Describe Protocols and Port Numbers



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Network Engineer

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Module Goals



Application Layer Protocols

- Data Transfer Protocols
- Authentication Protocols
- Network Service Protocols
- Network Management Protocols
- Audio/Visual Protocols
- Database Protocols



OSI Model

7	Application Layer
6	Presentation Layer
5	Session Layer
4	Transport Layer
3	Network Layer
2	Data Link Layer
1	Physical Layer

OSI Model

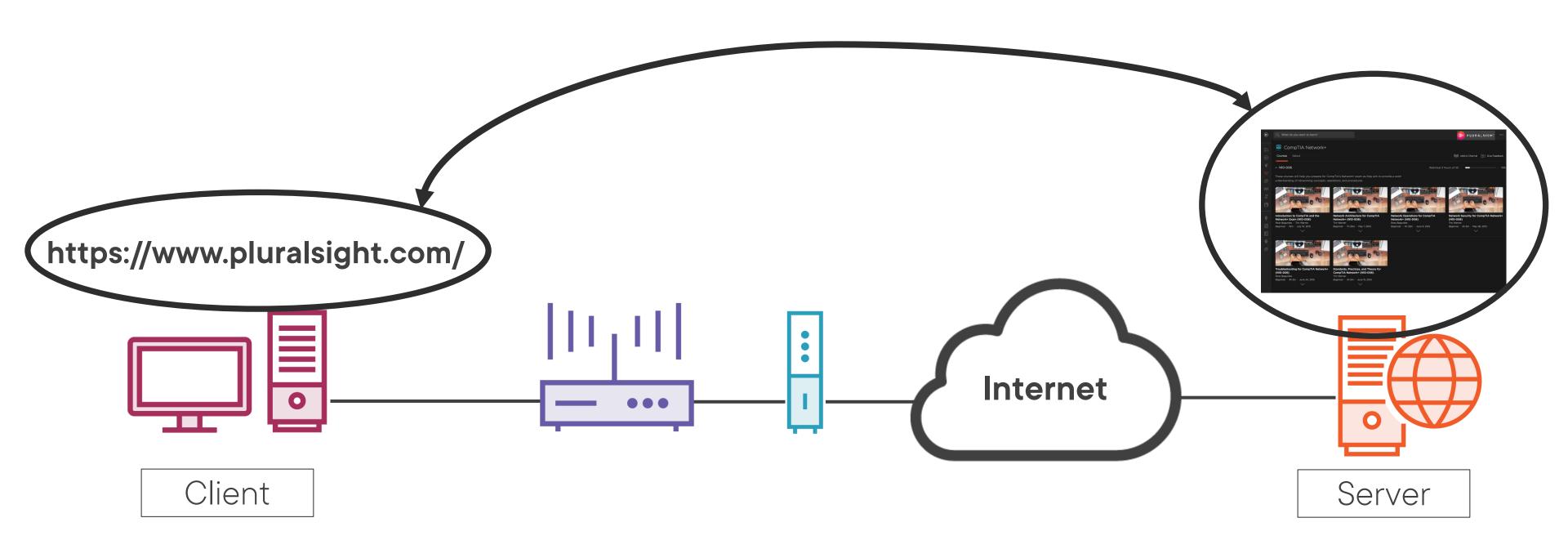
7	Application Layer
6	
5	
4	Transport Layer
3	
2	
1	

