

ASCEND CERTIFIED TECHNICAL EXPERT (ACTE)

CANDIDATE GUIDE

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Table of Contents

1.0 General Candidate Information 7

1.1. Candidate Guide Overview 7

1.2. ACTE Program Overview 7

1.2.1. ACTE Access Certification 7

1.2.2. ACTE ATM Certification 8

1.2.3. ACTE Frame Relay Certification 8

1.3. Benefits of Becoming an ACTE 9

1.4. ACTE Requirements 10

1.5. ACTE Recertification 10

1.6. ACTE Enrollment, Registration and Scheduling 11

1.7. Frequently Asked Questions 12

2.0 Access Certification: Series 100 15

2.1. Ascend Access Products 15

2.2. Exam 101: Networking and Telecommunications Fundamentals 17

2.2.1. Exam 101 Objectives 17

2.2.2. Exam 101: Sample Test Items 20

2.2.3. Exam 101: Suggested Study Resources 22

2.3. Exam 102: Access Configuration, Maintenance and Problem Solving 24

2.3.1. Exam 102: Objectives 25

2.3.2. Exam 102: Sample Test Items 27

2.3.3. Exam 102: Suggested Study Resources 29

2.4. Exam 103: Access Certification Lab 31

2.4.1. Exam 103: Objectives 33

2.4.2. Exam 103: Suggested Study Resources 34

APPENDIX A: References to Helpful Resources 38

APPENDIX B: Ascend Worldwide Training Curriculum 42

APPENDIX C: Key Contacts 44

ACTE Program Representative 44

Global Education Training Contacts 44

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1.0 GENERAL CANDIDATE INFORMATION

1.1. CANDIDATE GUIDE OVERVIEW

The *Ascend Certified Technical Expert Candidate Guide* is designed to provide a comprehensive overview of the certification program. This guide assists you in identifying study resources, available training and other useful information to help prepare for the challenge of becoming an ACTE.

The key components of this guide are:

- ACTE Program description
- Detailed information for each certification exam
- Study resources and guidelines for exam preparation
- Other helpful resources

1.2. ACTE PROGRAM OVERVIEW

To become an ACTE you may pursue any of three major technological certification tracks:

- Access
- ATM
- Frame Relay

Each certification track requires you to pass a series of computer-based exams and lab exams specific to each technology. These exams are administered through an Ascend authorized testing facility. The certification tracks are described in the following.

1.2.1. ACTE Access Certification

The ACTE Access (series 100, *refer to section 2.0 for details*) certification track tests the knowledge and skills needed in the remote access area of the telecommunications industry and is designed to address the following:

- Installation, configuration and problem resolution of Ascend Access products.

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1.2.2. ACTE ATM Certification

The ATM certification (Series 800, under development, please check the Ascend ACTE web site for updates on test availability) tracks test the knowledge and skills needed in their respective technological areas of the telecommunications industry. The three levels of ATM certification are defined as follows:

1. Installation and configuration of Ascend ATM networks
2. Operations and support of Ascend ATM networks
3. Advanced troubleshooting and support of Ascend ATM networks

1.2.3. ACTE Frame Relay Certification

The Frame Relay (Series 900, under development, please check the Ascend ACTE web site for updates on test availability) certification tracks test the knowledge and skills needed in their respective technological areas of the telecommunications industry. The three levels of Frame Relay certification are defined as follows:

1. Installation and configuration of Ascend Frame Relay networks
2. Operations and support of Ascend Frame Relay networks
3. Advanced troubleshooting and support of Ascend Frame Relay networks

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1.3. BENEFITS OF BECOMING AN ACTE

Ascend Certified Technical Expert (ACTE) certification benefits anyone who distributes, sells, services, manages, installs, or supports Ascend equipment. ACTE candidates include Ascend support personnel, business partners, customers, systems integrators and network design professionals

As an ACTE your skills are recognized and validated by a leading supplier of data and telecommunications equipment for wide area network, enterprise network, and Internet solutions. Clients know that you are part of a select group of professionals with proven up-to-date skills and knowledge of technology fundamentals and Ascend equipment. You become even more valuable to your customers and your company while enhancing your reputation within the networking industry.

As an ACTE, you receive the following benefits:

- **Career Development:** Achieving ACTE certification is an excellent way to enhance your professional standing. As telecommunication and Internet services grow, ACTE certification validates your up-to-date knowledge of Ascend products and services in a quickly evolving business environment.

- **ACTE Awards Package:** Upon certification, candidates receive a certificate, unique ACTE ID, access to special offerings on the ACTE Web Site and the privilege of using the ACTE logo on business cards, letterhead, and personal web pages. The ACTE logo designates a hallmark of excellence for networking professionals worldwide.

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1.4. ACTE REQUIREMENTS

The ACTE program is comprised of three major tracks: ATM, Access, and Frame Relay. All three tracks have different certification levels.

For any certification track, ACTE candidates are required to pass a series of computer-based exams (CBEs) and an associated lab exam. The CBEs and lab exams are provided at Ascend authorized testing facilities.

For any given certification level within the ACTE program, the lab exam requirement must be completed within one year of passing the first CBE of a certification series. For example, if you successfully completed the first CBE for a given certification on June 30, 1998, you must pass the corresponding lab exam prior to June 30, 1999. If for any reason a candidate fails a CBE, the exam may be taken again — and re-taken as many times as required. Candidates who fail the hands-on lab exam must wait thirty (30) days before they can reschedule to take the exam again.

