development group at Cisco that built Traffic Engineering. They are among those with the greatest hands-on experience with this application. This book is the product of their experience." -George Swallow, Cisco Systems, Architect for Traffic Engineering Co-Chair, IETF MPLS Working Group Eric Osborne, CCIE(r) #4122, has been doing Internet engineering of one sort or another since 1995. He joined Cisco in 1998 to work in the Cisco Technical Assistance Center (TAC), moved from there to the ISP Expert team and then to the MPLS Deployment team. He has been involved in MPLS since the Cisco IOS(r) Software Release 11.1CT days. Ajay Simha, CCIE #2970, joined the Cisco TAC in 1996. He then went on to support tier 1 and 2 ISPs as part of Cisco's ISP Expert team. Ajay has been working as an MPLS deployment engineer since October 1999, and he has first-hand experience in troubleshooting, designing, and deploying MPLS.

Master the latest MPLS VPN solutions to design, deploy, and troubleshoot advanced or large-scale networks With MPLS and VPN Architectures, Volume II, you'll learn: How to integrate various remote access technologies into the backbone providing VPN service to many different types of customers The new PE-CE routing options as well as other advanced features, including per-VPN Network Address Translation (PE-NAT) How VRFs can be extended into a customer site to provide separation inside the customer network The latest MPLS VPN security features and designs aimed at protecting the MPLS VPN backbone How to carry customer multicast traffic inside a VPN The latest inter-carrier enhancements to allow for easier and more scalable deployment of inter-carrier MPLS VPN services Advanced troubleshooting techniques including router outputs to ensure high availability MPLS and VPN Architectures, Volume II, builds on the best-selling MPLS and VPN Architectures, Volume I (1-58705-002-1), from Cisco Press. Extending into more advanced topics and deployment architectures, Volume II provides readers with the necessary tools they need to deploy and maintain a secure, highly available VPN. MPLS and VPN Architectures, Volume II, begins with a brief refresher of the MPLS VPN Architecture. Part II describes advanced MPLS VPN connectivity including the integration of service provider access technologies (dial, DSL, cable, Ethernet) and a variety of routing protocols (IS-IS, EIGRP, and OSPF), arming the reader with the knowledge of how to integrate these features into the VPN backbone. Part III details advanced deployment issues including security, outlining the necessary steps the service provider must take to protect the backbone and any attached VPN sites, and also detailing the latest security features to allow more advanced topologies and filtering. This part also covers multi-carrier MPLS VPN deployments. Finally, Part IV provides a methodology for advanced MPLS VPN troubleshooting. MPLS and VPN Architectures, Volume II, also introduces the latest advances in customer integration, security, and troubleshooting features essential to providing the advanced services based on MPLS VPN technology in a secure and scalable way. This book is part of the Networking Technology Series from Cisco Press(r), which offers networking professionals valuable information for constructing efficient networks, understanding new technologies, and building successful careers.

An in-depth guide to understanding advanced MPLS implementation, including packet-based VPNs, ATM-based VPNs, traffic engineering, and quality of service "Advanced MPLS Design and Implementation" enables you to: Understand MPLS through a detailed analysis of MPLS architecture and operation Design and implement packet-based MPLS Virtual Private Networks (VPNs) using label switching routers (LSRs) Design and implement ATM-based MPLS VPNs using WAN-switched ATM LSRs Implement MPLS traffic engineering on your core network and optimize traffic flows dynamically Implement MPLS QoS and provide hard service guarantees with multiple classes of service Acquire practical design and implementation knowledge of real-world

MPLS VPNs, TE, and QoS through case studies and configuration examples Multiprotocol Label Switching (MPLS) is a highly scalable, high-performance forwarding technology that has multiple applications in the service provider and enterprise environment. This book is intended for internetwork engineers and administrators who are responsible for designing, implementing, and supporting service provider or enterprise MPLS backbone networks. It contains a broad range of technical details on MPLS and its associated protocols, packet-based MPLS, ATM-based MPLS, MPLS traffic engineering, MPLS QoS, MPLS design, and advanced MPLS architectures. This book contains MPLS theory, design, configuration, and various case studies. Use this book as a reference and guide for designing, implementing, and supporting an MPLS network. Even if you're not using Cisco(r) equipment, this book can increase your awareness and understanding of MPLS technology as well as provide you with detailed design concepts and rules for building scalable MPLS networks. "Advanced MPLS Design and Implementation" is your guide to understanding, designing, and implementing MPLS VPNs, WAN-switched MPLS VPNs, MPLS traffic engineering, and MPLS QoS.

Annotation "EIGRP Network Design Solutions uses case studies and real-world configuration examples to help you gain an in-depth understanding of the issues involved in designing, deploying, and managing EIGRP-based networks. It details proper designs that can be used to build large and scalable EIGRP-based networks and documents possible ways each EIGRP feature can be used in network design, implementation, troubleshooting, and monitoring."--BOOK JACKET. Title Summary field provided by Blackwell North America, Inc. All Rights Reserved.

The definitive guide to troubleshooting today's complex BGP networks This is today's best single source for the techniques you need to troubleshoot BGP issues in modern Cisco IOS, IOS XR, and NxOS environments. BGP has expanded from being an Internet routing protocol and provides a scalable control plane for a variety of technologies, including MPLS VPNs and VXLAN. Bringing together content previously spread across multiple sources, Troubleshooting BGP describes BGP functions in today's blended service provider and enterprise environments. Two expert authors emphasize the BGP-related issues you're most likely to encounter in real-world deployments, including problems that have caused massive network outages. They fully address convergence and scalability, as well as common concerns such as BGP slow peer, RT constraint filtering, and missing BGP routes. For each issue, key concepts are presented, along with basic configuration, detailed troubleshooting methods, and clear illustrations. Wherever appropriate, OS-specific behaviors are described and analyzed. Troubleshooting BGP is an indispensable technical resource for all consultants, system/support engineers, and operations professionals working with BGP in even the largest, most complex environments. · Quickly review the BGP protocol, configuration, and commonly used features · Master generic troubleshooting methodologies that are relevant to BGP networks · Troubleshoot BGP peering issues, flapping peers, and dynamic BGP peering · Resolve issues related to BGP route installation, path selection, or route policies · Avoid and fix convergence problems · Address platform issues such as high CPU or memory usage · Scale BGP using route reflectors, diverse paths, and other advanced features · Solve problems with BGP edge architectures, multihoming, and load balancing · Secure BGP inter-domain routing with RPKI · Mitigate DDoS attacks with RTBH and BGP Flowspec · Understand common BGP problems with MPLS Layer 3 or Layer 2 VPN services · Troubleshoot IPv6 BGP for service providers, including 6PE and 6VPE · Overcome problems with VXLAN BGP EVPN data center deployments · Fully leverage BGP High Availability features, including GR, NSR, and BFD · Use new BGP enhancements for link-state distribution or tunnel setup 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.

