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Network Security 1

Module 4 – Trust and Identity Technology

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Module 1 – Trust and Identity Technology

4.1 AAA

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AAA Model—
Network Security Architecture

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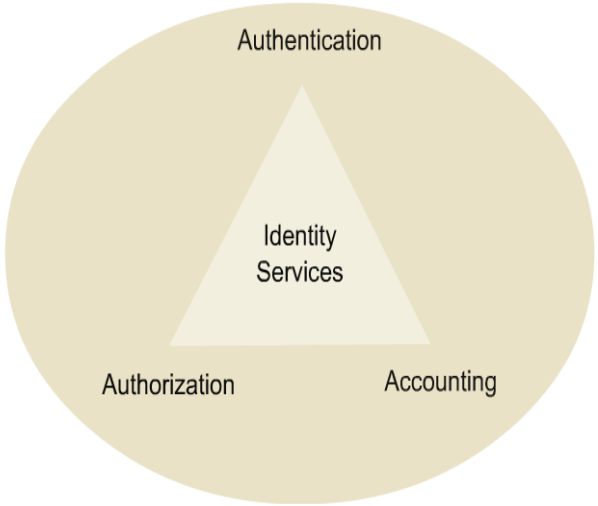
- Authentication
  - Who are you?
  - “I am user student and my password validateme proves it.”
- Authorization
  - What can you do? What can you access?
  - “I can access host 2000_Server with Telnet.”
- Accounting
  - What did you do? How long did you do it?
    How often did you do it?
  - “I accessed host 2000_Server with Telnet 15 times.”



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Implementing AAA Using Local Services

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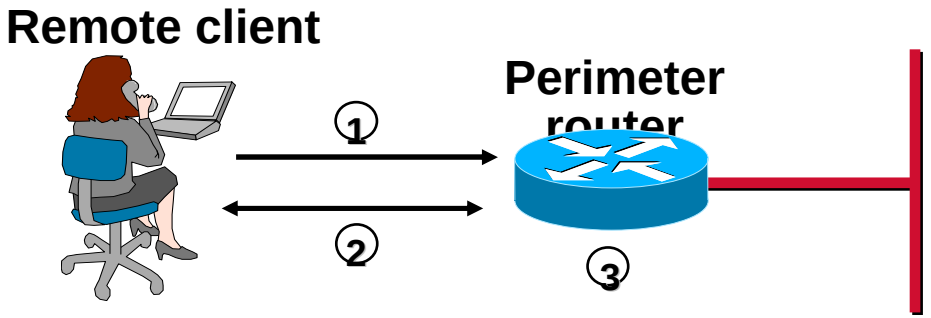

1. The client establishes connection with the router.
2. The router prompts the user for their username and password.
3. The router authenticates the username and password in the local database. The user is authorized to access the network based on information in the local database.

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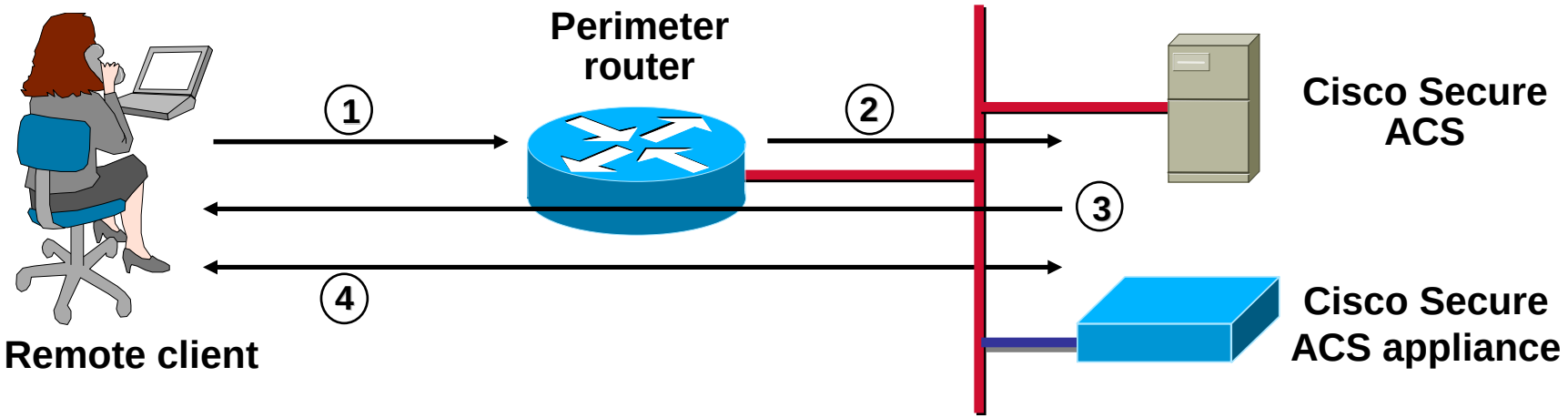
Implementing AAA Using External Servers



1. The client establishes a connection with the router.
2. The router communicates with the Cisco Secure ACS (server or appliance).
3. The Cisco Secure ACS prompts the user for their username and password.
4. The Cisco Secure ACS authenticates the user. The user is authorized to access the network based on information found in the Cisco Secure ACS database.