Finally, reviewing the suggested resources in this guide or taking Ascend Education courses does not necessarily guarantee certification success. Although we offer resources to assist you in preparing for the exams, the ACTE program is designed to test candidates' practical knowledge. Therefore, at least six months of hands-on experience with Ascend equipment is recommended prior to beginning the certification process.

1.5. ACTE RECERTIFICATION

Both written and lab exams are updated periodically to correlate with Ascend's product development. To maintain your certification, you must complete any update requirements that correspond to your particular ACTE program, within the time frame specified by Ascend. You will be notified six months prior to a required ACTE update. You are responsible for keeping informed of continuing ACTE requirements and for maintaining your ACTE certification. Specific ACTE re-certification guidelines are:

- ACTE certification is valid for at least one year
- To achieve ACTE re-certification, you must pass a re-certification exam before the expiration of your current ACTE certification
- Expiration of a current ACTE certification is based on Ascend's product development in the specific application area of your certification. You will be notified when re-certification is required. ACTE certification status is always valid for at least one year
- If you do not pass the re-certification exam before the expiration of your current ACTE certification you are required to take all associated CBEs and lab exams again

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1.6. ACTE ENROLLMENT, REGISTRATION AND SCHEDULING

Sylvan Prometrics administers all CBEs for the ACTE program. Sylvan Prometrics supports approximately 1,500 testing centers in more than 90 countries around the world. You are required to take all CBEs at a Sylvan Prometrics testing center to complete the written requirements for any given ACTE certification level. Contact Sylvan Prometrics (refer to Appendix C for contact information) to locate the nearest testing center in your area. You may also find other useful information about Sylvan testing practices on their web site.

Lab exams are administered at Ascend authorized certification labs. The ACTE Access Lab is located in Alameda, California (refer to Appendix C for contacting the Ascend Certification group).

You will need to bring one photo ID with signature (e.g., a valid driver's license) and one other ID with signature (e.g., a current credit card) to the testing center for proof of identity.

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1.7. FREQUENTLY ASKED QUESTIONS

What is the Ascend Certified Technical Expert (ACTE) program?

The ACTE program is a process for assuring that networking professionals maintain a high level of knowledge and skill when supporting Ascend products. Through a series of computer-based written exams and associated lab exams, candidates are required to demonstrate a thorough understanding of Ascend products and underlying technologies.

The ACTE program allows networking professionals to be part of an internationally recognized certification program.

The ACTE program was designed to certify experts who provide technical support on Ascend products. Ascend strongly recommends two years of general networking experience, including three to six months of hands-on experience with Ascend products, before taking the exams.

What is the reason for a certification program?

Internetworking is comprised of rapidly changing technologies. Corporations are demanding high levels of service from technical professionals. ACTE certification provides a standard for identifying and evaluating required knowledge and skill, and provides a worldwide standard of excellence for selling and supporting Ascend products.

Who should take advantage of this program?

ACTE benefits individuals who demonstrate a thorough knowledge and skill with Ascend products. This includes network administrators, consultants, ISPs, VARs, networking technical professionals or technical systems integrators, business partners, and technical trainers. ACTE is designed for anyone involved in installing, selling and supporting Ascend products.

Once ACTE certification is achieved, organizations and customers will have confidence in the networking professional's proven ability to install and maintain a variety of Ascend products. Moreover, certification becomes a formal validation of expert knowledge with Ascend products.

How do I become an ACTE?

ACTE certification is currently available for the Remote Access track and requires three exams - two computer-based exams and one hands-on lab exam. The two computer-based written exams are administered by Sylvan Prometrics. After passing the two computer-based exams, the hands-on lab exam may be taken.

You are an ACTE after successfully passing all exams for a given track and signing an Ascend ACTE Certification Agreement.

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What are the ACTE exams?

The computer-based written exams are closed book; no notes or books may be used. These exams are administered on a pass/fail basis by Sylvan Prometrics, an independent testing agency.

In the one-day lab exam, candidates are required to set up, configure, and maintain Ascend products. Lab exam tasks require a thorough understanding of networking technologies used in implementing the Ascend products. The exam is based on real-world scenarios, which test knowledge and troubleshooting skills.

Will the exams be updated to address changes in the Ascend product line?

Yes. ACTE certification exams are designed to reflect current changes in the product line and are updated periodically.

What training is recommended for exam preparation?

Because the ACTE program is designed to test expert-level knowledge, field experience is recommended prior to beginning the certification process. Ascend strongly recommends two years of general networking experience, including three to six months of hands-on experience with Ascend products.

Please refer to the individual certification programs in the ACTE Candidate Guide for suggested study resources.

How much do the exams cost?

Refer to the table for exam costs in your area.

Exam	US/Canada	Outside US (except Japan)	Japan
101 CBE	$125	$175	$225
102 CBE	$125	$175	$225
103 Lab Exam	$600	$600	$600

Note: Prices are in US dollars.

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How long do I have to complete ACTE certification requirements?

You must complete the appropriate lab exam within one year of achieving a pass status on the two computer-based exams.

How long does the ACTE certification last?

ACTE certification is valid for at least one year. After ACTE status is granted, Ascend will notify you when recertification is required.