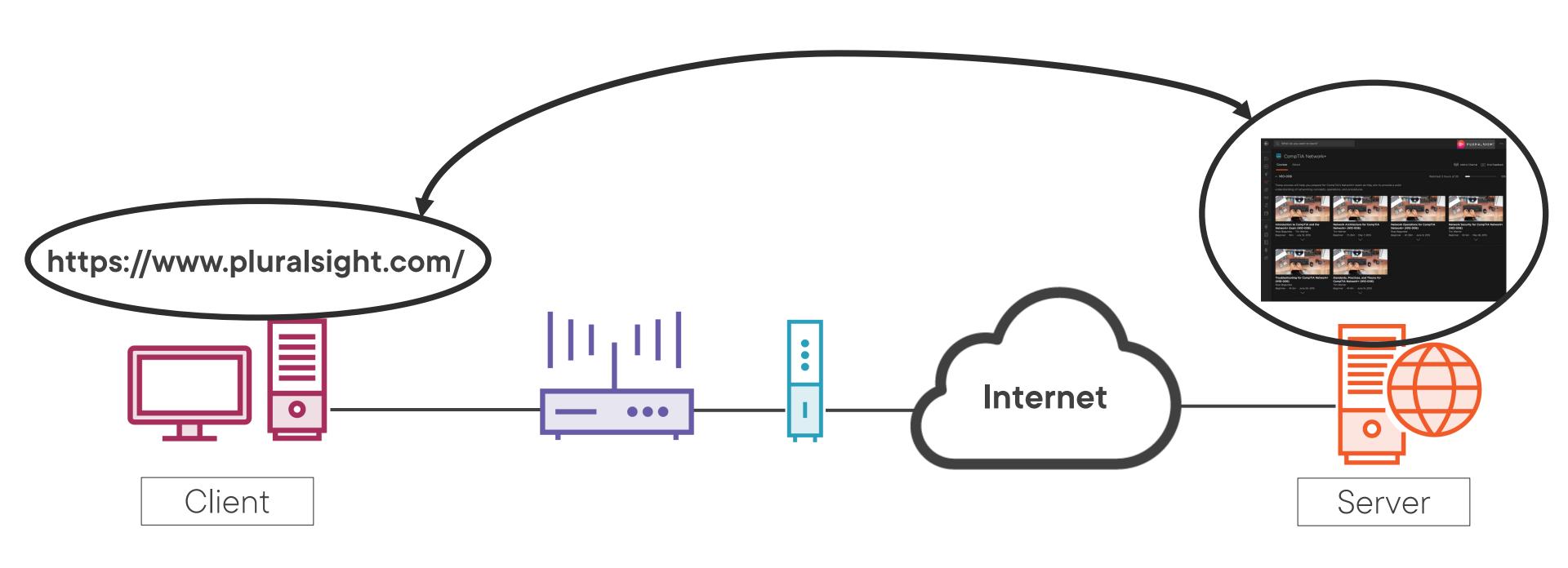
Application Layer Protocols



Transferring Data

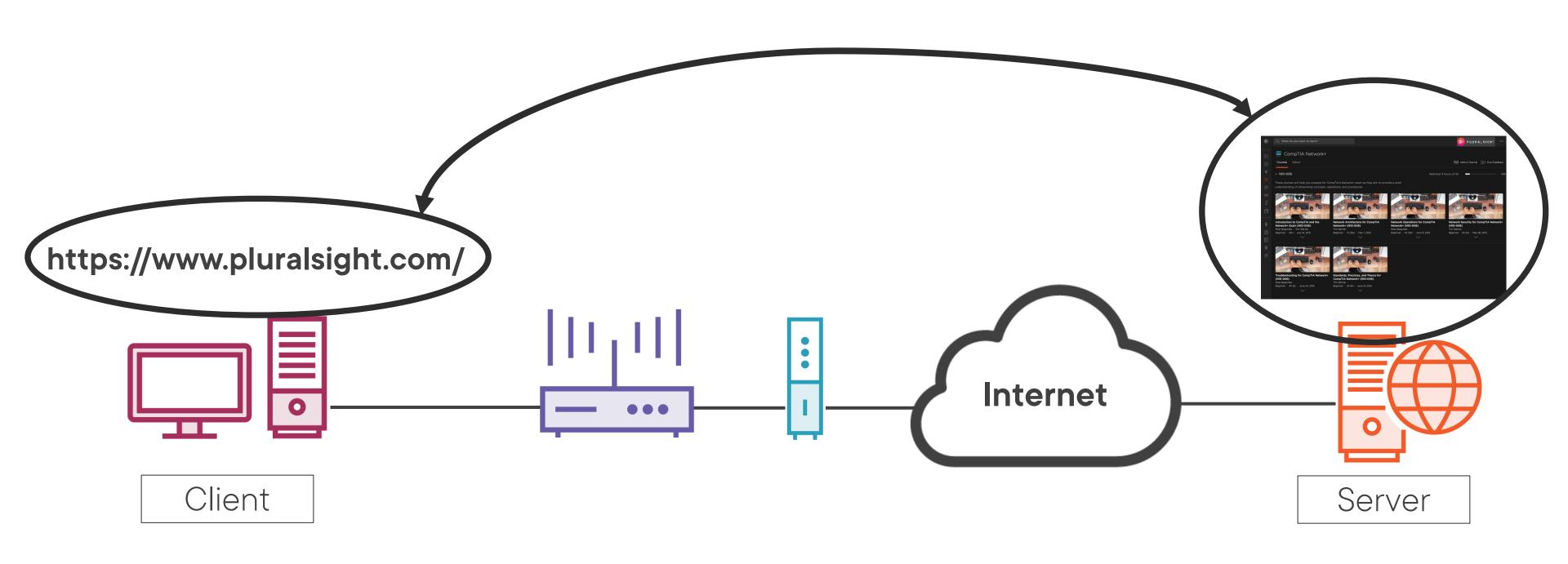






HTTP HTTPs

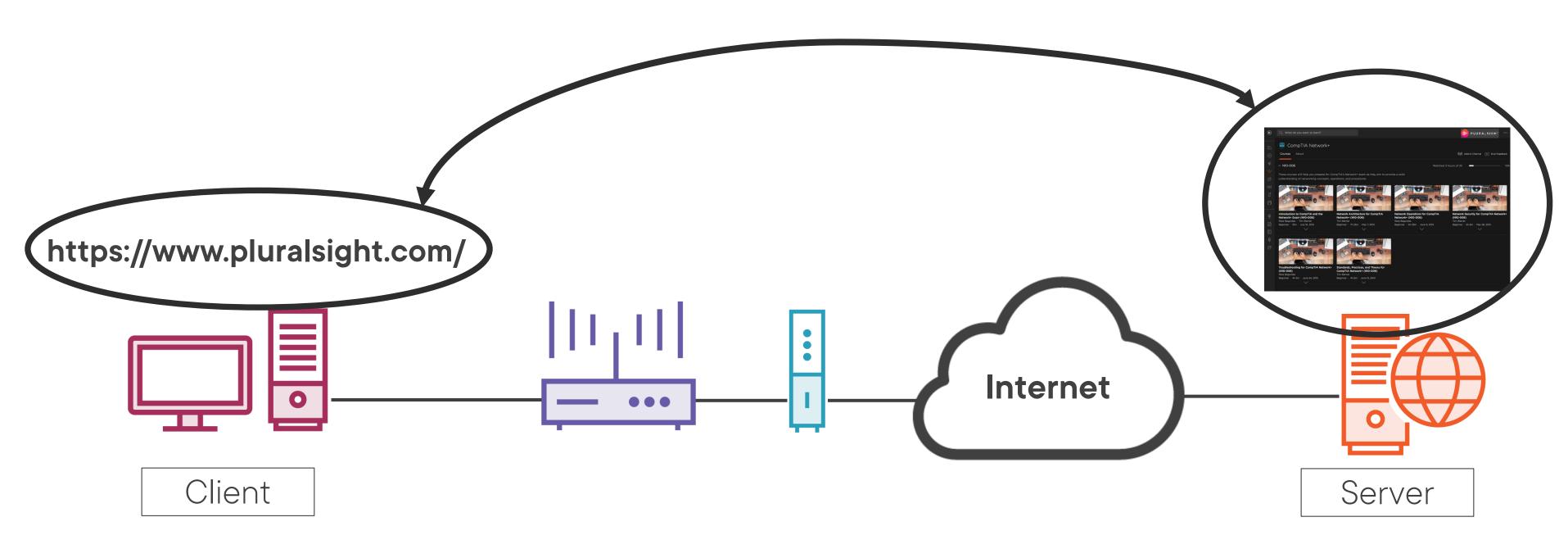




HTTP HTTPs

Hypertext Transfer Protocol (secure)