A comprehensive guide to implementing QoS in IP/MPLS networks using Cisco IOS and Cisco IOS XR Software Understand IP QoS architectures and how they apply to MPLS Take a detailed look at traffic management using policing, shaping, scheduling, and active queue management Study Cisco QoS behavioral model and the modular QoS command-line interface (MQC) Learn the operation of MPLS TE with its DiffServ extensions and applicability as a traffic-protection alternative Find multiple configuration and verification examples illustrating the implementation of MPLS TE, DS-TE, and FRR Review the different designs, ranging from a best-effort backbone to the most elaborate scenarios combining DiffServ, DS-TE, and FRR Quality of service (QoS) plays a key role in the implementation of IP and MPLS networks today. However, QoS can be one of the most complex aspects of networking. The industry efforts to achieve convergence have generated a need for increased levels of traffic differentiation. Today's networks need to meet an array of QoS requirements to support distinct applications (such as voice, video, and data) and multiple network services (such as IP, Ethernet, and ATM) on a single converged, multiservice network. QoS has therefore become an integral part of network design, implementation, and operation. QoS for IP/MPLS Networks is a practical guide that will help you facilitate the design, deployment, and operation of QoS using Cisco® IOS® Software and Cisco IOS XR Software. The book provides a thorough explanation of the technology behind MPLS QoS and related technologies, including the different design options you can use to build an MPLS network with strict performance requirements. This book discusses MPLS Traffic Engineering (MPLS TE) as a tool to complement MPLS QoS and enhance the performance characteristics of the network. You'll learn technology, configuration, and operational details, including the essentials facts about the behavior and configuration of the rich MPLS QoS and related MPLS TE functionality. To get the most out of this book, you should have a basic understanding of both IP and MPLS, including the basics of IP addressing and routing and the basics of MPLS forwarding.

How can you make multivendor services work smoothly on today's complex networks? This practical book shows you how to deploy a large portfolio of multivendor Multiprotocol Label Switching (MPLS) services on networks, down to the configuration level. You'll learn where Juniper Network's Junos,

Cisco's IOS XR, and OpenContrail, interoperate and where they don't. Two network and cloud professionals from Juniper describe how MPLS technologies and applications have rapidly evolved through services and architectures such as Ethernet VPNs, Network Function Virtualization, Seamless MPLS, Egress Protection, External Path Computation, and more. This book contains no vendor bias or corporate messages, just solid information on how to get a multivendor network to function optimally. Topics include: Introduction to MPLS and Software-Defined Networking (SDN) The four MPLS Builders (LDP, RSVP-TE, IGP SPRING, and BGP) Layer 3 unicast and multicast MPLS services, Layer 2 VPN, VPLS, and Ethernet VPN Inter-domain MPLS Services Underlay and overlay architectures: data centers, NVO, and NFV Centralized Traffic Engineering and TE bandwidth reservations Scaling MPLS transport and services Transit fast restoration based on the IGP and RSVP-TE FIB optimization and egress service for fast restoration "A comprehensive introduction to MPLS theory and practice"--Cover.

The Art of Network Architecture Business-Driven Design The business-centered, business-driven guide to architecting and evolving networks The Art of Network Architecture is the first book that places business needs and capabilities at the center of the process of architecting and evolving networks. Two leading enterprise network architects help you craft solutions that are fully aligned with business strategy, smoothly accommodate change, and maximize future flexibility. Russ White and Denise Donohue guide network designers in asking and answering the crucial questions that lead to elegant, high-value solutions. Carefully blending business and technical concerns, they show how to optimize all network interactions involving flow, time, and people. The authors review important links between business requirements and network design, helping you capture the information you need to design effectively. They introduce today's most useful models and frameworks, fully addressing modularity, resilience, security, and management. Next, they drill down into network structure and topology, covering virtualization, overlays, modern routing choices, and highly complex network environments. In the final section, the authors integrate all these ideas to consider four realistic design challenges: user mobility, cloud services, Software Defined Networking (SDN), and today's radically new data center environments. • Understand how your choices of technologies and design paradigms will impact your business • Customize designs to improve workflows, support BYOD, and ensure business continuity • Use modularity, simplicity, and network management to prepare for rapid change • Build resilience by addressing human factors and redundancy • Design for security, hardening networks without making them brittle • Minimize network management pain, and maximize gain • Compare topologies and their tradeoffs • Consider the implications of network virtualization, and walk through an MPLS-based L3VPN example • Choose routing protocols in the context of business and IT requirements • Maximize mobility via ILNP, LISP, Mobile IP, host routing, MANET, and/or DDNS • Learn about the challenges of removing and changing services hosted in cloud environments • Understand the opportunities and risks presented by SDNs • Effectively design data center control planes and topologies