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2.0 ACCESS CERTIFICATION: SERIES 100

2.1. ASCEND ACCESS PRODUCTS

Product Family	Features	Applications
MAX TNT	• Carrier class WAN access switch. • Highest port density in class. • Multiservice scalability: analog, ISDN, T1/E1, Frame Relay, LAN (Ethernet), also HSSI, DS3 and more… • Multiprotocol support: IP, IPX, AppleTalk; routing: RIP, OSPF, BGP4; WAN: PPP, SLIP, and more…	• Multiservice central site carrier or ISP POP. • Backbone Frame Relay network access using FrameLine T1/E1. • Voice over IP (MultiVoice).
MAX Family	• Family of WAN access products ranging from low-end to mid-range: modular and fixed configurations. • Multiservice scalability: hybrid analog/digital access, ISDN, T1/E1, Frame Relay, LAN (Ethernet), and more… • Extensive protocol support: LAN: TCP/IP, IPX, AppleTalk, WAN: PPP, SLIP, X.25, Frame Relay; Bandwidth management, compression, and more…	• Carrier and ISP POPs. • Corporate remote and Internet access. • Remote networking software: MAXDial, MAXLink Pro, multiprotocol support. • VPN: tunneling with ATMP, PPTP, L2TP, Raw TCP, IP Security (IPSec). • Firewall (supported through SecureConnect Firewall). • Voice over IP (MultiVoice). •
MultiDSL	• MAX 4000, 6000, and MAX TNT product families configured with DSL line cards. • Supports full range of DSL technologies: ISDL, SDSL, RADSL (CAP and DMT). • Multiprotocol support (IP, IPX, PPP, MP, Frame Relay), routing/bridging, more… • Multiservice: analog, ISDN, Frame Relay, MultiDSL…	• Central Office Equipment (COE) high-bandwidth applications. • Used in conjunction with DSLPipe (Pipeline Family) at customer site: Customer Premise Equipment (CPE). • Integrated COE/CPE allowing carriers to launch high-speed Internet access services that support high-bandwidth applications. • Voice over IP (MultiVoice).

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Pipeline Family	• Full family SOHO and branch office routers. • Multiservice scalability: ISDN, T1/E1, Frame Relay, Leased and Switched 56K. • Supports NAT and DHCP • Multiprotocol support: IP, IPX, AppleTalk… • Integrated dynamic firewall (through SecureConnect). • Integrated VPN w/40 Bit DES encryption standard (through SecureConnect).	• Telecommuting. • Small Office/Home Office. • Internet access and online services supporting single to multiple users. • Virtual Private Network (VPN) through integrated SecureConnect and IPSec.
SecureConnect	• Suite of security features that integrates firewall, IPSec encryption/authentication (tunneling), and VPN with: Pipeline 50, 75/85, 130, and 220 models. • SecureConnect Firewall: dynamic firewall technology based on stateful inspection. • SecureConnect Firewall + VPN: firewall with integrated IPSec encryption and authentication. Supports IP tunnels; also works with L2TP and ATMP.	• Internet firewalling, protecting private networks from intruders (separating public and private networks) • Virtual Private Networks (VPNs): encryption of all traffic across central trusted site(s), branch offices and remote users (in a corporate network).

Please refer to the Resource Library on the Ascend Web site home page for more information on Ascend Access products.

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2.2. EXAM 101: NETWORKING AND TELECOMMUNICATIONS FUNDAMENTALS

Exam 101 is comprised of 60 multiple choice test questions covering networking and telecommunications fundamentals. You must register with Sylvan Prometrics to take this exam. Exam costs:

Exam	US/Canada	Outside US (except Japan)	Japan
101 CBE	$125	$175	$225

Note: Prices are stated in US dollars.

Exam 101 challenges your knowledge and comprehension of the OSI network model, layer 2 LAN technology, service and line types that are characteristic in wide area networks, protocol basics, and the fundamentals of security implementation, network management, and troubleshooting.

2.2.1. Exam 101 Objectives

Exam 101 is based on the following objectives (listed in condensed format):

1. OSI/Layers

- Describe the layering process (as defined in the OSI model).
- Identify the functions of key layers in the OSI model.
- Identify internetworking devices.
- Trace the data flow process (as described in the OSI model).

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2. LAN

- Describe the characteristics of access methods.
- Describe physical interfaces on a local area network (LAN).
- Describe LAN topologies.
- Determine how data is framed and transferred in an Ethernet network.
- Describe bridging and illustrate its use.

3. WAN/Telecommunications

- Define types of services.
- Define telecommunication line types.

4. Protocols

- Identify the purpose and use of protocols.
- Describe protocol families.
- Describe dynamic routing.

5. Security

- Describe various firewalls and firewall technologies.
- Describe authentication and authorization.

6. Diagnosis, Troubleshooting and Solutions Development

- Identify decision factors needed to develop a networking solution.
- Identify and diagnose the problem.

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7. Managing the Network

- Demonstrate a working knowledge of SNMP.
- Demonstrate a working knowledge of network architecture.

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2.2.2. Exam 101: Sample Test Items

This section offers five sample test items that illustrate test content, test format, and level of difficulty.

1. In the TCP/IP protocol stack, which layer is responsible for re-transmission and sequencing?

   A. Data Link

   B. Network

   C. Physical

   D. Transport

   D is correct

   Comment: The transport layer handles retransmission and sequencing.

2. Which WAN encapsulation protocol would TCP/IP most likely use to pass packets within its remote access environment?

   A. SPX

   B. HDLC

   C. Ethernet

   D. Token ring

   B is correct

   Comment: HDLC is the only layer 2 WAN encapsulation protocol listed that is used over serial lines.

3. Which of the following communications devices would be used to transport packets between autonomous systems that are over 1000 kilometers apart?

   A. Concentrator

   B. Hub

   C. Router

   D. Transparent bridge

   C is correct

   Comment: Routers are the only devices aligned with the term autonomous system.