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The TACACS+ and RADIUS AAA Protocols

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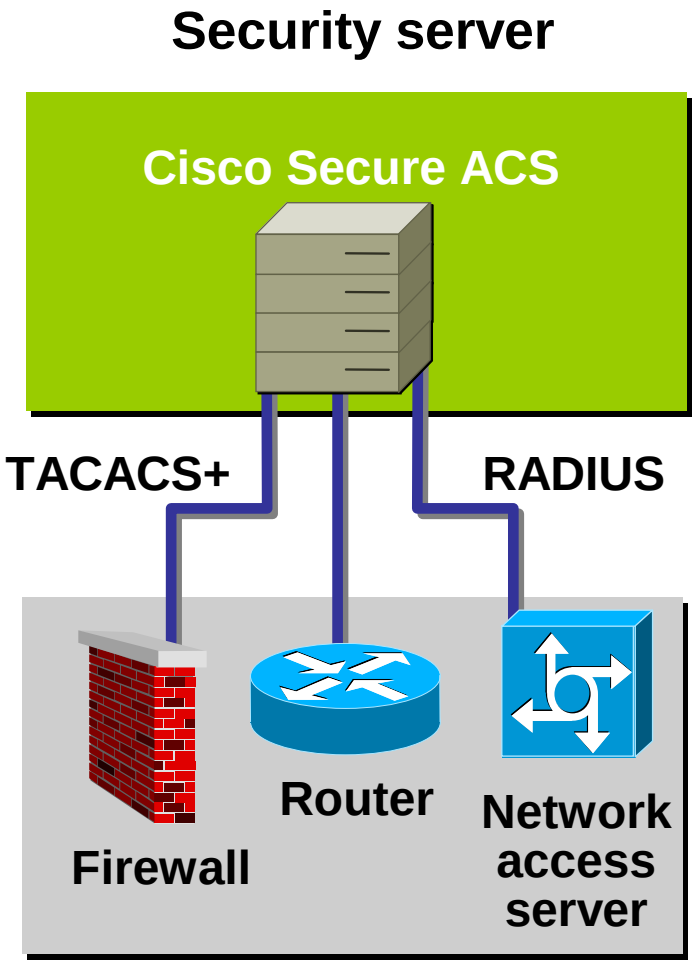
- Two different protocols are used to communicate between the AAA security servers and a router, NAS, or firewall.
- Cisco Secure ACS supports both TACACS+ and RADIUS:
  - TACACS+ remains more secure than RADIUS.
  - RADIUS has a robust API and strong accounting.



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The TACACS+ and RADIUS AAA Protocols

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	TACACS+	RADIUS
Functionality	Separates AAA	Combines Authentication/ Authorization
Transport Protocol	TCP	UDP
CHAP	Bidirectional	Unidirectional
Protocol Support	Multi-protocol support	No ARA No NetBEUI
Confidentiality	Entire Packet-Encrypted	Password-Encrypted
Accounting	Limited	Extensive

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4.2 Authentication Technologies

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Authentication—
One-Time Passwords, S/Key