Routing TCP/IP, Volume II: CCIE Professional Development, Second Edition The definitive guide to Cisco exterior routing protocols and advanced IP routing issues—now completely updated Praised in its first edition for its readability, breadth, and depth, Routing TCP/IP, Volume II, Second Edition will help you thoroughly understand modern exterior routing protocols and implement them with Cisco routers. Best-selling author Jeff Doyle offers crucial knowledge for every network professional who must manage routers to support growth and change. You'll find configuration and troubleshooting lessons that would cost thousands to learn in a classroom, plus up-to-date case studies, examples, exercises, and solutions. Routing TCP/IP, Volume II, Second Edition covers routing and switching techniques that form the foundation of all Cisco CCIE tracks. Its expert content and CCIE structured review makes it invaluable for anyone pursuing this elite credential. While its examples focus on Cisco IOS, the book illuminates concepts that are fundamental to virtually all modern networks and routing platforms. Therefore, it serves as an exceptionally practical reference for network designers, administrators, and engineers in any environment. · Review core inter-domain routing concepts, and discover how exterior routing protocols have evolved · Master BGP's modern operational components · Effectively configure and troubleshoot BGP · Control path attributes and selection to define better routes · Take full advantage of NLRI and routing policies · Provide for load balancing and improved network scalability · Extend BGP to multiprotocol environments via MP-BGP · Deploy, configure, manage, troubleshoot, and scale IP multicast routing · Implement Protocol Independent Multicast (PIM): Dense Mode, Sparse Mode, and Bidirectional · Operate, configure, and troubleshoot NAT in IPv4-IPv4 (NAT44) and IPv6-IPv4 (NAT64) environments · Avoid policy errors and other mistakes that damage network performance This book is part of the CCIE Professional Development series, which offers expert-level instruction on network design, deployment, and support methodologies to help networking professionals manage complex networks and prepare for the CCIE exams. Category: Networking Covers: BGP, Multicast, and NAT

Enterprise Network Testing Testing Throughout the Network Lifecycle to Maximize Availability and Performance Andy Sholomon, CCIE® No. 15179 Tom Kunath, CCIE No. 1679 The complete guide to using testing to reduce risk and downtime in advanced enterprise networks Testing has become crucial to meeting enterprise expectations of near-zero network downtime. Enterprise Network Testing is the first comprehensive guide to all facets of enterprise network testing. Cisco enterprise consultants Andy Sholomon and Tom Kunath offer a complete blueprint and best-practice methodologies for testing any new network system, product, solution, or advanced technology. Sholomon and Kunath begin by explaining why it is important to test and how network professionals can leverage structured system testing to meet specific business goals. Then, drawing on their extensive experience with enterprise clients, they present several detailed case studies. Through real-world examples, you learn how to test architectural "proofs of concept," specific network features, network readiness for use, migration processes, security, and more. Enterprise Network Testing contains easy-to-adapt reference test plans for branches, WANs/MANs, data centers, and campuses. The authors also offer specific guidance on testing many key network technologies, including MPLS/VPN, QoS, VoIP, video, IPsec VPNs, advanced routing (OSPF, EIGRP, BGP), and Data Center Fabrics. § Understand why, when, and how you should test your network § Use testing to discover critical network design flaws § Incorporate structured systems testing into enterprise architecture strategy § Utilize testing to improve decision-making throughout the network lifecycle § Develop an effective testing organization and lab facility § Choose and use test services providers § Scope, plan, and manage network test assignments § nLeverage the best commercial, free, and IOS test tools § Successfully execute test plans, including crucial low-level details § Minimize the equipment required to test large-scale networks § Identify gaps in network readiness § Validate and refine device configurations § Certify new hardware, operating systems, and software features § Test data center performance and scalability § Leverage test labs for hands-on technology training This book is part of the Networking Technology Series from Cisco Press®, which offers networking professionals valuable information for constructing efficient networks, understanding new technolo-

gies, and building successful careers.

MPLS-enabled networks are enjoying tremendous growth, but practical information on managing MPLS-enabled networks has remained hard to find. Until now. MPLS Network Management: MIBs, Tools, and Techniques is the first and only book that will help you master MPLS management technologies and techniques, as they apply to classic MPLS networks, traffic-engineered networks, and VPNs. Written by the co-author of most current MPLS management standards, it provides detailed, authoritative coverage of official MIBs, examining key topics ranging from syntax to access levels to object interaction. It also offers extensive consideration of third-party management interfaces, including tools for metering traffic and predicting traffic growth and behavior. If you're a network operator, network device engineer, or MPLS application developer, you need this book to get all you can out of all of MPLS's many capabilities. * The only book devoted entirely to the tools and techniques for controlling, monitoring, debugging, and optimizing MPLS-enabled networks. * Authoritative information from the co-author of most IETF MIBs relating to MPLS and GMPLS, PW3, and PPVPN. * Covers both standards-based and proprietary management technologies. * Includes interviews with seminal figures in the development of MPLS. * Via a companion web site, provides information on late-breaking developments in MPLS management and links to additional resources. * To be followed by a second volume presenting best-practice case studies dealing with how real companies approach the management of their MPLS networks.

Implement flexible, efficient LISP-based overlays for cloud, data center, and enterprise The LISP overlay network helps organizations provide seamless connectivity to devices and workloads wherever they move, enabling open and highly scalable networks with unprecedented flexibility and agility. LISP Network Deployment and Troubleshooting is the definitive resource for all network engineers who want to understand, configure, and troubleshoot LISP on Cisco IOS-XE, IOS-XR and NX-OS platforms. It brings together comprehensive coverage of how LISP works, how it integrates with leading Cisco platforms, how to configure it for maximum efficiency, and how to address key issues such as scalability and convergence. Focusing on design and deployment in real production environments, three leading Cisco LISP engineers present authoritative coverage of deploying LISP, verifying its operation, and optimizing its performance in widely diverse environments. Drawing on their unsurpassed experience supporting LISP deployments, they share detailed configuration examples, templates, and best practices designed to help you succeed with LISP no matter how you intend to use it. This book is the Cisco authoritative guide to LISP protocol and is intended for network architects, engineers, and consultants responsible for implementing and troubleshooting LISP network infrastructures. It includes extensive configuration examples with troubleshooting tips for network engineers who want to improve optimization, performance, reliability, and scalability. This book covers all applications of LISP across various environments including DC, Enterprise, and SP. Review the problems LISP solves, its current use cases, and powerful emerging applications Gain in-depth knowledge of LISP's core architecture and components, including xTRs, PxTRs, MR/MS, ALT, and control plane message exchange Understand LISP software architecture on Cisco platforms Master LISP IPv4 unicast routing, LISP IPv6 routing, and the fundamentals of LISP multicast routing Implement LISP mobility in traditional data center fabrics, and LISP IP mobility in modern data center fabrics Plan for and deliver LISP network virtualization and support multitenancy Explore LISP in the Enterprise multihome Internet/WAN edge solutions Systematically secure LISP environments Troubleshoot LISP performance, reliability, and scalability