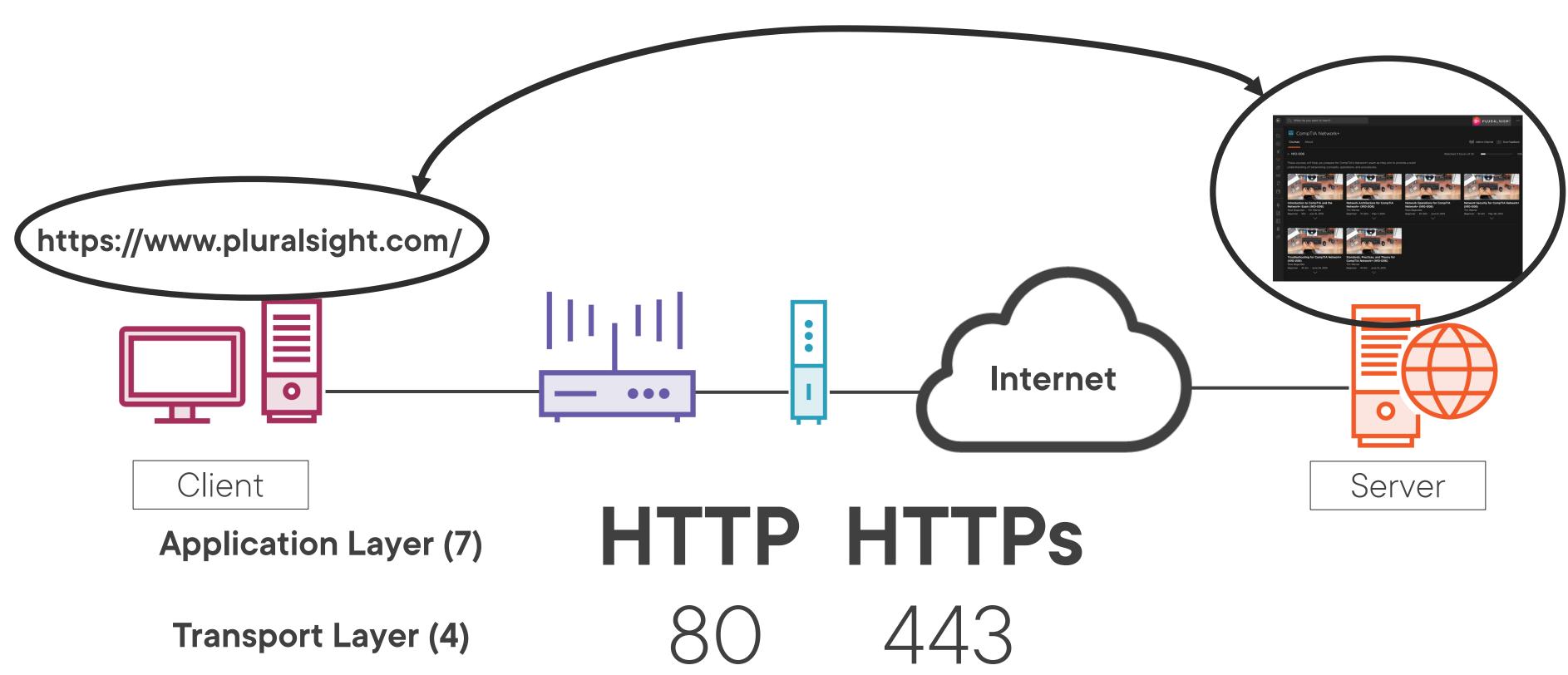




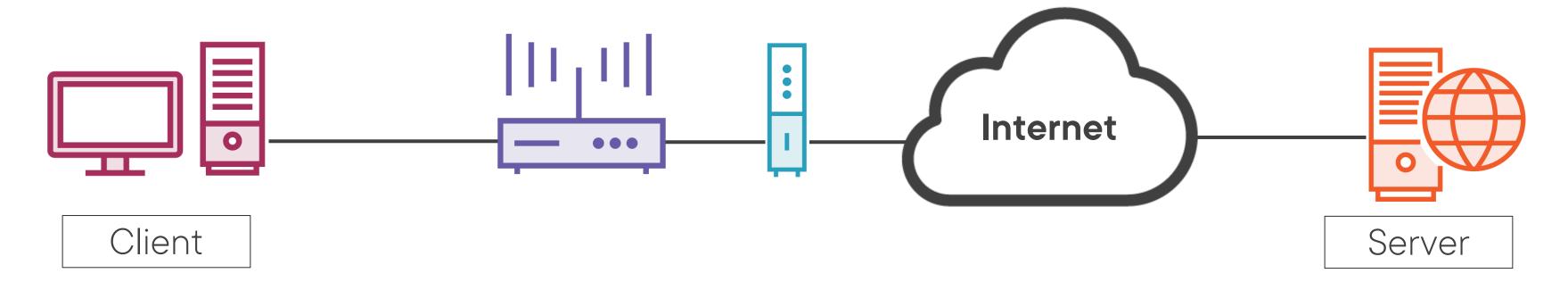
Application Layer (7)

