

CompTIA Network+ Exam N10-008

Lesson 1



Comparing OSI Model Network Functions

Objectives

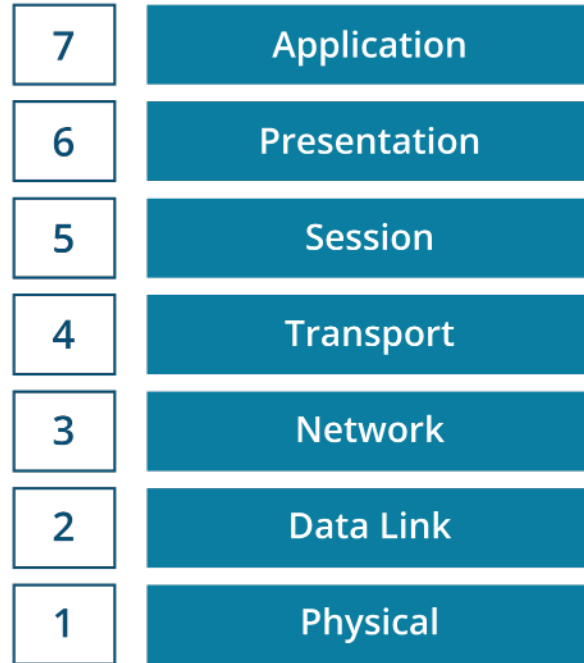
- Compare and contrast OSI model layers
- Configure SOHO networks

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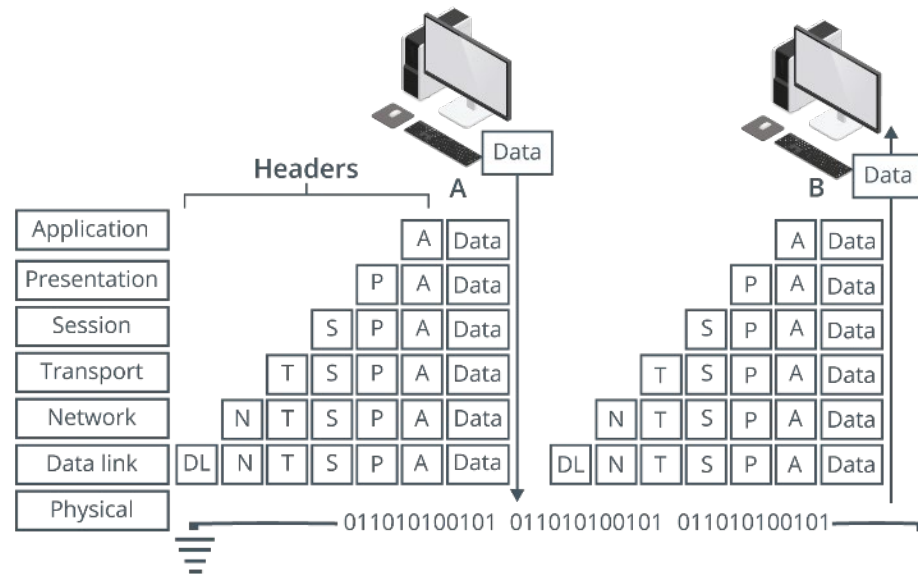
Topic 1A