Fast answers and reliable solutions for all widely-used Cisco router features - all in one time-saving guide Organized for maximum efficiency: describes actual commands and options in the sequence they should be used Helps network pros eliminate time-consuming documentation searches Extensive updates: IPv6, MPLS, AutoQoS, SIP, MGCP, voice troubleshooting, VPNs, security, and more "At-a-glance" illustrations offer fast answers and easy double-checking Locating reliable Cisco router configuration command information can require extensive, time-consuming research. Cisco Router Configuration Handbook, 2/e, is the solution: a day-to-day reference to the most widely used Cisco router features and configurations. Straight from Cisco experts, it covers every facet of router configuration, including fundamentals, network protocols, packet processing, voice/telephony, security, and more. This book is organized for maximum efficiency. Related features are covered together, and features and options are covered in the sequence in which they are typically used. Shaded tabs mark each section for quick reference. Information on each feature, technology, or protocol is presented in a concise one- or two-page format, with sections presenting quick facts, configuration information, and step-by-step examples, including both required and optional commands. Simply put, this book brings together all the Cisco routing configuration information most network professionals will ever need - and organizes it more efficiently than any other resource.

This guide for network engineers describe the design, deployment, and management of Multiprotocol Label Switching (MPLS). The book explains how MPLS virtual private networks (VPNs) function and compares MPLS to other approaches. Route distribution, VPN topologies, encapsulation, label distribution, and other techniques and features are covered. Numerous charts and diagrams are featured. Tomsu is a consulting engineer. Wieser is a systems engineer. c. Book News Inc.

CCDE Study Guide is written and reviewed by CCDE engineers and helps students to both improve design skills and to study for and pass the CCDE exam. Network design is an art, combining broad technology knowledge and experience. This book covers a broad number of technologies, protocols and design options, and considerations that can bring these aspects together and show how they can be used and thought about based on different requirements and business goals.

This is the eBook version of the printed book. If the print book includes a CD-ROM, this content is not included within the eBook version. Learn practical guidelines for designing and deploying a scalable BGP routing architecture Up-to-date coverage of BGP features like performance tuning, multiprotocol BGP, MPLS VPN, and multicast BGP In-depth coverage of advanced BGP topics to help design a complex BGP routing architecture Practical design tips that have been proven in the field Extensive configuration examples and case studies BGP Design and Implementation focuses on real-world problems and provides not only design solutions, but also the background on why they are appropriate and a practical overview of how they apply in to a top-down design. The BGP protocol is being used in both service provider and enterprise networks. The design goals of these two groups are different, leading to different architectures being used in each environment. The title breaks out the separate goals, and resulting solutions for each group to assist the reader in further understanding different solution strategies. This book starts by identifying key features and functionality in BGP. It then delves into the topics of performance tuning, routing policy development, and architectural scalability. It progresses by examining the chal-

lenges for both the service provider and enterprise customers, and provides practical guidelines and a design framework for each. BGP Design and Implementation finishes up by closely looking at the more recent extensions to BGP through Multi-Protocol BGP for MPLS-VPN, IP Multicast, IPv6, and CLNS. Each chapter is generally organized into the following sections: Introduction, Design and Implementation Guidelines, Case Studies, and Summary.

SRv6 Network Programming, beginning with the challenges for Internet Protocol version 6 (IPv6) network development, describes the background, roadmap design, and implementation of Segment Routing over IPv6 (SRv6), as well as the application of this technology in traditional and emerging services. The book begins with the development of IP technologies by focusing on the problems encountered during MPLS and IPv6 network development, giving readers insights into the problems tackled by SRv6 and the value of SRv6. It then goes on to explain SRv6 fundamentals, including SRv6 packet header design, the packet forwarding process, protocol extensions such as Interior Gateway Protocol (IGP), Border Gateway Protocol (BGP), and Path Computation Element Protocol (PCEP) extensions, and how SRv6 supports existing traffic engineering (TE), virtual private networks (VPN), and reliability requirements. Next, SRv6 network deployment is introduced, covering the evolution paths from existing networks to SRv6 networks, SRv6 network deployment processes, involved O&M technologies, and emerging 5G and cloud services supported by SRv6. Bit Index Explicit Replication IPv6 encapsulation (BIERv6), an SRv6 multicast technology, is then introduced as an important supplement to SRv6 unicast technology. The book concludes with a summary of the current status of the SRv6 industry and provides an outlook for new SRv6-based technologies. SRv6 Network Programming: Ushering in a New Era of IP Networks collects the research results of Huawei SRv6 experts and reflects the latest development direction of SRv6. With rich, clear, practical, and easy-to-understand content, the volume is intended for network planning engineers, technical support engineers and network administrators who need a grasp of the most cutting-edge IP network technology. It is also intended for communications network researchers in scientific research institutions and universities. Authors: Zhenbin Li is the Chief Protocol Expert of Huawei and member of the IETF IAB, responsible for IP protocol research and standards promotion at Huawei. Zhibo Hu is a Senior Huawei Expert in SR and IGP, responsible for SR and IGP planning and innovation. Cheng Li is a Huawei Senior Pre-research Engineer and IP standards representative, responsible for Huawei's SRv6 research and standardization.