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4. IP address is based on the concept of:

   A. Clients and servers

   B. Hosts and clients

   C. Hosts and networks

   D. Workstations and servers

   C is correct

   Comment: A host is essentially anything on the network that is capable of receiving and transmitting. Hosts are connected together by one or more networks.

5. What describes the Address Resolution Protocol (ARP)?

   A. Physically binds Layer 3 and Layer 2 addresses into one visible address

   B. Translates IP address to TCP and/or UDP port address pools

   C. Translates a private IP address to a public IP address

   D. Translates Layer 3 IP addresses to Layer 2 physical addresses

   D is correct

   Comment: ARP is used for dynamic discovery of Ethernet addresses. ARP keeps an internal table of IP addresses and corresponding Ethernet address.

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2.2.3. Exam 101: Suggested Study Resources

As you prepare for Exam 101 we suggest that you evaluate your own technology strengths and weaknesses against the Exam 101 objectives described previously. Then review the following suggested resources to help you determine your best course of study.

Finally, at least six months of hands-on experience with Ascend products is recommended prior to beginning the certification process.

Ascend Education

On the Ascend home page is a link to the Ascend Education web page. This page contains links for Ascend training, curriculum maps, CBT courses, course schedules, registration information and more. You can also call Ascend to have course information sent to you (refer to Appendix C for contact information).

Links on the Ascend Site

On the Ascend home page is a link to the Resource Library for information including:

- Technical backgrounders/overviews
- Resource guides
- White papers
- Technology FAQs
- Application/solution notes

NOTE: Appendix A includes several additional Internet sites that are useful. These sites contain information on data and telecommunications standards and technology. Appendix A also provides a comprehensive list of suggested books.

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Suggested Networking and Telecommunications Books

The following books are suggested resources for Exam 101 study:

1. Comer, Douglas E. (1995). Internetworking with TCP/IP: Principles, Protocol and Architecture. Third Edition. 640 pp. Prentice Hall.

2. Black, Uyless. (1997). TCP/IP and Related Protocols. Third Edition. 402 pages. McGraw Hill.

3. Dhawan, Chander. (1998). Enabling Remote Access: with PSTN, ISDN and Internet. 510 pp. McGraw Hill.

4. Tanenbaum, Andrew S. (1996) Computer Networks. Third Edition. 848 pp. Prentice Hall.

5. Froehlich, Fritz E. (1994) Encyclopedia of Telecommunications: IEEE 802.3 & Ethernet Standards to Interrelationship of the SS7 Protocol Architecture & the OSI

6. Graham, Buck B., Graham, Norman B. (1996) TCP/IP Addressing: Designing and Optimizing Your IP Addressing Scheme. 328 pp.

7. Sportack, Mark A. (1997). Networking Essentials (Unleashed) 575 pp. Sams Publishing.

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2.3. EXAM 102: ACCESS CONFIGURATION, MAINTENANCE AND PROBLEM SOLVING

Exam 102 is comprised of 80 multiple choice test questions. You must register with Sylvan Prometics to take this exam.

Refer to the table for exam costs in your area.

Exam	US/Canada	Outside US (except Japan)	Japan
102 CBE	$125	$175	$225

Note: Prices are in US dollars.

While Exam 101 tests your knowledge and comprehension of networking fundamentals, Exam 102 is designed to test your configuration, maintenance and problem resolution skills on the following Ascend products:

- MAX 4000 and MAX 6000 series routers
- Pipeline family of remote access devices
- Access Control (recently renamed NavisRadius), and SecureConnect on the MAX and Pipeline devices

For a comprehensive view of the skill sets Exam 102 is designed to measure, review the objectives below.

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2.3.1. Exam 102: Objectives

Exam 102 is based on the following key objectives:

1. **MAX and Pipeline Product Capabilities**
   - Describe Pipeline capabilities (75, 130).
   - Describe MAX capabilities (4000, 6000 families).

2. **MAX/Pipeline Design**
   - Assess user needs.
   - Assess available resources.
   - Identify resource adjustments.

3. **MAX/Pipeline Implementation**
   - Determine implementation schedule.
   - Acquire necessary resources.
   - Install hardware.
   - Configure the installation.
   - Diagnose and troubleshoot the installation.

4. **MAX/Pipeline Operations**
   - Modify system configuration.
   - Build and modify profiles.
   - Back up and restore system.

5. **Access Control (recently renamed NavisRadius) Product Capabilities**
   - Identify products that are supported by Access Control.
   - Describe how MAX attributes map to Access Control.
   - Configure MAX to work with Access Control.
   - Test Access Control installation using MAX screens and debug tools.

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6. Internet Security

- Describe network security fundamentals.
- Define security threats.
- Describe various SecureConnect firewalls and firewall technologies.

7. SecureConnect

- Describe the SecureConnect product.
- Describe the SecureConnect technical features.
- Describe SecureConnect technology.

8. Security policies

- Perform a risk assessment.
- Map network access.

9. SecureConnect Installation

- Install SecureConnect Manager on a workstation or server.
- Enable SecureConnect firewalls on an Ascend router.

10. SecureConnect Configuration

- Use SecureConnect Manager for configuration.
- Install a SecureConnect firewall.

11. Installation Verification

- Initiate DEBUG mode.
- Use FWALLDBLOG command to view the firewall.
- Resolve various error conditions.
- Determine if the problem has been fixed successfully.

12. Maintenance Procedures

- Track the location of firewalls.
- Analyze and interpret log files for network analysis purposes.
- Manage the network security events.