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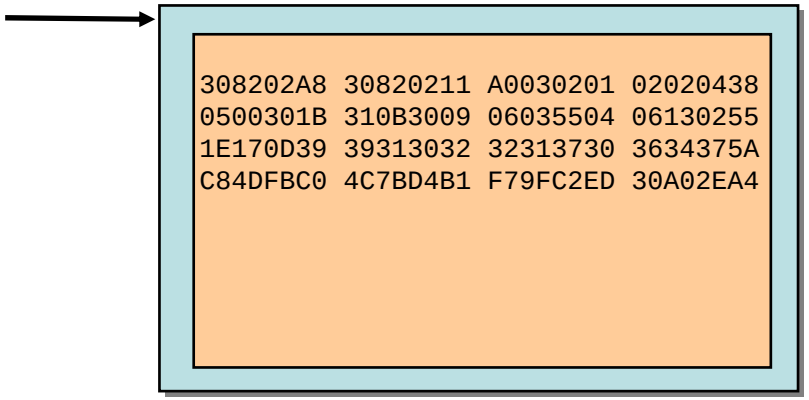
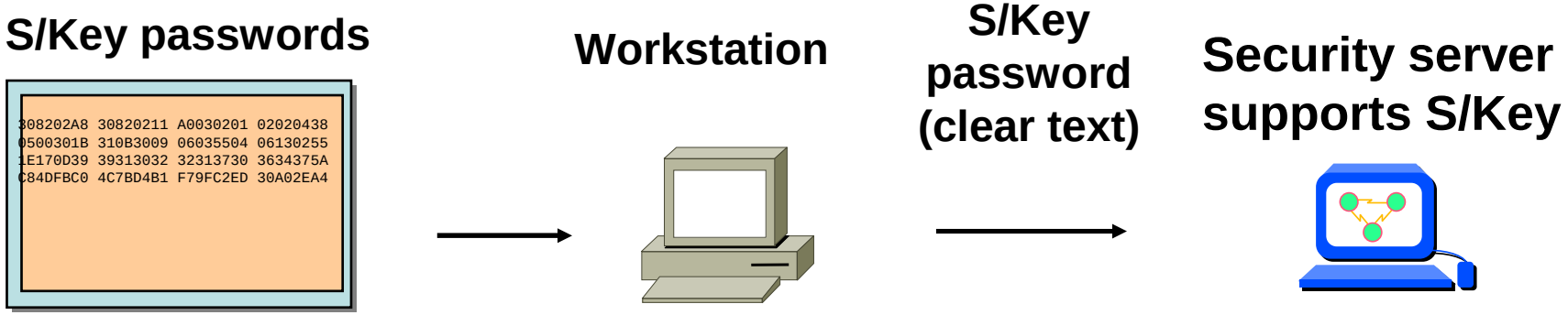
- List of one-time passwords
- Generated by S/Key program hash function
- Sent in clear text over network
- Server must support S/Key





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Authentication—
Token Cards and Servers

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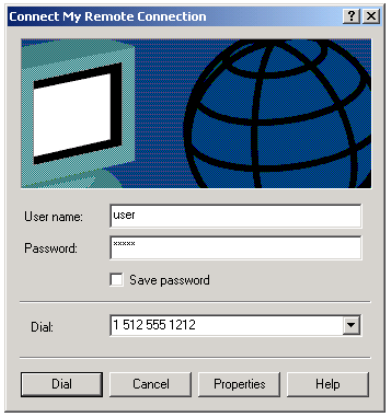
1.

2.



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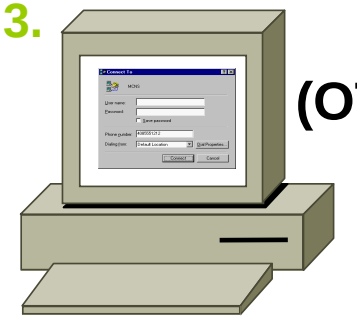
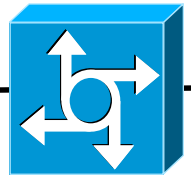
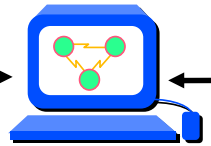


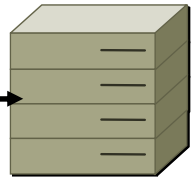
(OTP)





Cisco Secure ACS

4.



Token server

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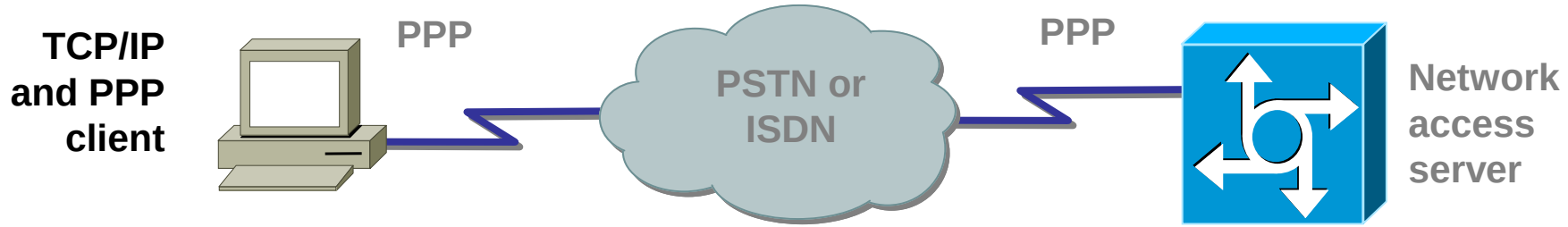
AAA Example—Authentication Via PPP Link