HTTP HTTPs



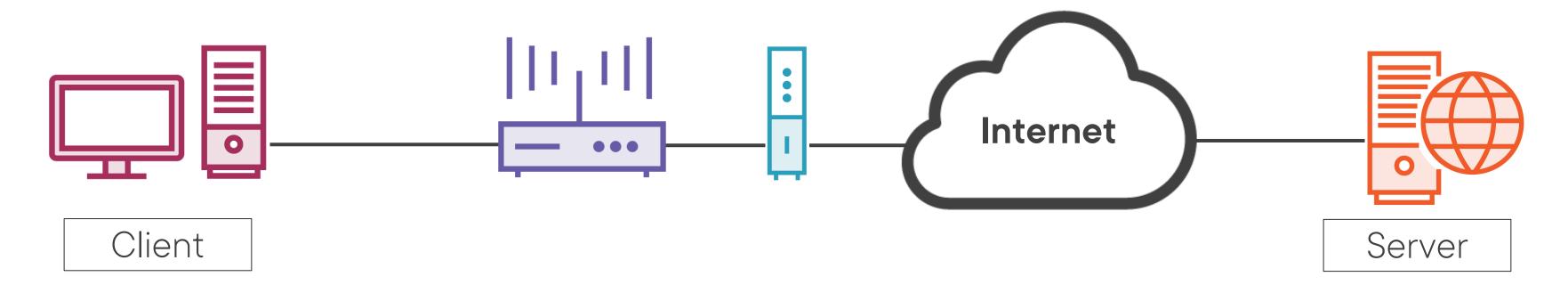






HTTPs 443

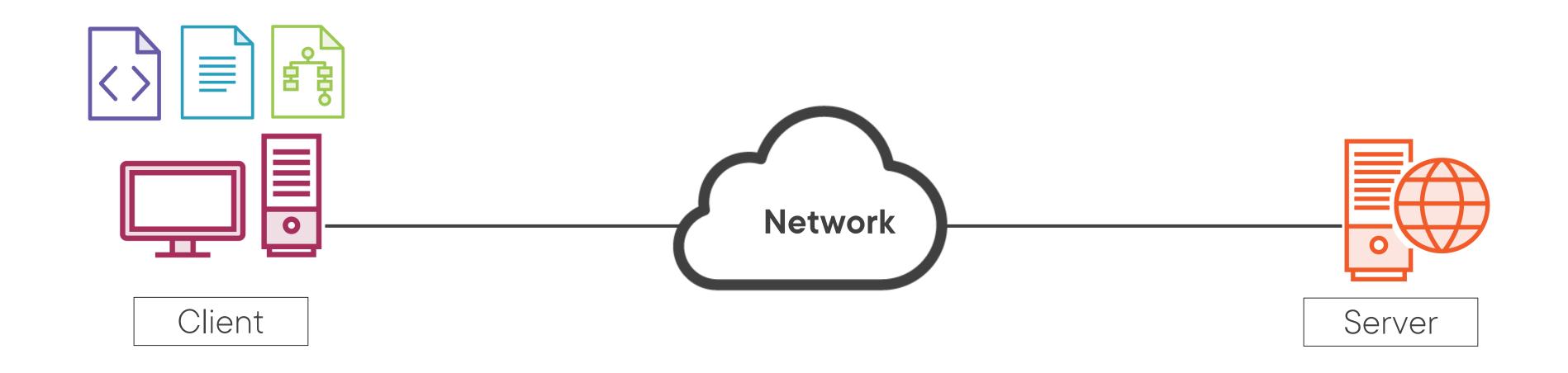
SSL TLS

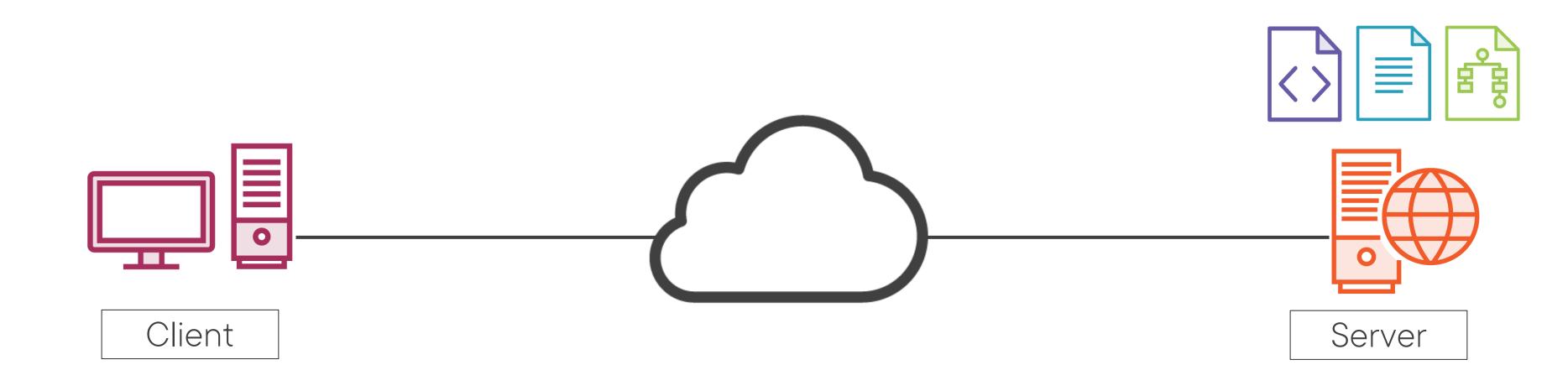


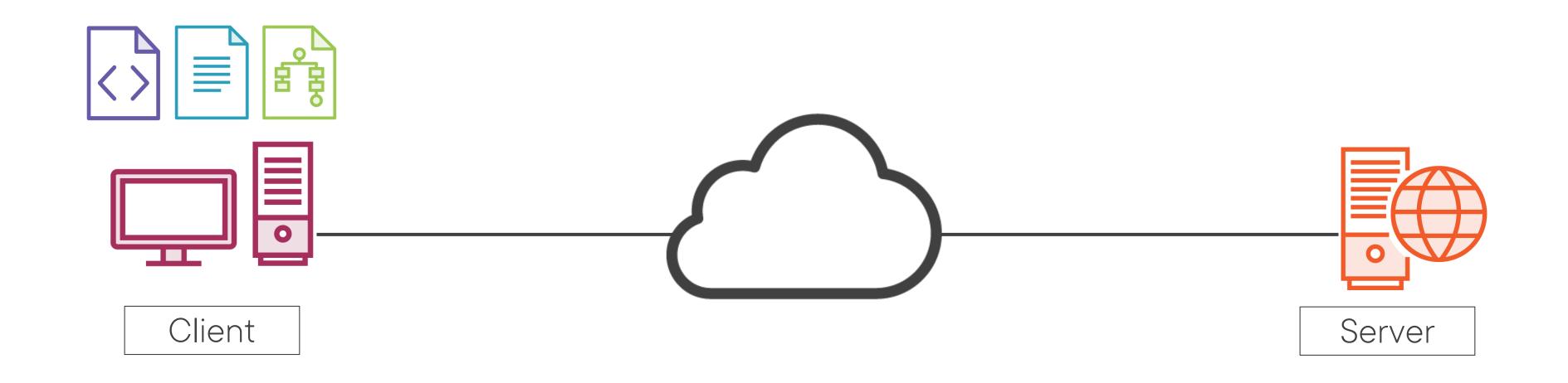
HTTPs 443

TLS











FTP sfTP TFTP





FTP

20/21

sFTP