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2.3.2. Exam 102: Sample Test Items

This section offers five sample test items that illustrate test content, test format, and level of difficulty.

1. When ISDN service is used, how does the MAX 4000 or 6000 series determine where to terminate an incoming call?

A. From the bearer capability information on the D-channel

B. From the signaling information on the D-channel

C. From the channel ID information on the D-channel

D. From the B-channel

A is correct

Comment: The bearer capability information element tags a call as voice, 56K digital, or 64K digital, plus other choices. This would be one way the MAX determines whether to route the call to a Hybrid Access module or to a modem.

2. A demonstration must be made for a MAX 4000 or 6000 series to connect to another MAX. There are no available external telecommunications services available for the demonstration. Which of the following alternatives can be used to allow the demonstration to proceed?

A. Divide a PRI line between the MAXs.

B. Use a T1/E1 crossover cable between the MAXs.

C. Configure port-to-port switching via a WAN port and a PRI card.

D. Configure port-to-port switching via a NET/BRI card.

B is correct

Comment: PRI lines cannot be “divided,” there is no such thing as a PRI “card” and port-to-port switching is not possible with the Net/BRI card. Therefore, “B” is the only answer that can be correct.

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3. Incoming calls are connecting and authenticating into a MAX 4000 or 6000 series, but the users can not access devices outside of the LAN segment. Which of the following is most likely the cause?

A. RADIUS user profiles are incorrect.

B. The WAN IP address is incorrect.

C. The default gateway for the MAX has not been set.

D. The default gateway for the dial-in users has not been set.

C is correct

Comment: The default gateway provides the MAX with the address of a remote device to which it should route all packets with an unknown destination address.

4. **A Connection Profile has a dial number of 3-555-6650 and T1/E1 operational. When dialed from the MAX, the call terminates. Trunk groups have been enabled. Which of the following is a possible cause of the problem?**

A. NET/T1 or NET/E1 profile is configured with all channels set to switched ok.

B. 3 in the dial number is reserved for destination tables.

C. T1/E1 channels have a 9 in the Trk/Grp field.

D. T1/E1 channels are set to nailed.

B is correct

Comment: When Trk/Grp = Yes, a first digit of “3” in the Dial Number string acts as a pointer to the destination tables.

5. All of the following are acceptable syntax in SecureConnect, except:

A. *

B. 192.148.32.0/18

C. 2255.255.255.0

D. 192.148.32.1

C is correct

Comment: First octet in answer "C" is invalid. Each octet of an IP address must represent a digit between 0 and 255.

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2.3.3. Exam 102: Suggested Study Resources

As you prepare for Exam 102 we suggest you evaluate your own technology strengths and weaknesses against the Exam 102 objectives described previously. Because Exam 102 is Ascend product specific, your best resource is Ascend itself. The following Ascend product training and literature resources provide the suggested best course of study to prepare for Exam 102.

Finally, at least 6 months of hands-on Ascend equipment experience is recommended prior to beginning the certificate process.

Ascend Education

To prepare for Exam 102, the following Ascend Education courses are suggested:

- MAX/Pipeline Installation and Configuration (Instructor-Led Course)
- Radius (Access Control) Installation and Configuration (Instructor-Led Course)
- MAX Troubleshooting (Instructor-Led Course)

You can register for any of the above courses directly from the Ascend Education page. You can also find links to Ascend's training curriculum, curriculum maps, CBTs, course scheduling, registration information and more.

Note: Appendix B in this document provides course information for Ascend training programs worldwide. Global contact and registration information is also included.

Other Ascend Resources

Some of the best study resources for Exam 102 are the product manuals that are shipped with Ascend equipment. Another handy resource is the Ascend Document Library on CD-ROM. If you do not have product manuals or the Document Library on CD-ROM, you can order them through Ascend's Order Management Department. The toll-free number to call is *(888) 673-3718.* Several suggested manuals are listed below:

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Model Number	Description
DOCS-CDROM	Ascend Documentation Library on CDROM
P75-DC-BRI	User Manual Set for Pipeline 75
P130-DC-GEN	User Manual Set for Pipeline 130
MX-DC-T1	User Manual Set for MAX T1/PRI models
MX-DC-GEN	User Manual Set for MAX TI/E1 models
TNT-DC-GEN	Documentation Set for MAX TNT

The Ascend web site provides links to a number of helpful resources to access and learn more about Ascend products. We suggest you examine the following links:

- Products and Services: Where you can view a menu of Ascend's complete product family such as the Pipeline Remote Access Products, MAX WAN Access Switches, SecureConnect, Navis Network and Service Management and Access Control (recently renamed NavisRadius) product literature.

- Support: Where you can find support level information on MAX and Pipeline family products, including configuration tips and, in some cases, documentation.

- Resource Library: Within the Resource Library there are a number of menus and subsequent links to useful product-specific information, including Technical Backgrounders/Overviews, Resource Guides, white papers, technology FAQs, and application/solution notes.

Review these resources for technical product information on the MAX 4000 and 6000 families, Pipeline family of remote access devices, SecureConnect, and Access Control (recently renamed NavisRadius).

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2.4. EXAM 103: ACCESS CERTIFICATION LAB

Exam 103 is a hands-on exam administered on a pass/fail basis at Ascend's ACTE Certification Lab. After you have successfully completed Exam 101 and 102 you are qualified to take the Remote Access Certification Lab - Exam 103. Here you will demonstrate the ability to:

- Set up, configure, and maintain Ascend products and third-party management tools
- Use debugging and authentication tools
- Select and configure bandwidth requirements

Working individually in private pods, you have one day to complete the lab (7 working hours). A proctor is on site to administer the lab exam and answer your questions.