Compare and Contrast OSI Model Layers

Open Systems Interconnection Model



Data Encapsulation and Decapsulation



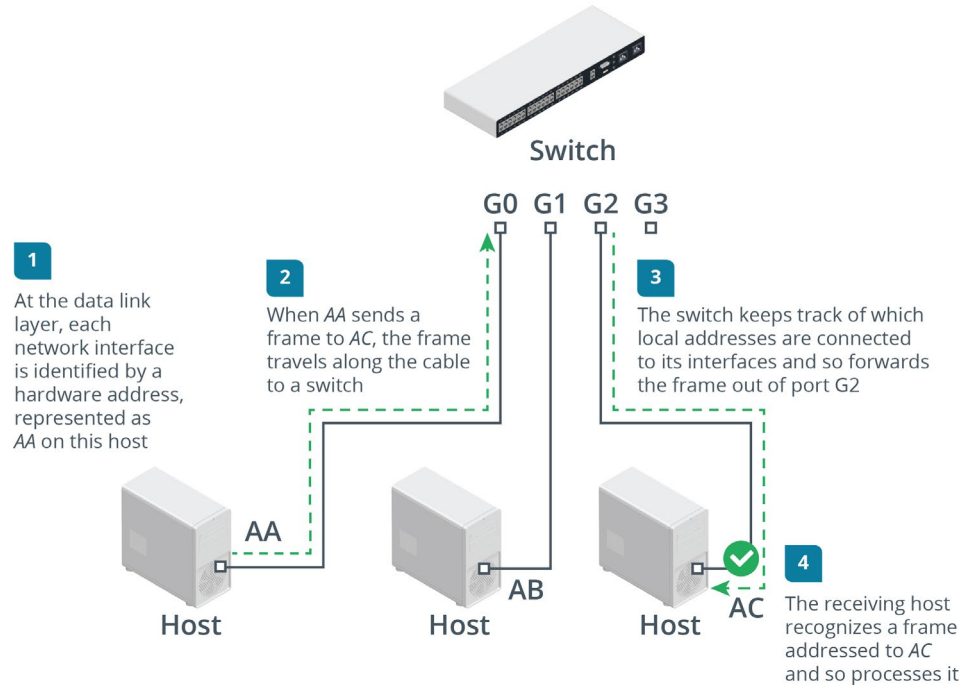
- Network protocol functions
 - Addressing
 - Encapsulation
- Protocol stack
 - Same layer interaction
 - Adjacent layer interaction
- Protocol Data Unit (PDU)
 - Headers
 - Payload/data

Layer 1—Physical

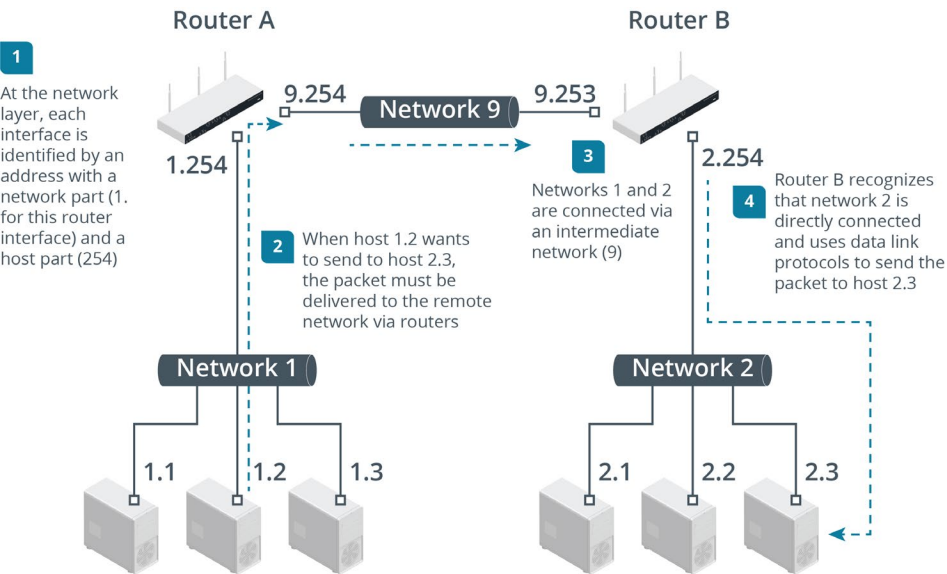
- Physical (PHY) layer transmission media types
 - Cabled
 - Wireless
- PHY layer features
 - Physical topology and segments
 - Physical interface and transmission of signals
 - Modulation and encoding
- Devices working at layer 1
 - Transceiver, repeater, hub, media converter, modem

Layer 2—Data Link

- Exchange PDUs as frames using hardware addresses within local segment
- Logical versus physical topology
- Intermediate systems versus end systems
- Devices working at layer 2
 - Network interface card (NIC), bridge, switch, wireless access point (AP)