22

TFTP

69



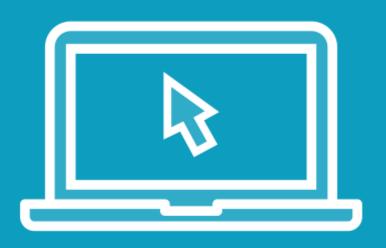


FTP sftp smb

20 /21 22 69 445



Demo



Examine FTP and SMB operation



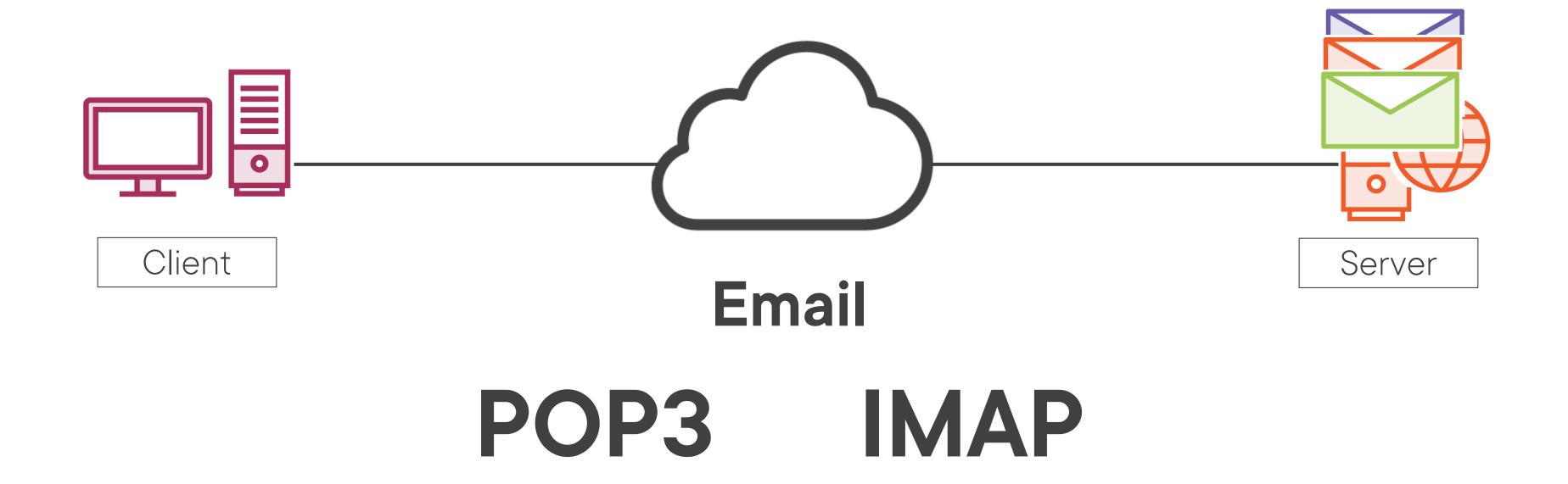
Email

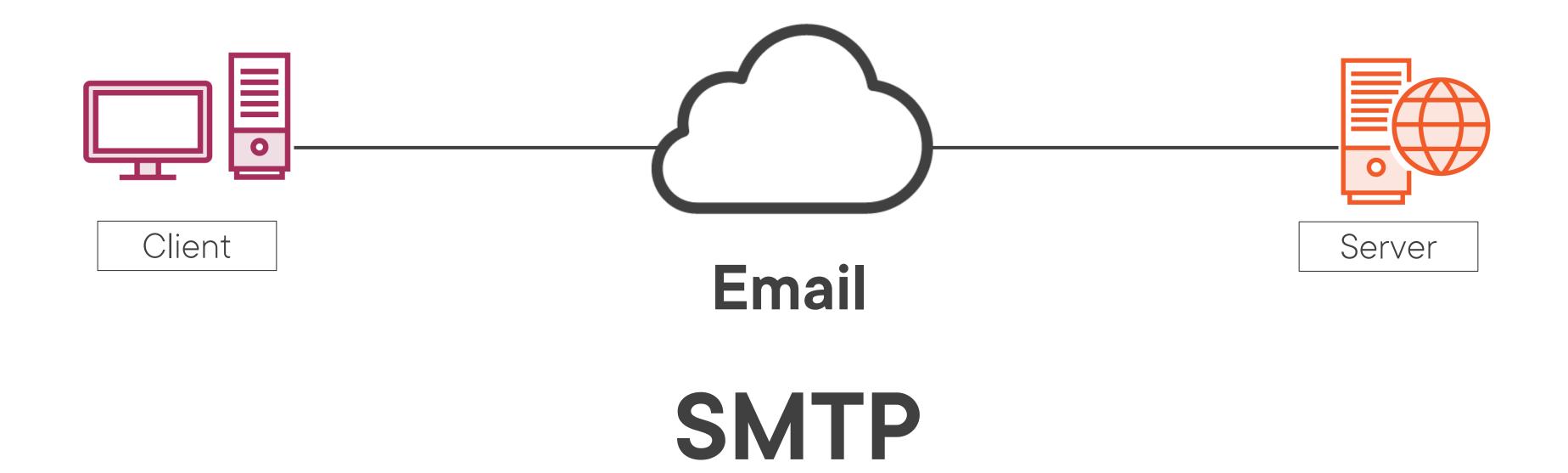


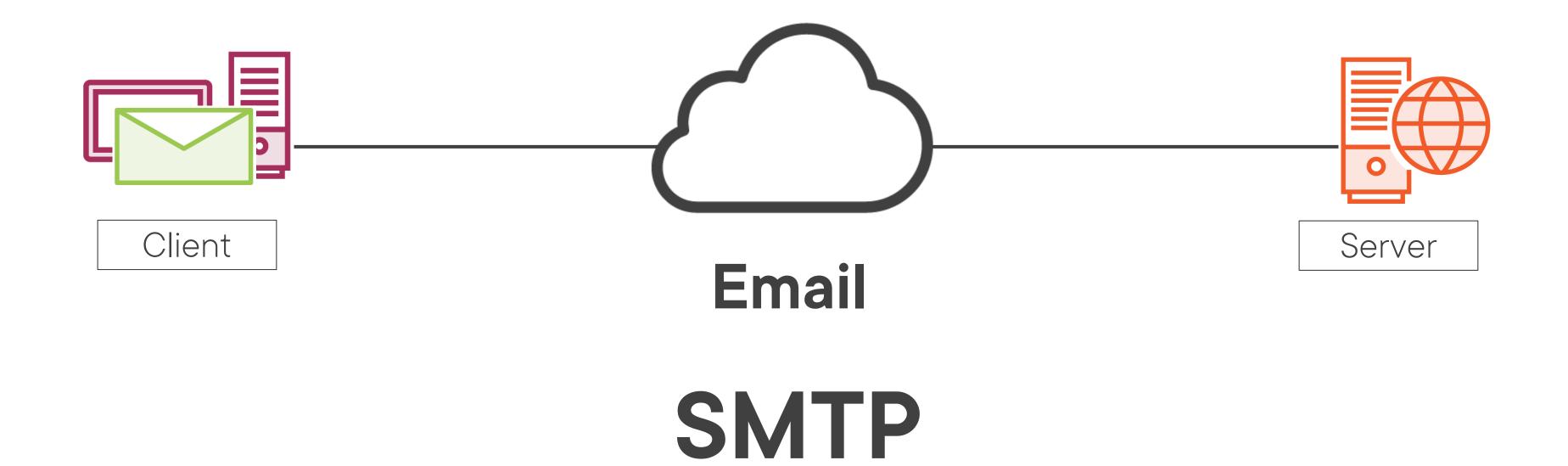