A lab exam pod is comprised of client/server systems including Novell 4.11 Server, NT 4.0 Server, NT 4.0 and Windows 95 workstations. Pipeline devices, MAX 4000 and 6000 routers constitute the Ascend equipment in the pod configuration. Networking devices (e.g., Ethernet hubs), management software and other software tools necessary to complete the lab are part of the configuration. You also have access to Ascend product documentation, in printed format as well as on CDROM.

The lab exam emulates job performance skills emphasizing: design, installation, configuration, operational maintenance, and troubleshooting of a remote access network. Successfully working through this series of tasks demonstrates that candidates can support Ascend products across the full service cycle.

The certification exam is presented as a working scenario. The Candidate Workbook directs you through the lab exercises, which formulate the scenario.

The scenario is scripted to simulate the requirements of real-world network support consultation. You assume responsibility for network design, including the development of a logical network layout and cable diagram. You also work though device configuration, hardware and software maintenance, and troubleshooting their solution.

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Refer to the table for exam costs in your area.

Exam	US/Canada	Outside US (except Japan)	Japan
103 Lab Exam	$600	$600	$600

Note: Prices are in US dollars.

The objectives below are organized according to the lab design. Please review these objectives for a more comprehensive understanding of what the Remote Access Certification Lab is designed to measure.

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2.4.1. Exam 103: Objectives

The Remote Access Certification Lab exam is based on job performance skills in the following areas:

1. Site Survey and Job Scope

- Determine the appropriate hardware
- Determine and diagram the appropriate cabling

2. Hardware and Software Installation

- Connect the cables
- Install the card modules
- Interpret software options
- Configure modem dial-up connections

3. Configuration and Validation

- System globals
- Security
- WAN Profiles
- Telco - Domestic (for United States and Canada candidates)
- Telco - International (for most international candidates)
- Telco - International (for other international candidates, such as Japan)
- Answer Profiles
- Connection Profiles
- Client security

4. Hardware and Software Maintenance

- MAX/Pipeline
- Perform software upgrades
- Perform configuration backup/restore
- Retrieve and interpret debug information
- Access Control
- Remove software
- Upgrade software

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5. Problem Determination and Resolution

- MAX/Pipeline
- Use debug
- Configure status windows (MAX series only)
- Interpret status codes
- Use product documentation
- Configure loopback lines
- Interpret status windows
- Interpret LEDs
- Determine appropriate cable pin-outs
- Recognize slot card/hardware failure
- Perform network diagnostics (ping, trace route, terminal server commands)
- Interpret modem diagnostics
- Access Control
- Use debug command on the MAX (radif)
- Use debug on Access Control server
- Analyze Access Control accounting
- SecureConnect
- Validate that firewall is operational on MAX or Pipeline (fwalldblog)
- Configure and implement Network Address Translation (NAT)
- Use debug commands on Pipeline (nattoggle, napt)

2.4.2. Exam 103: Suggested Study Resources

In preparation for Exam 103 we suggest you evaluate your own technology strengths and weaknesses against the Exam 103 objectives described in section 2.4.1. Because Exam 103 is geared toward experience with installation, configuration, and operation of Ascend equipment, one of your best resources is Ascend technical training. The following Ascend product training and literature resources provide courses of study that will assist you in preparing for Exam 103.

Finally, at least 6 months of hands-on Ascend equipment experience is recommended prior to beginning the certificate process.

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Ascend Education

To prepare for Exam 103, the following three instructor-led courses are suggested:

- MAX/Pipeline Installation and Configuration
- Radius (Access Control) Installation and Configuration
- MAX Troubleshooting

You can register for any of the above courses directly from the Ascend Education web page. You can also find links to Ascend's training curriculum, curriculum maps, computer-based training courses, course scheduling and registration information, and more.

Note: Appendix B in this document provides course information for Ascend training programs worldwide. Global contact and registration information is also provided.

Other Ascend Resources

The product manuals listed below are suggested as study resources for Exam 102, they are also helpful to prepare for Exam 103. If you do not have access to recent Ascend product manuals, they can be ordered through Ascend's Order Management Department. The toll-free number is *(888) 673-3718.*

Model Number	**Description**
DOCS-CDROM	Ascend Documentation Library on CDROM
P75-DC-BRI	User Manual Set for Pipeline 75
P130-DC-GEN	User Manual Set for Pipeline 130
MX-DC-T1	User Manual Set for MAX T1/PRI models
MX-DC-GEN	User Manual Set for MAX TI/E1 models
TNT-DC-GEN	Documentation Set for MAX TNT

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Links on the Ascend Site

On the Ascend web site there are a number of helpful resources you can access to learn more about Ascend products. While the Ascend site is more useful when preparing for Exam 102, we suggest you revisit it for information and help specific to Exam 103. The links recommended for Exam 102 are again suggested for Exam 103. For Exam 103 the "Support" link may prove very helpful.

- Support provides support-level information on MAX and Pipeline family products, including configuration tips and, in some cases, documentation. Link to the Software Library to access technical FAQs, technical background and product manuals.

- Products and Services Provides a menu of Ascend's product family. We suggest you go to Pipeline Remote Access Products, MAX WAN Access Switches, SecureConnect, and Navis Network and Service Management to review NavisRadius (formerly Access Control) product literature.