Trust the best-selling Official Cert Guide series from Cisco Press to help you learn, prepare, and practice for exam success. They are built with the objective of providing assessment, review, and practice to help ensure you are fully prepared for your certification exam. This book, combined with CCNA 200-301 Official Cert Guide, Volume 1, covers all the exam topics on the CCNA 200-301 exam. · Master Cisco CCNA 200-301 exam topics · Assess your knowledge with chapter-opening quizzes · Review key concepts with exam preparation tasks This is the eBook edition of CCNA 200-301 Official Cert Guide, Volume 2. This eBook does not include access to the Pearson Test Prep practice exams that comes with the print edition. CCNA 200-301 Official Cert Guide, Volume 2 presents you with an organized test preparation routine through the use of proven series elements and techniques. “Do I Know This Already?” quizzes open each chapter and enable you to decide how much time you need to spend on each section. Exam topic lists make referencing easy. Chapter-ending Exam Preparation Tasks help you drill on key concepts you must know thoroughly. CCNA 200-301 Official Cert Guide, Volume 2 from Cisco Press enables you to succeed on the exam the first time and is the only self-study resource approved by Cisco. Best-selling author Wendell Odom shares preparation hints and test-taking tips, helping you identify areas of weakness and improve both your conceptual knowledge and hands-on skills. This complete study package includes · A test-preparation routine proven to help you pass the exams · Do I Know This Already? quizzes, which enable you to decide how much time you need to spend on each section · Chapter-ending Key Topic tables, which help you drill on key concepts you must know thoroughly · The powerful Pearson Test Prep Practice Test software, complete with hundreds of well-reviewed, exam-realistic questions, customization options, and detailed performance reports · A free copy of the CCNA 200-301 Network Simulator, Volume 2 Lite software, complete with meaningful lab exercises that help you hone your hands-on skills with the command-line interface for routers and switches · Links to a series of hands-on config labs developed by the author · Online interactive practice exercises that help you enhance your knowledge · More than 50 minutes of video mentoring from the author · An online interactive Flash Cards application to help you drill on Key Terms by chapter · A final preparation chapter, which guides you through tools and resources to help you craft your review and test-taking strategies · Study plan suggestions and templates to help you organize and optimize your study time Well regarded for its level of detail, study plans, assessment features, hands-on labs, and challenging review questions and exercises, this official study guide helps you master the concepts and techniques that ensure your exam success. CCNA 200-301 Official Cert Guide, Volume 2, combined with CCNA 200-301 Official Cert Guide, Volume 1, walk you through all the exam topics found in the Cisco 200-301 exam. Topics covered in Volume 2 include · IP access control lists · Security services · IP services · Network architecture · Network automation Companion Website: Companion Website: The companion website contains CCNA Network Simulator Lite software, practice exercises, 50 minutes of video training, and other study resources. See the Where Are the Companion Files on the last page of your eBook file for instructions on how to access. In addition to the wealth of content, this new edition includes a series of free hands-on exercises to help you master several real-world configuration activities. These exercises can be performed on the CCNA 200-301 Network Simulator Lite, Volume 2 software included for free on the companion website that accompanies this book.

Master advanced MPLS VPN deployment solutions to design, deploy, and troubleshoot advanced or large-scale networks Builds on best-selling success of first volume with more advanced features to get more out of your network Improve network efficiency with MPLS data routing techniques like Traffic Engineering (TE) and Any Transport over MPLS (AToM) Learn new PE-CE routing techniques and per-VPN Network Address Translation (PE-NAT) features to build advanced virtual private networks as your remote employee base increases “MPLS and VPN Architectures,” Volume II builds on the best-selling MPLS and VPN Architectures, Volume I (1587050021) from Cisco Press. Extending into more advanced topics and deployment architectures, Volume II provides readers with the necessary tools they need to deploy and maintain a secure, highly available Virtual Private Network (VPN). These VPNs serve a greater role in networks as the number of remote employees increase, building on the demand for access to company networks with the same level of quality and speed delivered in an office setting. Multiprotocol Label Switching (MPLS) is the key to successful VPNs. With coverage of a variety of advanced features, like traffic engineering (TE) that improves network data transfer efficiency by prioritizing the more important data flows on a network, “MPLS and VPN Architectures,” Volume II teaches the value, usage, and impact of a variety of advanced techniques on a net-

work. Other features like Quality of Service, Any Transport over MPLS (AToM), and the new PE-CE routing options make this a valuable guide to enhancing any VPN to bring the greatest efficiency, quality and security available. Jim GuichardM/b>, CCIE No. 2069, is a Technical Leader II within the Internet Technologies Division (ITD) at Cisco Systems, and is the co-author of MPLS and VPN Architectures, published by Cisco Press. Ivan Pepelnjak, CCIE No. 1354, is the Chief Technologies Advisor at NIL Data Communications, and is the co-author of MPLS and VPN Architectures, published by Cisco Press. Jeff Apcar is a Senior Design Consulting Engineer in the Asia Pacific Advanced Services group at Cisco Systems.

CCIE Professional Development Network Security Technologies and Solutions A comprehensive, all-in-one reference for Cisco network security Yusuf Bhajji, CCIE No. 9305 Network Security Technologies and Solutions is a comprehensive reference to the most cutting-edge security products and methodologies available to networking professionals today. This book helps you understand and implement current, state-of-the-art network security technologies to ensure secure communications throughout the network infrastructure. With an easy-to-follow approach, this book serves as a central repository of security knowledge to help you implement end-to-end security solutions and provides a single source of knowledge covering the entire range of the Cisco network security portfolio. The book is divided into five parts mapping to Cisco security technologies and solutions: perimeter security, identity security and access management, data privacy, security monitoring, and security management. Together, all these elements enable dynamic links between customer security policy, user or host identity, and network infrastructures. With this definitive reference, you can gain a greater understanding of the solutions available and learn how to build integrated, secure networks in today's modern, heterogeneous networking environment. This book is an excellent resource for those seeking a comprehensive reference on mature and emerging security tactics and is also a great study guide for the CCIE Security exam. “Yusuf’s extensive experience as a mentor and advisor in the security technology field has honed his ability to translate highly technical information into a straight-forward, easy-to-understand format. If you’re looking for a truly comprehensive guide to network security, this is the one!” –Steve Gordon, Vice President, Technical Services, Cisco Yusuf Bhajji, CCIE No. 9305 (R&S and Security), has been with Cisco for seven years and is currently the program manager for Cisco CCIE Security certification. He is also the CCIE Proctor in the Cisco Dubai Lab. Prior to this, he was technical lead for the Sydney TAC Security and VPN team at Cisco. Filter traffic with access lists and implement security features on switches Configure Cisco IOS router firewall features and deploy ASA and PIX Firewall appliances Understand attack vectors and apply Layer 2 and Layer 3 mitigation techniques Secure management access with AAA Secure access control using multifactor authentication technology Implement identity-based network access control Apply the latest wireless LAN security solutions Enforce security policy compliance with Cisco NAC Learn the basics of cryptography and implement IPsec VPNs, DMVPN, GET VPN, SSL VPN, and MPLS VPN technologies Monitor network activity and security incident response with network and host intrusion prevention, anomaly detection, and security monitoring and correlation Deploy security management solutions such as Cisco Security Manager, SDM, ADSM, PDM, and IDM Learn about regulatory compliance issues such as GLBA, HIPAA, and SOX This book is part of the Cisco CCIE Professional Development Series from Cisco Press, which offers expert-level instruction on network design, deployment, and support methodologies to help networking professionals manage complex networks and prepare for CCIE exams. Category: Network Security Covers: CCIE Security Exam