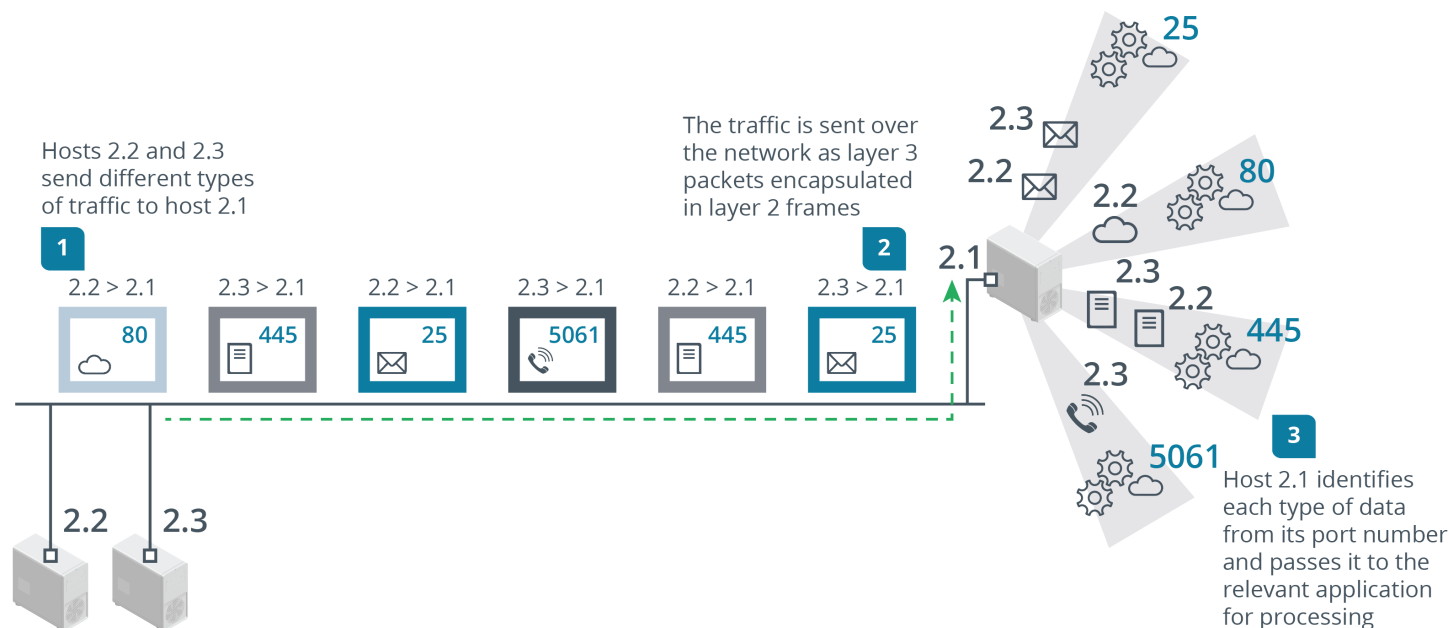
Layer 3—Network



- Network of networks or internetwork
- Forward datagrams/packets via routers using logical network addresses
- Can contain multiple segments using different physical layer specifications and layer 2 protocols
- Devices working at layer 3
 - Router, basic firewall

Layer 4—Transport

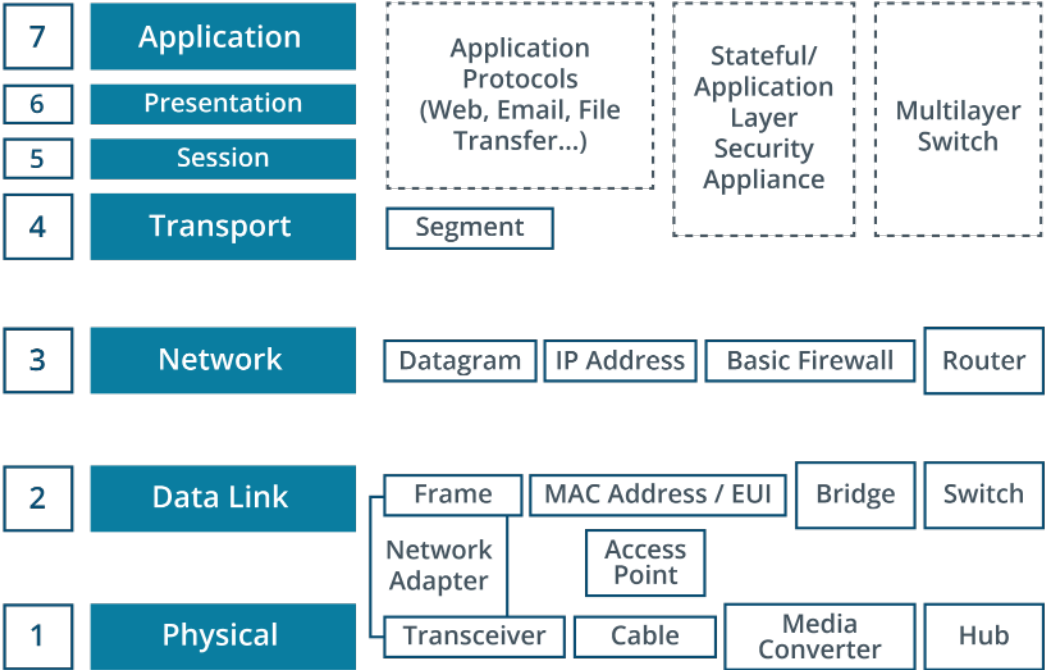
- Identify application data using port numbers
- Load balancer, advanced firewall, intrusion detection system (IDS)