Email

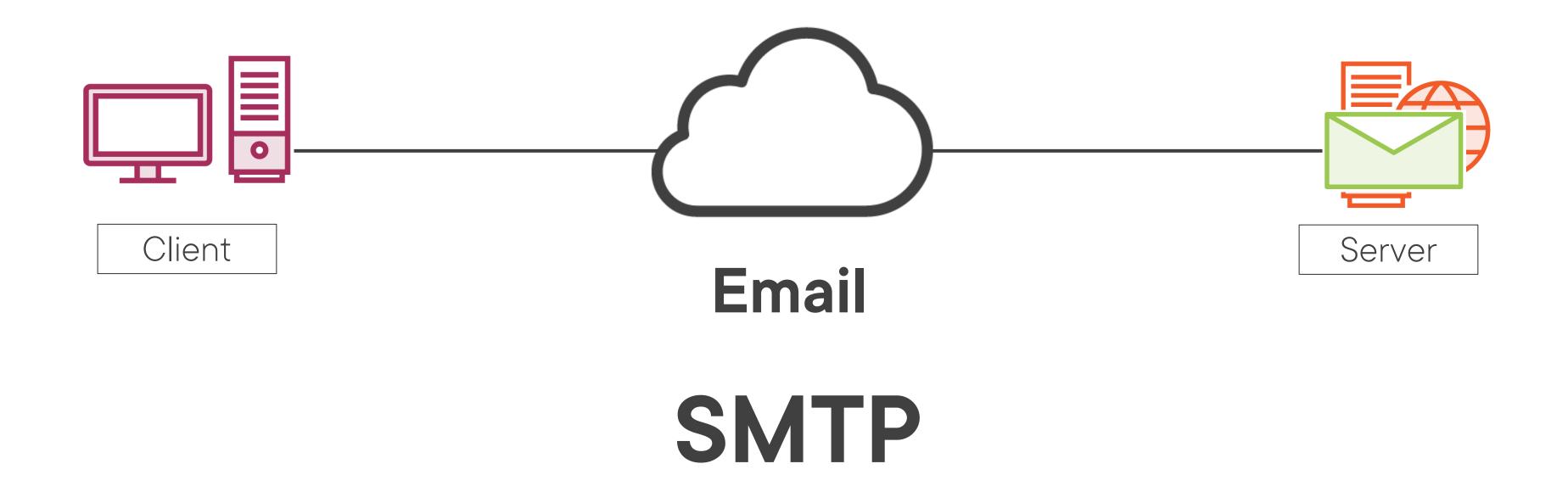
POP3 IMAP SMTP

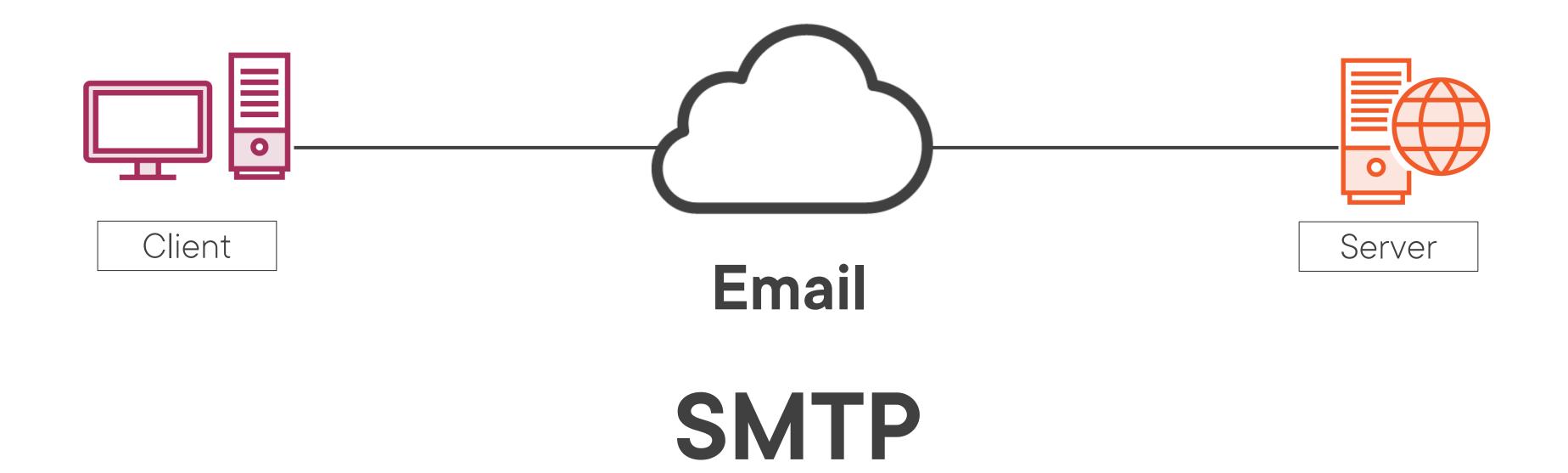


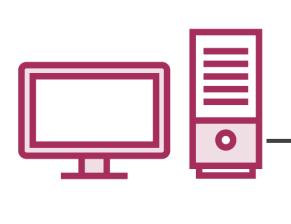












Client





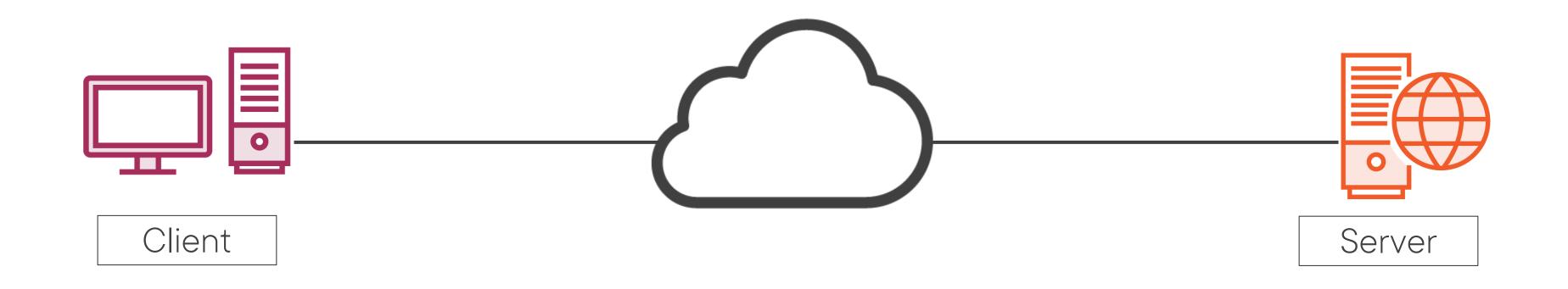
Email

POP3
10/995

IMAP 143/993

SMTP 25/465







LDAP