This revised version of the bestselling first edition provides a self-study complement to the Cisco CCIP training course implementing Cisco MPLS. Extensive case studies guide readers through the design and deployment of real-world MPLS/VPN networks MPLS and VPN Architectures.

bull; Gain a comprehensive view of network security issues and concepts, then master specific implementations based on your network needs bull; Learn how to use new and legacy Cisco Systems equipment to secure your networks bull; Understand how to design and build security services while also learning the legal and network accessibility impact of those services

A detailed guide for deploying PPTP, L2TPv2, L2TPv3, MPLS Layer-3, AToM, VPLS and IPsec virtual private networks.

Architecture of Network Systems explains the practice and methodologies that will allow you to solve a broad range of problems in system design, including problems related to security, quality of service, performance, manageability, and more. Leading researchers Dimitrios Serpanos and Tilman Wolf develop architectures for all network sub-systems, bridging the gap between operation and VLSI. This book provides comprehensive coverage of the technical aspects of network systems, including system-on-chip technologies, embedded protocol processing and high-performance, and low-power design. It develops a functional approach to network system architecture based on the OSI reference model, which is useful for practitioners at every level. It also covers both fundamentals and the latest developments in network systems architecture, including network-on-chip, network processors, algorithms for lookup and classification, and network systems for the next-generation Internet. The book is recommended for practicing engineers designing the architecture of network systems and graduate students in computer engineering and computer science studying network system design. This is the first book to provide comprehensive coverage of the technical aspects of network systems, including processing systems, hardware technologies, memory managers, software routers, and more. Develops a systematic approach to network architectures, based on the OSI reference model, that is useful for practitioners at every level. Covers both the important basics and cutting-edge topics in network systems architecture, including Quality of Service and Security for mobile, real-time P2P services, Low-Power Requirements for Mobile Systems, and next generation Internet systems.

* *Up-to-date coverage of BGP features like performance tuning, multiprotocol BGP, MPLS VPN, and multicast BGP. *In-depth coverage of advanced BGP topics to help design a complex BGP routing architecture *Practical design tips proven in the field with large-scale networks *Extensive configuration examples and case studies

Improve operations and agility in any data center, campus, LAN, or WAN Today, the best way to stay in control of your network is to address devices programmatically and automate network interactions. In this book, Cisco experts Ryan Tischer and Jason Gooley show you how to do just that. You'll learn how to use programmability and automation to solve business problems, reduce costs, promote agility and innovation, handle accelerating complexity, and add value in any data center, campus, LAN, or WAN. The authors show you how to create production solutions that run on or interact with Nexus NX-OS-based switches, Cisco ACI, Campus, and WAN technologies. You'll learn how to use advanced Cisco tools together with industry-standard languages and platforms, including Python, JSON, and Linux. The authors demonstrate how to support dynamic application environments, tighten

links between apps and infrastructure, and make DevOps work better. This book will be an indispensable resource for network and cloud designers, architects, DevOps engineers, security specialists, and every professional who wants to build or operate high-efficiency networks. Drive more value through programmability and automation, freeing resources for high-value innovation Move beyond error-prone, box-by-box network management Bridge management gaps arising from current operational models Write NX-OS software to run on, access, or extend your Nexus switch Master Cisco's powerful on-box automation and operation tools Manage complex WANs with NetConf/Yang, ConfD, and Cisco SDN Controller Interact with and enhance Cisco Application Centric Infrastructure (ACI) Build self-service catalogs to accelerate application delivery Find resources for deepening your expertise in network automation

"Here at last is a single, all-encompassing resource where the myriad applications sharpen into a comprehensible text." Kireeti Kompella, Juniper Fellow, Juniper Networks. The authoritative guide to MPLS, now in its second edition, fully updated with brand new material! Multiprotocol Label Switching (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, the Second 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 Second Edition contains more than 150 illustrations, new chapters, and more coverage, guiding the reader from the basics of the technology, including signaling protocols, traffic engineering and fast reroute, though all its major applications. MPLS Enabled-Applications, Second Edition, contains comprehensive up-to-date coverage of: the current status and the future potential of all major MPLS applications, including L3VPNs (Layer 3 Virtual Private Networks), L2VPNs (Layer 2 Virtual Private Networks), pseudowires and VPLS . (Virtual Private LAN Service). extensive discussion of multicast support over MPLS, including a new chapter dedicated to multicast in VPNs, explaining both the PIM/GRE (Protocol Independent Multicast / Generic Routing Encapsulation) and the next generation BGP/MPLS solutions, new material on support of multicast in VPLS, a much-expanded chapter on MPLS multicast and a section operations and management (OAM) tools for point-to-multipoint LSPs. a new chapter on MPLS in access networks, as well as coverage of the use of MPLS in mobile and data communication networks. inter-operation of LDP(Label Distribution Protocol) and BGP (Border Gateway Protocol) based VPLS. comprehensive coverage of the base technology, as well as the latest IETF drafts With a foreword by Yakov Rekhter

This book describes the essential components of the SCION secure Internet architecture, the first architecture designed foremost for strong security and high availability. Among its core features, SCION also provides route control, explicit trust information, multipath communication, scalable quality-of-service guarantees, and efficient forwarding. The book includes functional specifications of the network elements, communication protocols among these elements, data structures, and configuration files. In particular, the book offers a specification of a working prototype. The authors provide a comprehensive description of the main design features for achieving a secure Internet architecture. They facilitate the reader throughout, structuring the book so that the technical detail gradually increases, and supporting the text with a glossary, an index, a list of abbreviations, answers to frequently asked questions, and special highlighting for examples and for sections that explain important research, engineering, and deployment features. The book is suitable for researchers, practitioners, and graduate students who are interested in network security.