Upper Layers

- Layer 5—Session
 - Establish rules for exchange of messages and sequencing (dialog control)
- Layer 6—Presentation
 - Establish data formats (such as character sets)
- Layer 7—Application
 - Present requests and responses from server or client software with structured headers and data payload

OSI Model Summary




Review Activity: OSI Model Layers

- Open Systems Interconnection Model
- Data Encapsulation and Decapsulation
- Layer 1—Physical
- Layer 2—Data Link
- Layer 3—Network
- Layer 4—Transport
- Upper Layers

Lab Activity

Assisted Lab: Exploring the Lab Environment

- Lab types
 - Assisted labs guide you step-by-step through tasks
 - Applied labs set goals with limited guidance
- Complete lab
 - Submit all items for grading and check each progress box
 - Select “Grade Lab” from final page
- Save lab 
 - Select the hamburger menu and select “Save”
 - Save up to two labs in progress for up to 7 days
- Cancel lab without grading
 - Select the hamburger menu and select “End”

Lesson 1

Topic 1B

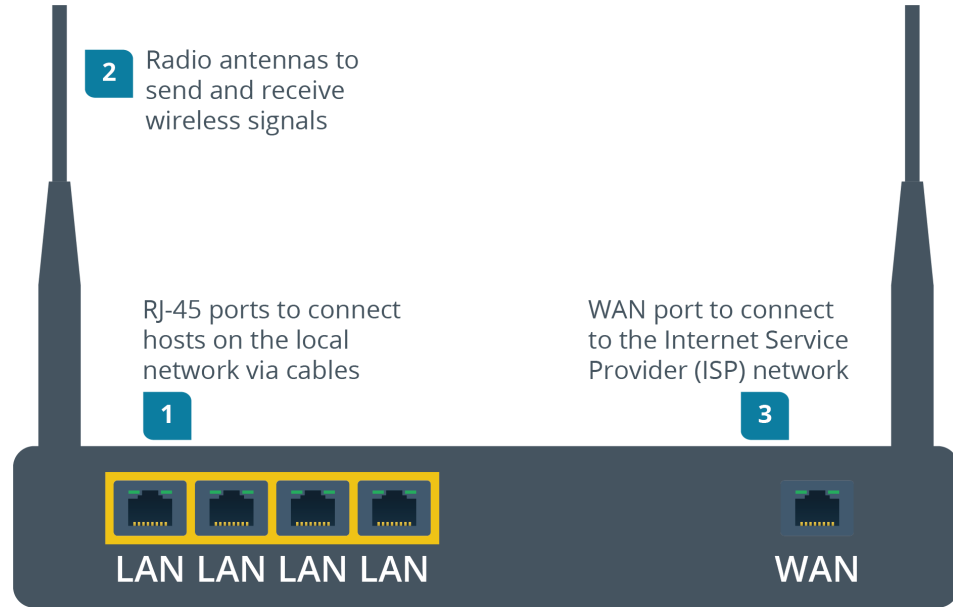
Configure SOHO Networks

SOHO Routers

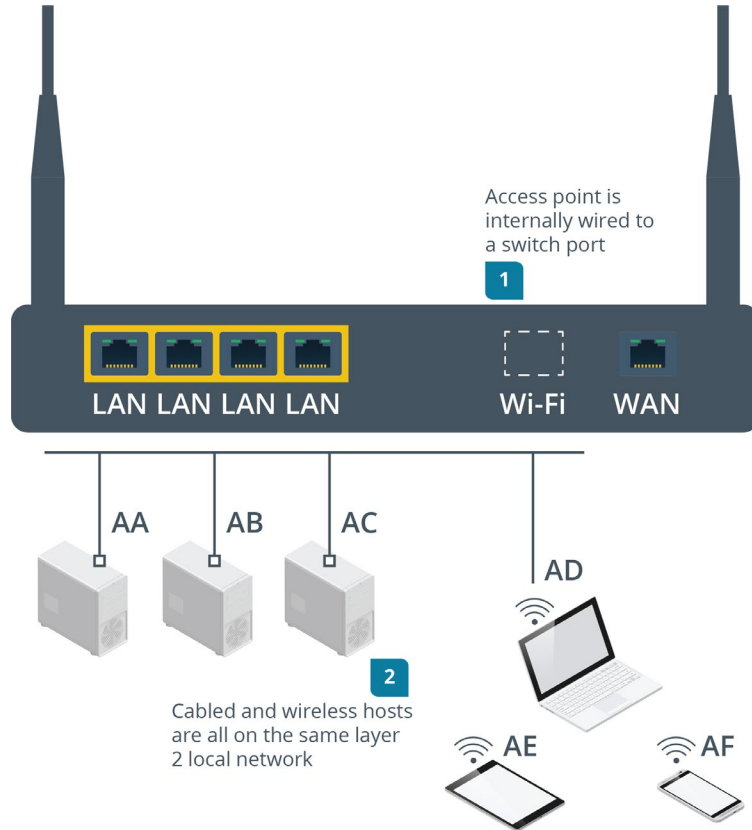
- Local area network (LAN) scope
- Small office, home office (SOHO) category LANs
- Wide area network (WAN) scope
- SOHO router
 - Multifunction network appliance
 - Combine modem, switch, wireless access point, router, firewall
 - Establish a local area network and connect it to the Internet WAN

Physical Layer Functions

- RJ-45 ports for cabled network connections
- Radio antennas for wireless signaling
- Modem for WAN connectivity

