ICND

Interconnecting Cisco Network Devices

Volume 1

Version 1.1

Student Guide

Text Part Number: 97-0503-02

The products and specifications, configurations, and other technical information regarding the products in this manual are subject to change without notice. All statements, technical information, and recommendations in this manual are believed to be accurate but are presented without warranty of any kind, express or implied. You must take full responsibility for their application of any products specified in this manual.

LICENSE

PLEASE READ THESE TERMS AND CONDITIONS CAREFULLY BEFORE USING THE MANUAL, DOCUMENTATION, AND/OR SOFTWARE ("MATERIALS"). BY USING THE MATERIALS YOU AGREE TO BE BOUND BY THE TERMS AND CONDITIONS OF THIS LICENSE. IF YOU DO NOT AGREE WITH THE TERMS OF THIS LICENSE, PROMPTLY RETURN THE UNUSED MATERIALS (WITH PROOF OF PAYMENT) TO THE PLACE OF PURCHASE FOR A FULL REFUND.

Cisco Systems, Inc. ("Cisco") and its suppliers grant to you ("You") a nonexclusive and nontransferable license to use the Cisco Materials solely for Your own personal use. If the Materials include Cisco software ("Software"), Cisco grants to You a nonexclusive and nontransferable license to use the Software in object code form solely on a single central processing unit owned or leased by You or otherwise embedded in equipment provided by Cisco. You may make one (1) archival copy of the Software provided You affix to such copy all copyright, confidentiality, and proprietary notices that appear on the original. EXCEPT AS EXPRESSLY AUTHORIZED ABOVE, YOU SHALL NOT: COPY, IN WHOLE OR IN PART, MATERIALS; MODIFY THE SOFTWARE; REVERSE COMPILE OR REVERSE ASSEMBLE ALL OR ANY PORTION OF THE SOFTWARE; OR RENT, LEASE, DISTRIBUTE, SELL, OR CREATE DERIVATIVE WORKS OF THE MATERIALS.

You agree that aspects of the licensed Materials, including the specific design and structure of individual programs, constitute trade secrets and/or copyrighted material of Cisco. You agree not to disclose, provide, or otherwise make available such trade secrets or copyrighted material in any form to any third party without the prior written consent of Cisco. You agree to implement reasonable security measures to protect such trade secrets and copyrighted Material. Title to the Materials shall remain solely with Cisco.

This License is effective until terminated. You may terminate this License at any time by destroying all copies of the Materials. This License will terminate immediately without notice from Cisco if You fail to comply with any provision of this License. Upon termination, You must destroy all copies of the Materials.

Software, including technical data, is subject to U.S. export control laws, including the U.S. Export Administration Act and its associated regulations, and may be subject to export or import regulations in other countries. You agree to comply strictly with all such regulations and acknowledge that it has the responsibility to obtain licenses to export, re-export, or import Software.

This License shall be governed by and construed in accordance with the laws of the State of California, United States of America, as if performed wholly within the state and without giving effect to the principles of conflict of law. If any portion hereof is found to be void or unenforceable, the remaining provisions of this License shall remain in full force and effect. This License constitutes the entire License between the parties with respect to the use of the Materials

Restricted Rights - Cisco's software is provided to non-DOD agencies with RESTRICTED RIGHTS and its supporting documentation is provided with LIMITED RIGHTS. Use, duplication, or disclosure by the U.S. Government is subject to the restrictions as set forth in subparagraph "C" of the Commercial Computer Software - Restricted Rights clause at FAR 52.227-19. In the event the sale is to a DOD agency, the U.S. Government's rights in software, supporting documentation, and technical data are governed by the restrictions in the Technical Data Commercial Items clause at DFARS 252.227-7015 and DFARS 227.7202.

DISCLAIMER OF WARRANTY. ALL MATERIALS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND ITS SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. In no event shall Cisco's or its suppliers' liability to You, whether in contract, tort (including negligence), or otherwise, exceed the price paid by You. The foregoing limitations shall apply even if the above-stated warranty fails of its essential purpose.

The following information is for FCC compliance of Class A devices: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

The following information is for FCC compliance of Class B devices: The equipment described in this manual generates and may radiate radio-frequency energy. If it is not installed in accordance with Cisco's installation instructions, it may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in part 15 of

the FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the Cisco equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

• Turn the television or radio antenna until the interference stops.