A complete guide to understanding, designing, and deploying Layer 2 VPN technologies and pseudowire emulation applications Evaluate market drivers for Layer 2 VPNs Understand the architectural frame-work and choices for Layer 2 VPNs, including AToM and L2TPv3 Grasp the essentials of Layer 2 LAN and WAN technologies Examine the theoretical and operational details of MPLS and LDP as they pertain to AToM Understand the theoretical and operational details of Layer 2 protocols over L2TPv3 in IP networks Learn about Layer 2 VPN bridged and routed interworking and Layer 2 local switching Understand the operation and application of Virtual Private LAN Services (VPLS) Learn about foundation and advanced AToM and L2TPv3 topics through an extensive collection of case studies The historical disconnect between legacy Layer 2 and Layer 3 VPN solutions has forced service providers to build, operate, and maintain separate infrastructures to accommodate various VPN access technologies. This costly proposition, however, is no longer necessary. As part of its new Unified VPN Suite, Cisco Systems® now offers next-generation Layer 2 VPN services like Layer 2 Tunneling Protocol version 3 (L2TPv3) and Any Transport over MPLS (AToM) that enable service providers to offer Frame Relay, ATM, Ethernet, and leased-line services over a common IP/MPLS core network. By unifying multiple network layers and providing an integrated set of software services and management tools over this infrastructure, the Cisco® Layer 2 VPN solution enables established carriers, IP-oriented ISP/CLECs, and large enterprise customers (LECs) to reach a broader set of potential VPN customers and offer truly global VPNs. Layer 2 VPN Architectures is a comprehensive guide to consolidating network infrastructures and extending VPN services. The book opens by discussing Layer 2 VPN applications utilizing both AToM and L2TPv3 protocols and comparing Layer 3 versus Layer 2 provider-provisioned VPNs. In addition to describing the concepts related to Layer 2 VPNs, this book provides an extensive collection of case studies that show you how these technologies and architectures work. The case studies include both AToM and L2TPv3 and reveal real-world service provider and enterprise design problems and solutions with hands-on configuration examples and implementation details. The case studies include all Layer 2 technologies transported using AToM and L2TPv3 pseudowires, including Ethernet, Ethernet VLAN, HDLC, PPP, Frame Relay, ATM AAL5 and ATM cells, and advanced topics relevant to Layer 2 VPN deployment, such as QoS and scalability.

Best-practice QoS designs for protecting voice, video, and critical data while mitigating network denial-of-service attacks Understand the service-level requirements of voice, video, and data applications Examine strategic QoS best practices, including Scavenger-class QoS tactics for DoS/worm mitigation Learn about QoS tools and the various interdependencies and caveats of these tools that can impact design considerations Learn how to protect voice, video, and data traffic using various QoS mechanisms Evaluate design recommendations for protecting voice, video, and multiple classes of data while mitigating DoS/worm attacks for the following network infrastructure architectures: campus LAN, private WAN, MPLS VPN, and IPSec VPN Quality of Service (QoS) has already proven itself as the enabling technology for the convergence of voice, video, and data networks. As business needs evolve, so do the demands for QoS. The need to protect critical applications via QoS mechanisms in business networks has escalated over the past few years, primarily due to the increased frequency and sophistication of denial-of-service (DoS) and worm attacks. End-to-End QoS Network Design is a detailed handbook for planning and deploying QoS solutions to address current business needs. This book goes beyond discussing available QoS technologies and considers detailed design examples that illustrate where, when, and how to deploy various QoS features to provide validated and tested solutions for voice, video, and critical data over the LAN, WAN, and VPN. The book starts with a brief background of network infrastructure evo-

lution and the subsequent need for QoS. It then goes on to cover the various QoS features and tools currently available and comments on their evolution and direction. The QoS requirements of voice, interactive and streaming video, and multiple classes of data applications are presented, along with an overview of the nature and effects of various types of DoS and worm attacks. QoS best-practice design principles are introduced to show how QoS mechanisms can be strategically deployed end-to-end to address application requirements while mitigating network attacks. The next section focuses on how these strategic design principles are applied to campus LAN QoS design. Considerations and detailed design recommendations specific to the access, distribution, and core layers of an enterprise campus network are presented. Private WAN QoS design is discussed in the following section, where WAN-specific considerations and detailed QoS designs are presented for leased-lines, Frame Relay, ATM, ATM-to-FR Service Interworking, and ISDN networks. Branch-specific designs include Cisco® SAFE recommendations for using Network-Based Application Recognition (NBAR) for known-worm identification and policing. The final section covers Layer 3 VPN QoS design-for both MPLS and IPSec VPNs. As businesses are migrating to VPNs to meet their wide-area networking needs at lower costs, considerations specific to these topologies are required to be reflected in their customer-edge QoS designs. MPLS VPN QoS design is examined from both the enterprise and service provider's perspectives. Additionally, IPSec VPN QoS designs cover site-to-site and teleworker contexts. Whether you are looking for an introduction to QoS principles and practices or a QoS planning and deployment guide, this book provides you with the expert advice you need to design and implement comprehensive QoS solutions.