- Resource Library Provides a number of menus and subsequent links to useful product-specific information, including technical backgrounds/overviews, resource guides, white papers, technology FAQs, and application/solution notes.

- Suggested books covering Microsoft Windows NT and Novell NetWare.

Exam 103 requires administration level knowledge of Windows NT Server 4.0 and NetWare 4.11, the following books are suggested. Other suggested materials are listed in Appendix A.

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Books on Microsoft Windows NT

Minasi, Mark, and Dyson, Peter. (1997) (Mastering) Windows NT Server 4. 1664 pp. Sybex.

Windows NT 4.0: System Architecture and Network Support, Part 1

Ziff Davis Staff / Other Format / Date Published: October 1998

Pearce, Eric. (1997) Windows NT in a Nutshell. 425 pp. O'Reilly & Associates.

Tittel, Ed. (1996) Windows NT Networking for Dummies. 384 pp. IDG Books Worldwide.

Cassel, Paul and Mathias, Sean. (1997) Windows NT Workstation 4, with CD-ROM (Unleashed). Sams Publishing.

Books on Novell NetWare

Sant'Angelo, Rick. (1995) NetWare Unleashed/Book and Disk. 1321 pp. Sams Publishing.

Beheler, Ann. (1998) Data Communications and Networking Fundamentals Using Novell Network (4.11). Prentice Hall.

Tittel, Ed., Gaskins, James., Johnson, David. (1998) Networking with NetWare for Dummies. 208 pp. IDG Books Worldwide.

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APPENDIX A: REFERENCES TO HELPFUL RESOURCES

The links in this section identify web sites that provide access to technology standards, white papers, Request for Comments (RFCs) from the IETF, technology articles, technology primers and other resources targeted at networking professionals. In most cases, the home page is identified. Links on the home page can point you to the information sources that are of specific interest to you. There are also links to Microsoft and Novell home pages, as well as a reference list of suggested books.

- IETF Home Page

http://ietf.cnri.reston.va.us/home.html

Internet Engineer Task Force (IETF) Home Page: Of most interest to you would be the Request for Comment (RFC) documents, which are indexed and openly provided by the IETF.

- Computer and Communications Standards

http://www.cmpcmm.com/cc/standards.html

This source provides an extensive list of links to many computer and telecommunications technology standards and standards bodies, including the IETF, ANSI, IEEE, the ITU, ATM Forum and many others.

- Telecommunications Information Resource

http://china.si.umich.edu/telecom/telecom-info.html

This page provides links to many resources. Be sure to check out links to Technical Information and FAQs. There are many other links that branch to useful information.

- Network Professionals Resource Center

http://www.inetassist.com/urlidx.htm

This home page provides an index of link groups to many useful study resources, including technical reports, TCP/IP resources, data communications tutorials, and more.

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- The Matrix

http://members.iquest.net/~mdd/ipx.html

This Novell-inspired page supports networking professionals. It provides valuable information on Novell-related technologies, as well as other technologies, including TCP/IP, UNIX, Windows NT, Frame Relay, ATM, network management, and more.

- Telecommunications Magazine Online

http://www.telecommagazine.com

A great source for technology articles written by professionals in the field. A searchable index offers a wealth of comprehensive articles on past, current and evolving telecommunications and networking technologies.

- Data Comm Magazine Tech Tutorials

http://www.data.com/tutorials/

Data Communications Magazine on line offers a section devoted to technology tutorials. This page provides a list of tightly crafted tutorials on many networking and communications technology subjects.

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Links to Microsoft and Novell Home Pages

Below are links to the home pages of Microsoft and Novell. Because the ACTE/RA 103 Lab Exam requires knowledge of Microsoft NT 4.0 Server, NT Workstation 4.0, Windows 95 Workstation, and Novell 4.11 Server, it may be helpful to view Microsoft and Novell web sites to find training that will supplement your skills in these areas.

- Microsoft Home Page

http://www.microsoft.com

On the Microsoft home page check out the IT Professionals/Execs link to find training and certification resources.

- Novell Home Page

http://www.novell.com

On the Novell home page, click on Training and Services to find training and certification resources.

Suggested Books on Data and Telecommunications Fundamentals

1. Comer, Douglas E. (1995). Internetworking with TCP/IP: Principles, Protocol and Architecture. Third Edition. 640 pp. Prentice Hall.

2. Black, Uyless. (1997). TCP/IP and Related Protocols. Third Edition. 402 pages. McGraw Hill.

3. Dhawan, Chander. (1998). Enabling Remote Access: with PSTN, ISDN and Internet. 510 pp. McGraw Hill.

4. Tanenbaum, Andrew S. (1996) Computer Networks. Third Edition. 848 pp. Prentice Hall.

5. Froehlich, Fritz E. (1994) Encyclopedia of Telecommunications: IEEE 802.3 & Ethernet Standards to Interrelationship of the Ss7 Protocol Architecture & the OSI

Reference Model & Protocols. Vol. 9. Publisher unknown.

6. Graham, Buck B., Graham, Norman B. (1996) TCP/IP Addressing: Designing and Optimizing Your IP Addressing Scheme. 328 pp. Publisher unknown.

7. Sportack, Mark A. (1997). Networking Essentials (Unleashed) 575 pp. SamsPublishing.

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Suggested Books on Microsoft Windows NT

Minasi, Mark, and Dyson, Peter. (1997) (Mastering) Windows NT Server 4. 1664 pp. Sybex.

Windows NT 4.0: System Architecture and Network Support, Part 1

Ziff Davis Staff / Other Format / Date Published: October 1998

Pearce, Eric. (1997) Windows NT in a Nutshell. 425 pp. O'Reilly & Associates.