- PAP—Password Authentication Protocol
  - Clear text, repeated password
  - Subject to eavesdropping and replay attacks
- CHAP—Challenge Handshake Authentication Protocol
  - Secret password, per remote user
  - Challenge sent on link (random number)
  - Challenge can be repeated periodically to prevent session hijacking
  - The CHAP response is an MD5 hash of (challenge + secret) provides authentication
  - Robust against sniffing and replay attacks
- MS-CHAP—Microsoft CHAP v1 (supported in IOS > 11.3) and v1 or v2 (supported in IOS > 12.2)

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4.3 Identity Based Networking Services (IBNS)

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Identity Based Networking Services

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Features and Benefits:

- Intelligent adaptability for offering greater flexibility and mobility to stratified users
- A combination of authentication, access control, and user policies to secure network connectivity and resources
- User productivity gains and reduced operating costs

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4.4 Network Admission Control (NAC)

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NAC Components

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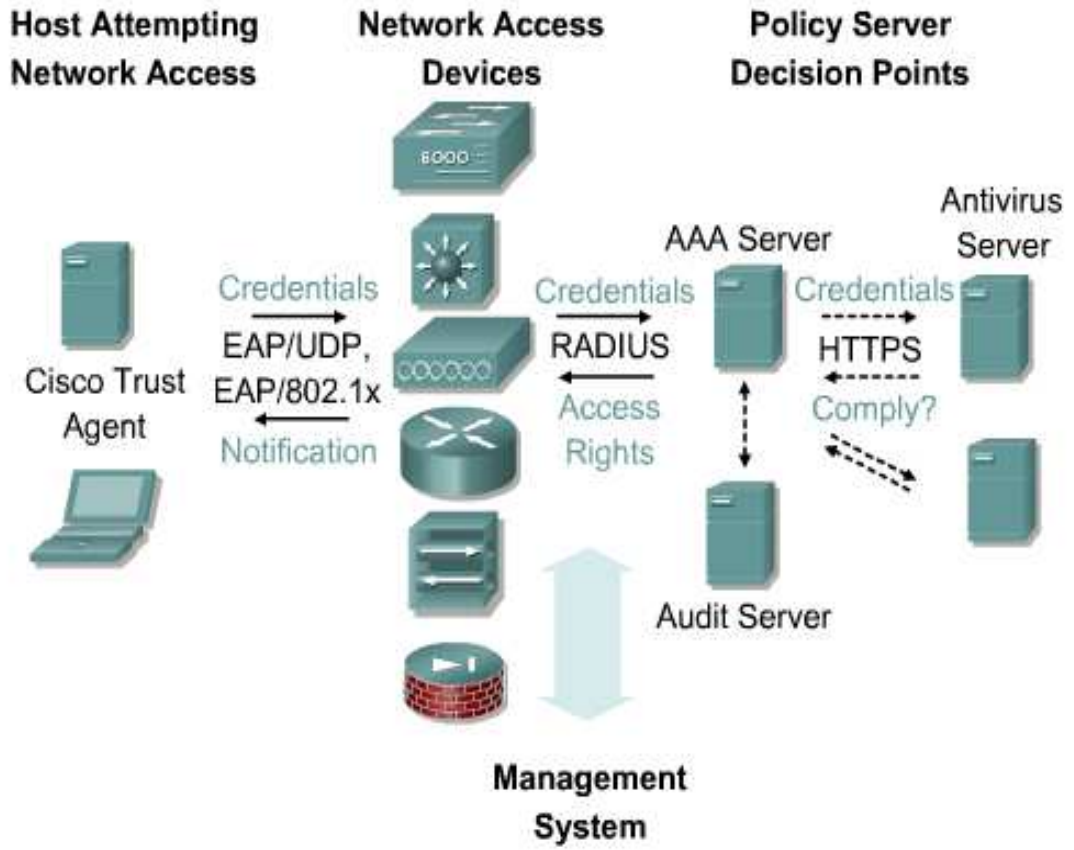
The Four Components of the NAC System



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NAC Vendor Participation

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NAC Enabled Applications	Vendor
eTrust AntiVirus, eTrust PestPatrol IBM - NAC enabled applications: Tivoli	Computer Associates International, Inc.
CyberGatekeeper Server 3.1 & CyberGatekeeper Policy Manager 3.1	InfoExpress
VirusScan 7.x and 8.0i	McAfee, Inc.
Symantec AntiVirus 9.0 & Symantec Client Security 2.0	Symantec
Trend Micro OfficeScan Corporate Edition 6.5	Trend Micro, Inc

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