Trust the best-selling Official Cert Guide series from Cisco Press to help you learn, prepare, and practice for exam success. They are built with the objective of providing assessment, review, and practice to help ensure you are fully prepared for your certification exam. --Master Cisco CCNP ROUTE 300-101 exam topics --Assess your knowledge with chapter-opening quizzes --Review key concepts with exam preparation tasks This is the eBook edition of the CCNP Routing and Switching ROUTE 300-101 Official Cert Guide. This eBook does not include the companion CD-ROM with practice exam that comes with the print edition. CCNP Routing and Switching ROUTE 300-101 Official Cert Guide from Cisco Press enables you to succeed on the exam the first time and is the only self-study resource approved by Cisco. Expert instructor and best-selling author Kevin Wallace shares preparation hints and test-taking tips, helping you identify areas of weakness and improve both your conceptual knowledge and hands-on skills. This complete, official study package includes --A test-preparation routine proven to help you pass the exam --"Do I Know This Already?" quizzes, which enable you to decide how much time you need to spend on each section --Chapter-ending exercises, which help you drill on key concepts you must know thoroughly --The powerful Pearson IT Certification Practice Test software, complete with hundreds of well-reviewed, exam-realistic questions, customization options, and detailed performance reports --More than 60 minutes of personal video mentoring from the author on important exam topics --A final preparation chapter, which guides you through tools and resources to help you craft your review and test-taking strategies --Study plan suggestions and templates to help you organize and optimize your study time Well regarded for its level of detail, study plans, assessment features, challenging review questions and exercises, this official study guide helps you master the concepts and techniques that ensure your exam success. CCNP Routing and Switching ROUTE 300-101 Official Cert Guide is part of a recommended learning path from Cisco that includes simulation and hands-on training from authorized Cisco Learning Partners and self-study products from Cisco Press. To find out more about instructor-led training, e-learning, and hands-on instruction offered by authorized Cisco Learning Partners worldwide, please visit www.cisco.com. The official study guide helps you master topics on the CCNP R&S ROUTE 300-101 exam, including --Routing protocol characteristics and virtual routers --Remote site connectivity --IPv6 routing and RIPng --EIGRP, OSPFv2, and OSPFv3 --IGP redistribution and route selection --eBGP and iBGP --IPv6 Internet connectivity --Router security --Routing protocol authentication

"Technological advances have led to wide deployment and use of embedded systems in an increasing range of applications, from mobile phones to car, plane and spacecraft and from digital id's to military systems in the field. Many of these applications place significant security requirements and have led to significant research activity in the area of security and embedded systems, due to the limited resources of conventional embedded systems. This emerging research area is of great importance to a large number of public and private organizations, due to their desire to deploy secure embedded systems in the field. This publication brings together one of the first international efforts to emphasize the importance of this emerging technical field and provides presentations of leading researchers in the field. Its objectives are to present the technologies and open problems of the emerging area of security and embedded systems, to present the latest research results in all aspects of security in embedded systems, and, finally, to provide a roadmap of the technology for the future. Considering the main directions of research in the field, three main areas are discussed: (i) foundations of security and embedded systems, (ii) secure embedded computing systems and (iii) telecommunications and network services."

This book constitutes the refereed post-proceedings of the Second International Conference on Theoretical and Mathematical Foundations of Computer Science, ICTMF 2011, held in Singapore in May 2011. The conference was held together with the Second International Conference on High Performance Networking, Computing, and Communication systems, ICHCC 2011, which proceedings are published in CCIS 163. The 84 revised selected papers presented were carefully reviewed and selected for inclusion in the book. The topics covered range from computational science, engineering and technology to digital signal processing, and computational biology to game theory, and other related topics.

Designing Cisco Network Service Architectures (ARCH) Foundation Learning Guide, Third Edition, is a Cisco(R)-authorized, self-paced learning tool for CCDP(R) foundation learning. This book provides you with the knowledge needed to perform the conceptual, intermediate, and detailed design of a network infrastructure that supports desired network solutions over intelligent network services, in order to achieve effective performance, scalability, and availability. By reading this book, you will gain a thorough understanding of how to apply solid Cisco network solution models and recommended design practices to provide viable, stable enterprise internetworking solutions. The book presents concepts and examples that are necessary to design converged enterprise networks. Advanced network infrastructure technologies, such as virtual private networks (VPNs) and other security solutions are also covered. Designing Cisco Network Service Architectures (ARCH) Foundation Learning Guide, Third Edition teaches you the latest development in network design and technologies, including network infrastructure, intelligent network services, and converged network solutions. Specific topics include campus, routing, addressing, WAN services, data center, e-commerce, SAN, security, VPN, and IP multicast design, as well as network management. Chapter-ending review questions illustrate and help solidify the concepts presented in the book. Whether you are preparing for CCDP certification or simply want to gain a better understanding of designing scalable and reliable network architectures, you will benefit from the founda-

tion information presented in this book. Designing Cisco Network Service Architectures (ARCH) Foundation Learning Guide, Third Edition, is part of a recommended learning path from Cisco that includes simulation and hands-on training from authorized Cisco Learning Partners and self-study products from Cisco Press. To find out more about instructor-led training, e-learning, and hands-on instruction offered by authorized Cisco Learning Partners worldwide, please visit www.cisco.com/go/authorizedtraining. John Tiso, CCIE No. 5162, CCDP is a Product Manager for Cisco Systems. He holds a B.S. Degree in Computer Science and Mathematics from Adelphi University and a Graduate Citation in Strategic Management from Harvard University. John is a published author, has served as a technical editor for Cisco Press, and has participated as a SME for the CCIE program. Prior to Cisco, he was a senior consultant and architect in the Cisco partner channel. - Learn about the Cisco Enterprise Architecture - Create highly available campus and

data center network designs - Develop optimum Layer 3 designs - Examine advanced WAN services design considerations - Evaluate SAN design considerations - Deploy effective e-commerce module designs - Create effective security services and IPsec and SSL VPN designs - Design IP multicast networks - Understand the network management capabilities within Cisco IOS Software This book is in the Foundation Learning Guide Series. These guides are developed together with Cisco(R) as the only authorized, self-paced learning tools that help networking professionals build their understanding of networking concepts and prepare for Cisco certification exams. Category: Cisco Certification Covers: CCDP ARCH 642-874 Master advanced MPLS VPN deployment solutions to design, deploy, and troubleshoot advanced or large-scale networks. This title builds on the best-selling success of the first volume with more advanced features to get more out of a network.