LDAPs





LDAP

LDAPs

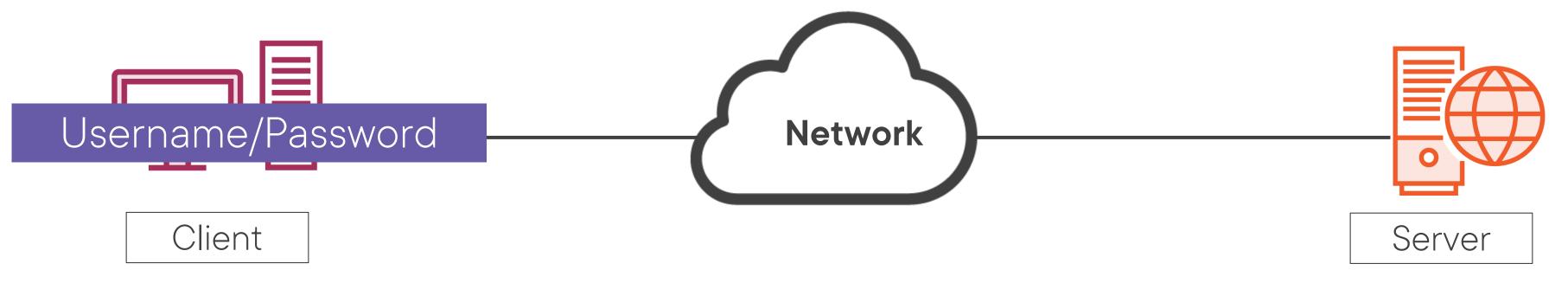




LDAP

LDAPs





LDAP

LDAPs





LDAP

LDAPs





Authentication

LDAP

LDAPs

Lightweight Directory Access Protocol





Authentication

LDAP

LDAPs

Lightweight Directory Access Protocol





