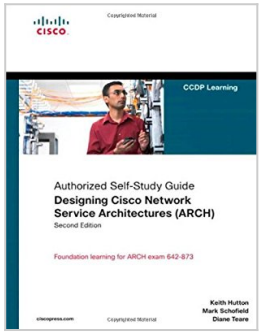

Designing Cisco Network Service Architectures (ARCH) (Authorized Self-Study Guide) (2nd Edition)

By Keith T. Hutton, Mark D. Schofield, Diane Teare

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Authorized Self-Study Guide
Designing Cisco Network Service Architectures (ARCH)
Second Edition

Foundation learning for ARCH exam 642-873

Keith Hutton
Mark Schofield
Diane Teare

Designing Cisco Network Service Architectures (ARCH), Second Edition, is a Cisco®-authorized, self-paced learning tool for CCDP® foundation learning. This book provides you with knowledge of the latest developments in network design and technologies, including network infrastructure, intelligent network services, and converged network solutions. By reading this book, you will gain a thorough understanding of issues and considerations for fundamental infrastructure services, including security, network management, QoS, high availability, bandwidth use optimization through IP multicasting, and design architectures for network solutions such as voice over WLAN and e-commerce.

Whether you are preparing for CCDP certification or simply want to gain a better understanding of modular campus and edge network design and strategic solutions for enterprise networks such as storage area networking, virtual private networking, advanced addressing and routing, and data centers, you will benefit from the foundation information presented in this book.

Designing Cisco Network Service Architectures (ARCH), Second 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.

Keith Hutton is a lead architect for Bell Canada in the enterprise customer space. Keith still retains his certified Cisco instructor accreditation, as well as the CCDP, CCNP®, and CCIP® certifications.

Mark Schofield has been a network architect at Bell Canada for the past six years. During the past five years, he has been involved in the design, implementation, and planning of large national networks for Bell Canada's federal government customers.

Diane Teare is a professional in the networking, training, project management, and e-learning fields. She has more than 20 years of experience in designing, implementing, and troubleshooting network hardware and software, and has been involved in teaching, course design, and project management.

- Learn about the Cisco SONA framework, enterprise campus architecture, and PPDIOO network life-cycle approach
- Review high availability designs and implement optimal redundancy
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- Evaluate design considerations in the data center core, aggregation, and access layers
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- Utilize the network management capabilities inherent in Cisco IOS® software

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- Sales Rank: #2537427 in Books
- Brand: Brand: Cisco Press
- Published on: 2009-01-03
- Ingredients: Example Ingredients
- Original language: English
- Number of items: 1
- Dimensions: 9.34" h x 1.64" w x 7.76" l, 2.70 pounds
- Binding: Hardcover
- 672 pages

Designing Cisco Network Service Architectures (ARCH)

Introduction

Designing Cisco Network Service Architectures (ARCH), Second Edition, covers how to perform the conceptual, intermediate, and detailed design of a network infrastructure. This design supports network solutions over intelligent network services to achieve effective performance, scalability, and availability of the network. This book enables readers, applying solid Cisco network solution models and best design practices, to provide viable and stable enterprise internetworking solutions. In addition, the book has been written to help candidates prepare for the Designing Cisco Network Service Architectures Exam (642-873 ARCH). This exam is one of the requirements for the CCDP certification. This exam tests a candidate's knowledge of the latest development in network design and technologies, including network infrastructure, intelligent network services, and converged network solutions.

Since the first edition was published in 2004, the ARCH course has changed to reflect the new exam requirements. This led to the immediate need for an update to this examination preparation text. Readers of the previous edition of *Designing Cisco Network Architectures (ARCH)* can use this text to update their knowledge and skill sets.

Goals of This Book

Upon completing this book, you will be able to meet these objectives:

- Introduce the Cisco Service-Oriented Network Architecture (SONA) framework, and explain how it addresses enterprise network needs for performance, scalability, and availability
- Describe how the Cisco Enterprise Architectures are used in the SONA framework for designing enterprise networks
- Create intermediate and detailed enterprise campus network, enterprise edge, and remote infrastructure designs that offer effective functionality, performance, scalability, and availability
- Create conceptual, intermediate, and detailed intelligent network service designs for network management, high availability, security, quality of service (QoS), and IP multicast
- Create conceptual, intermediate, and detailed virtual private network (VPN) designs
- Create conceptual, intermediate, and detailed voice over wireless network designs

Prerequisite Knowledge

Although enthusiastic readers will tackle less-familiar topics with some energy, a sound grounding in networking is advised. To gain the most from this book, you should be familiar with internetworking technologies, Cisco products, and Cisco IOS Software features. You will find knowledge about the following topics helpful for your successful understanding of the material presented in this book:

- How to design the necessary services to extend IP addresses using variable-length subnet masking (VLSM), Network Address Translation (NAT), and route summarization
- How to implement appropriate networking routing protocols, such as Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), and Border Gateway Protocol (BGP) on an existing internetwork
- How to redistribute routes between different routing protocols
- The required Cisco products and services that enable connectivity and traffic transport for a multilayer campus network
- The necessary services at each layer of the network to enable all users to obtain membership in multicast

groups in a working enterprise network
- How to control network traffic by implementing the necessary admission policy at each layer of the network topology
- How to identify the appropriate hardware and software solutions for a given set of WAN technology requirements, including access between a central campus, branch offices, and telecommuters
- The Cisco equipment to establish appropriate WAN connections
- How to use protocols and technologies that enable traffic flow between multiple sites while minimizing the amount of overhead traffic on each connection
- QoS capabilities to ensure that mission-critical applications receive the required bandwidth within a given WAN topology
- How to implement Cisco voice solutions
- How to implement Cisco wireless solutions
- How to implement basic security steps and mitigation techniques

How This Book Is Organized

Of course, you can read the chapters in this book sequentially, but the organization also allows you to focus your reading on specific topics of interest. For example, if you want to focus on advanced routing design, you can skim Chapters 1 and 2 (which cover SONA and the elements of the enterprise campus network design), and then focus on the advanced IP addressing and routing topics in Chapter 3. Each chapter examines topics around a specific set of design issues. Specifically, the chapters in this book cover the following topics:

- Chapter 1, “Cisco SONA and the Cisco Enterprise Architecture,” introduces the hierarchical model. It reviews Cisco SONA framework. This chapter also introduces the Cisco Enterprise Campus Architecture and reviews the Cisco PPDIOO network lifecycle approach.
- Chapter 2, “Enterprise Campus Network Design,” reviews high-availability designs and how to implement optimal redundancy. An in-depth look at recommended practices for Layer 2 and Layer 3 design elements follows. A discussion of the Layer 2 to Layer 3 boundary designs and issues concludes with a number of considerations for supporting infrastructure services.
- Chapter 3, “Developing an Optimum Design for Layer 3,” begins by reviewing the importance of IP address planning, and then covers advanced routing elements. Discussions focus on scalable EIGRP, OSPF, and BGP designs.
- Chapter 4, “Advanced WAN Services Design Considerations,” covers advanced WAN service layers. This overview goes into more detail about the common WAN optical technologies of SONET, SDH, DWDM, and Resilient Packet Ring. A discussion about Metro Ethernet, VPLS, and MPLS VPN technologies follows (and includes an examination of a number of design considerations). The discussion then turns to implementing advanced WAN services.
- Chapter 5, “Enterprise Data Center Design,” focuses on the enterprise data center, and covers the data center architecture model and design consideration in the data center core, aggregation, and access layers. The discussion then turns to scaling, with a look at how to scale a three-layer data center architecture.
- Chapter 6, “SAN Design Considerations,” covers storage-area networks, from components and topologies to SAN technologies. SAN design factors center on port density and topology, with some discussion about extending the SAN with various protocols.
- Chapter 7, “E-Commerce Module Design,” begins with an e-commerce overview and a look at the components of high availability in this module. The chapter covers common e-commerce design components, designing an integrated e-commerce architecture, and how to fine-tune e-commerce designs.
- Chapter 8, “Security Services Design,” delves into designing firewall services in various scenarios. The chapter also covers network admission control services, with a review of Cisco NAC appliance fundamentals and NAS deployment options and designs. The discussion then turns to intrusion detection

and prevention design.

- Chapter 9, “IPsec and SSL VPN Design,” examines remote-access VPN design. Site-to-site VPN designs are covered, too. This chapter also covers IPsec VPN technologies, including Cisco Easy VPN, GRE over IPsec, and DMVPN. Recommendations for managing VPNs and considerations for scaling VPNs conclude the chapter.
- Chapter 10, “IP Multicast Design,” covers IP multicast and multicast routing. Topics covered in this chapter include Protocol Independent Multicast (PIM), rendezvous points, and securing IP multicast.
- Chapter 11, “VoWLAN Design,” introduces the Cisco Unified Wireless Network and examines requirements for voice over WLAN in the enterprise network. This chapter also discusses VoWLAN coverage considerations and the site survey process.
- Chapter 12, “Network Management Capabilities with Cisco IOS Software,” examines Cisco network management capabilities embedded in Cisco IOS Software. This chapter also covers the syslog process, NetFlow, and NBAR, with a focus on the Cisco technologies themselves and how they enable other discovery tools, including Cisco AutoQoS. The chapter concludes with an overview of IP SLAs measurements.

This book also contains an appendix and an acronym list:

- Appendix A, “Answers to Review Questions,” provides the answers to all the chapter-ending review questions.
- “Acronyms and Abbreviations,” identifies abbreviations, acronyms, and initialisms used in this book.

?**Note:**¿¿The website references in this book were accurate at the time of this writing. However, some might have changed since then. If a URL is unavailable, you can always search using the title as keywords in your favorite search engine.

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