• Move the equipment to one side or the other of the television or radio.

• Move the equipment farther away from the television or radio.

• Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

Modifications to this product not authorized by Cisco Systems, Inc. could void the FCC approval and negate your authority to operate the product.

The following third-party software may be included with your product and will be subject to the software license agreement:

CiscoWorks software and documentation are based in part on HP OpenView under license from the Hewlett-Packard Company. HP OpenView is a trademark of the Hewlett-Packard Company. Copyright © 1992, 1993 Hewlett-Packard Company.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

Network Time Protocol (NTP). Copyright © 1992, David L. Mills. The University of Delaware makes no representations about the suitability of this software for any purpose.

Point-to-Point Protocol. Copyright © 1989, Carnegie-Mellon University. All rights reserved. The name of the University may not be used to endorse or promote products derived from this software without specific prior written permission.

The Cisco implementation of TN3270 is an adaptation of the TN3270, curses, and termcap programs developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981-1988, Regents of the University of California.

Cisco incorporates Fastmac and TrueView software and the RingRunner chip in some Token Ring products. Fastmac software is licensed to Cisco by Madge Networks Limited, and the RingRunner chip is licensed to Cisco by Madge NV. Fastmac, RingRunner, and TrueView are trademarks and in some jurisdictions registered trademarks of Madge Networks Limited. Copyright © 1995, Madge Networks Limited. All rights reserved.

XRemote is a trademark of Network Computing Devices, Inc. Copyright © 1989, Network Computing Devices, Inc., Mountain View, California. NCD makes no representations about the suitability of this software for any purpose.

The X Window System is a trademark of the X Consortium, Cambridge, Massachusetts. All rights reserved.

Access Registrar, AccessPath, Any to Any, AtmDirector, Browse with Me, CCDA, CCDE, CCDP, CCIE, CCNA, CCNP, CCSI, CD-PAC, the Cisco logo, Cisco Certified Internetwork Expert logo, *CiscoLink*, the Cisco Management Connection logo, the Cisco Net*Works* logo, the Cisco Powered Network logo, Cisco Systems Capital, the Cisco Systems Capital logo, Cisco Systems Networking Academy, the Cisco Systems Networking Academy logo, the Cisco Technologies logo, ConnectWay, Fast Step, FireRunner, Follow Me Browsing, FormShare, GigaStack, IGX, Intelligence in the Optical Core, Internet Quotient, IP/VC, Kernel Proxy, MGX, MultiPath Data, MultiPath Voice, Natural Network Viewer, NetSonar, Network Registrar, the Networkers logo, *Packet*, PIX, Point and Click Internetworking, Policy Builder, Precept, ScriptShare, Secure Script, ServiceWay, Shop with Me, SlideCast, SMARTnet, SVX, *The Cell*, TrafficDirector, TransPath, ViewRunner, Virtual Loop Carrier System, Virtual Service Node, Virtual Voice Line, VisionWay, VlanDirector, Voice LAN, WaRP, Wavelength Router, Wavelength Router Protocol, WebViewer, Workgroup Director, and Workgroup Stack are trademarks; Changing the Way We Work, Live, Play, and Learn, Empowering the Internet Generation, The Internet Economy, and The New Internet Economy are service marks; and ASIST, BPX, Catalyst, Cisco, Cisco IOS, the Cisco IOS logo, Cisco Systems, the Cisco Systems logo, the Cisco Systems Cisco Press logo, Enterprise/Solver, EtherChannel, EtherSwitch, FastHub, FastLink, FastPAD, FastSwitch, GeoTel, IOS, IP/TV, IPX, LightStream, LightSwitch, MICA, NetRanger, Post-Routing, Pre-Routing, Registrar, StrataView Plus, Stratm, TeleRouter, and VCO are registered trademarks of Cisco Systems, Inc. or its affiliates in the U.S. and certain other countries. All other trademarks mentioned in this document are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any of its resellers. (9912R)

Interconnecting Cisco Network Devices, Revision 1.1: Student Guide

Table of Contents

Module 1

Getting Started with Cisco Networks