Tittel, Ed. (1996) Windows NT Networking for Dummies. 384 pp. IDG Books Worldwide.

Cassel, Paul and Mathias, Sean. (1997) Windows NT Workstation 4, with CD-ROM (Unleashed). Sams Publishing.

Suggested Books on Novell NetWare

Sant'Angelo, Rick. (1995) NetWare Unleashed/Book and Disk. 1321 pp. Sams Publishing.

Beheler, Ann. (1998) Data Communications and Networking Fundamentals Using Novell Network (4.11). Prentice Hall.

Tittel, Ed., Gaskins, James., Johnson, David. (1998) Networking with NetWare for Dummies. 208 pp. IDG Books Worldwide.

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APPENDIX B: ASCEND WORLDWIDE TRAINING CURRICULUM

Ascend Education is committed to delivering focused, cost-effective training programs that maximize your ability to successfully design, operate and manage Ascend products in networking environments. Ascend can reinforce your competitive position with courses and workshops that encompass a wide range of topics on network planning, design, installation, configuration, optimization, management, and operation. To keep pace with expanding technology, we continually enhance courseware and develop new offerings so you benefit to the fullest.

The instructional design of our courses is a blend of presentation, discussion, and hands-on exercises so attendees realize full benefit from their studies. Students acquire new skills and knowledge through practice on Ascend technology in a controlled, instructor-facilitated setting.

Flexible offerings allow you to make the most of your training dollar. You can choose from classes at our training facilities. Classes can also be brought directly to your site, when you have a group of professionals who wish to attend the same program. Additionally, our training consultants can work with you to customize any course to meet your specific needs—a practical option for your unique technical circumstances. Conducting custom classes at your site or at one of our facilities is always an option. Pricing for on-site and customized training is provided on request.

Code Course Per Student @ Any U.S. Center

20111 B-STDX Installation & Maintenance (1 day) $450

20121 CBX 500/GX 550 Installation & Maintenance (1 day) available Jan. 1999 $450

20200 NavisCore NMS Fundamentals (2 days) $1000

20211 Frame Relay Configuration I (2 days) $1000

20215 Frame Relay Configuration II (2 days) $1000

20231 ATM Configuration (2 days) $1000

20235 Frame Relay/ATM Interworking (2 days) $1000

20250 SA Configuration & Operations (2 days) $1000

20270 IP Navigator Configuration (3 days) $1500

20310 Troubleshooting Ascend Frame Relay Networks (3 days) $1800

20500 NavisAccess Fundamentals (2 days) $1000

20600 MAX/Pipeline Installation & Configuration (3 days) $1500

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20610 RADIUS Installation & Configuration (2 days) $1000

20620 Multiband Configuration & Operations (2 days) $1000

20630 MAX TNT Installation & Configuration (3 days) $1500

20640 GRF Installation & Configuration (3 days) $1800

20700 MAX Troubleshooting (2 days) $1200

Computer-based Training Per CBT

20830 MAX TNT Interactive Training $499

20840 GRF GateD $499

20851 Remote Access Fundamentals (preliminary version; currently hard copy) $99

Contact Ascend Global Education

1-800-380-1026 (Americas) +33 4 92 96 56 02 (EMEA) +61 3 9656 7000 (APAC)

813-5325-7340 (Japan) 510-747-2125 (all other International inquiries)

www.ascend.com/education

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APPENDIX C: KEY CONTACTS

ACTE PROGRAM REPRESENTATIVE

For information about Ascend Certified Technical Expert Program or to register for an exam call an ACTE Program Representative at the following regional telephone numbers:

Region	Telephone
US	888-322-ACTE
Americas	1 510 769-6001, ext 74300
Europe, Middle East, and Africa (EMEA)	33 4 92 96 56 02
Asia Pacific (APAC)	61 3 9656 7002

GLOBAL EDUCATION TRAINING CONTACTS

For general information about Ascend Global Education, refer to the following regional telephone numbers:

Region	Telephone
US	800-380-1026
Europe, Middle East, and Africa (EMEA)	33 4 92 96 56 02
Germany	49 6 150 109 410
United Kingdom	44 1252 360019
Asia Pacific (APAC) Melbourne	61 3 9656 7000
Tokyo	813 5325 7340

To register for Ascend training courses (from Appendix B) contact the following Ascend representatives:

510-769-6001 ext. 74300

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Americas

Name	Location	Telephone	Fax
Carri Baxter	Alameda, CA .	510-747-2415	510-747-2419
Michele Sharples	Westford, MA.	978-692-1206	978-692-1218

Europe, Middle East, Africa (EMEA)

Name	Location	Telephone	Fax
Claire Fenner	UK	+44 1252 360019	+44 1252 360001
Dominique Boeufgras	France	+33 4 92 96 56 02	+33 4 92 96 56 07
Katharina Franke	Germany +	49 6 150 109 410	+49 6 150 109 494
Sandra Market	Germany	+49 6 150 109 410	+49 6 150 109 494

Asia Pacific (APAC)

Name	Location	Telephone	Fax
Melissa Hartog	Melbourne, Aus.	+61 3 9656 7055	+61 3 9656 7005
Etsuko Murata	Tokyo, Japan	+081 3 5325 7397	+081 3 5325 7399

Additional Contacts

ACTE and Sylvan Information and Registration: 1-888-322-ACTE (2283)

International: (510) 769-6001 ext. 74300, or email acte@ascend.com

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