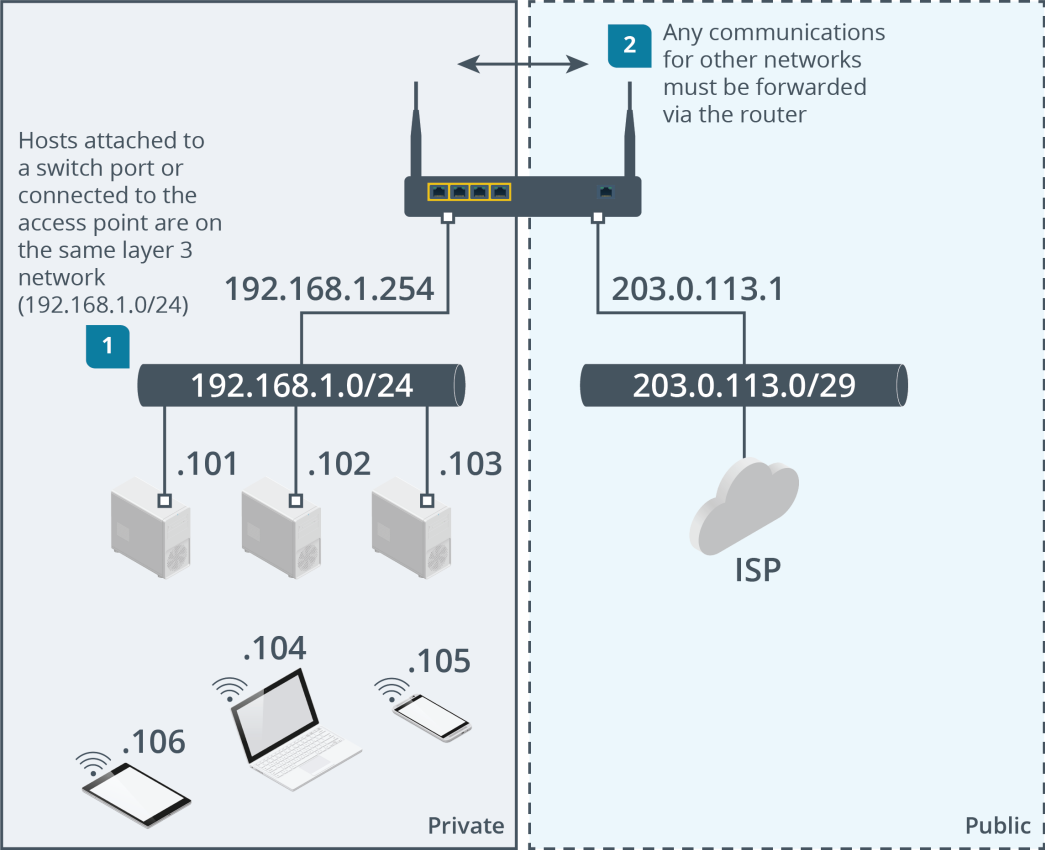


Data Link Layer Functions



- Ethernet switch
 - Connect the RJ-45 ports
- Wireless access point
 - Implement a Wi-Fi standard
 - Connect stations in a wireless LAN (WLAN)
 - Connected to switch to bridge wired and wireless segments in single data link network
- Media access control (MAC) hardware addresses identify each interface

Network Layer Functions



Transport and Application Layer and Security Functions

- Filtering between public and private zones (firewall)
 - Specify allow/block rules for IP addresses
 - Specify allow/block rules for layer 4 port numbers
- Authenticate access to the wireless network
- Protect the SOHO router management interface

The screenshot displays the TP-Link Archer VR900 web management interface. The browser address bar shows the IP address 192.168.1.254. The interface has a blue header with the TP-LINK logo and the model name Archer VR900. Below the header, there are tabs for 'Quick Setup', 'Basic', and 'Advanced'. The 'Advanced' tab is selected. On the left side, there is a sidebar menu with icons and labels for various settings: NAT Forwarding, USB Settings, Parental Controls, Bandwidth Control, Security, System Tools (highlighted in blue), Time Settings, Diagnostics, Firmware Upgrade, Backup & Restore, Administration (highlighted in blue), and System Log. The main content area is divided into three sections: 'Account Management', 'Local Management', and 'Remote Management'. The 'Account Management' section includes fields for 'Old Password:', 'New Password:', and 'Confirm New Password:', each with a password input field. The 'New Password' field has a strength indicator showing 'High'. A green 'Save' button is at the bottom right of this section. The 'Local Management' section includes fields for 'Port:' (set to 80) and 'IP/MAC Address:'. A green 'Save' button is at the bottom right. The 'Remote Management' section includes a checkbox for 'Remote Management:' (unchecked), and fields for 'Port:' (set to 80) and 'IP/MAC Address:'. A green 'Save' button is at the bottom right.

The Internet

- The public switched telephone network (PSTN)
- Internet service providers (ISPs)
- Internet standards and authorities
 - Internet Assigned Numbers Authority (IANA)
 - Manages IP address allocation and namespaces
 - Internet Corporation for Assigned Names and Numbers (ICANN)
 - Regional Internet Registries (RIRs) and ISPs
 - Internet Engineering Taskforce (IETF) and requests for comments (RFCs)


Hexadecimal Notation

- Base numbering systems and place position
 - $255 = (2 \times 10 \times 10) + (5 \times 10) + 5$
- Binary/base 2
 - $11111111 =$
 $(1 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2) + (1 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2) + (1 \times 2 \times 2 \times 2 \times 2 \times 2) + (1 \times 2 \times 2 \times 2 \times 2) + (1 \times 2 \times 2 \times 2) + (1 \times 2 \times 2) + (1 \times 2) + 1 = 255$
- Hexadecimal/base 16
 - $A=10, B=11, C=12, D=13, E=14, F=15$
 - $FF = 255$

Review Activity: SOHO Networks

- SOHO Routers
- Physical Layer Functions
- Data Link Layer Functions
- Network Layer Functions
- Transport and Application Layer and Security Functions
- The Internet
- Hexadecimal notation

Assisted Lab: Configure a SOHO Router

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Summary