Authentication

LDAP

LDAPs

389

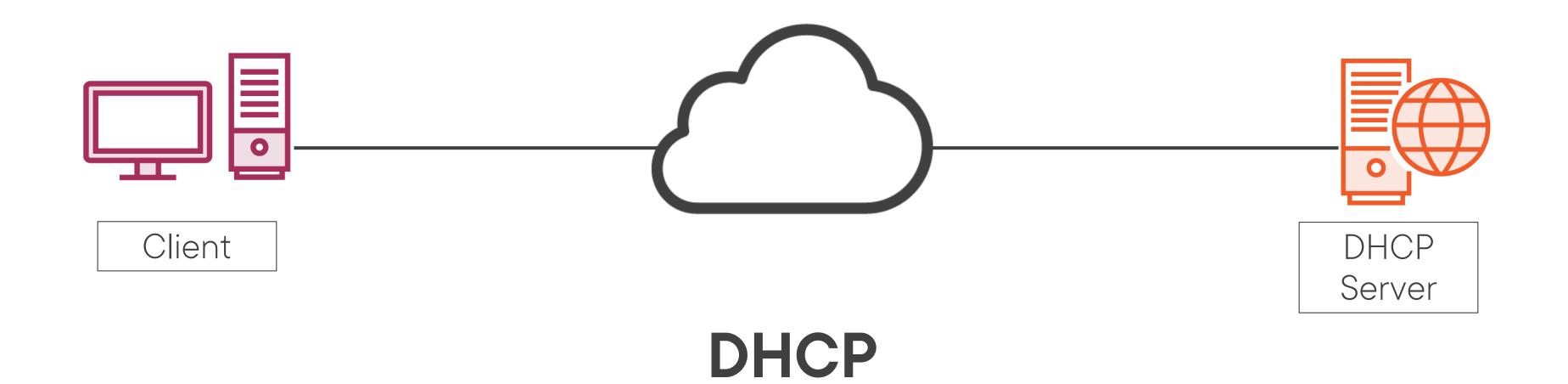
636



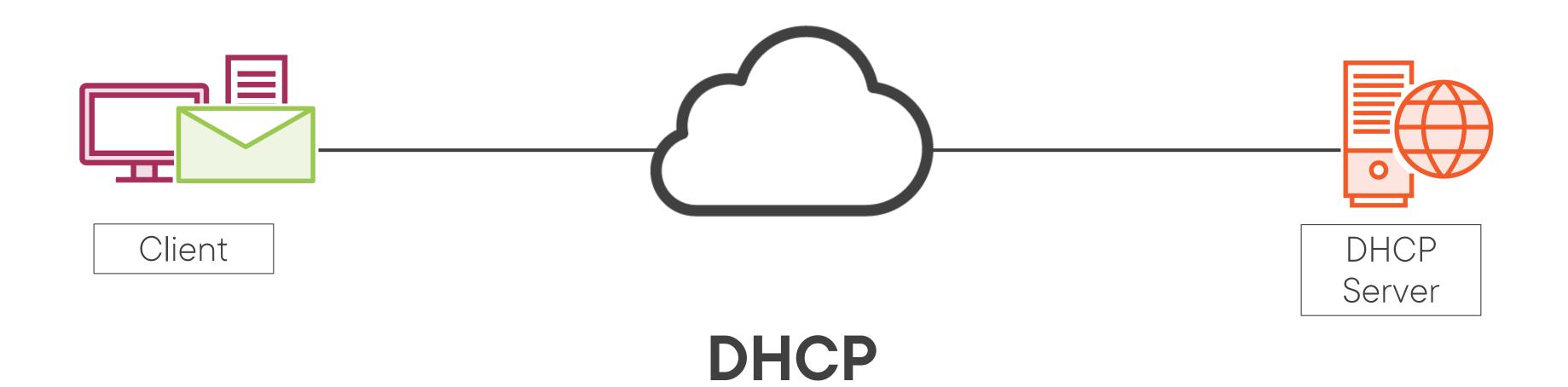
Network Services



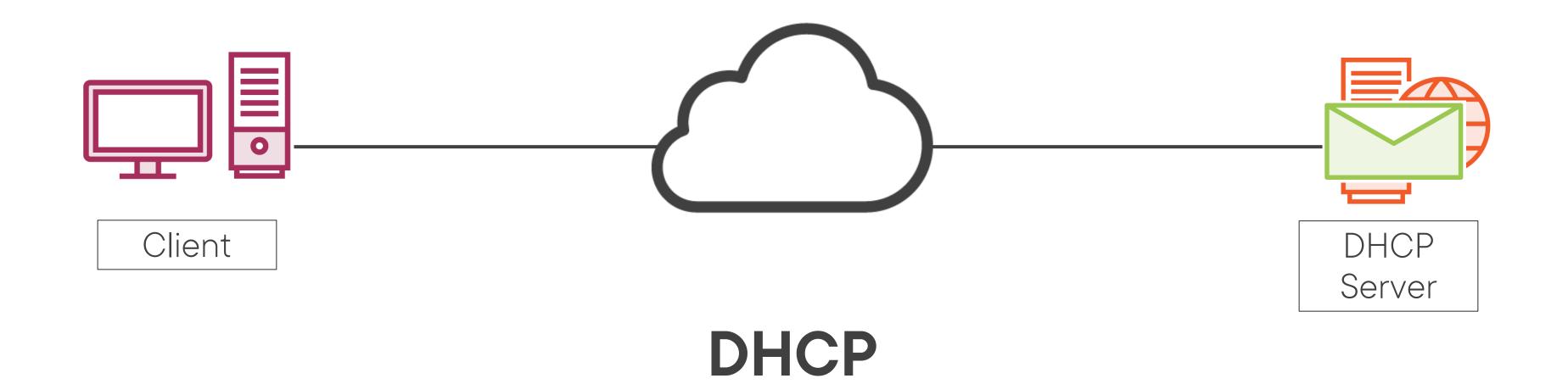
Dynamic Host Configuration Protocol



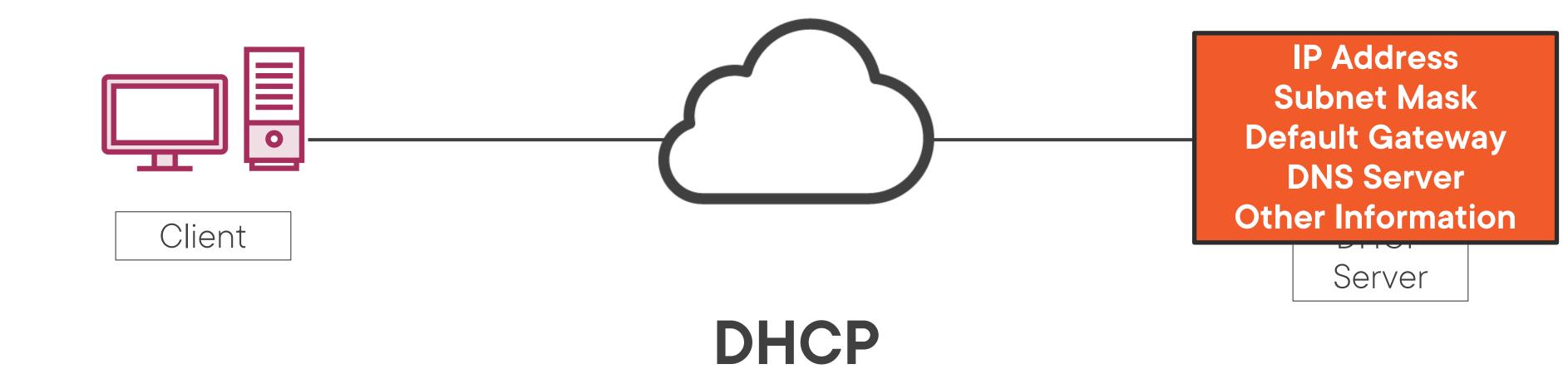








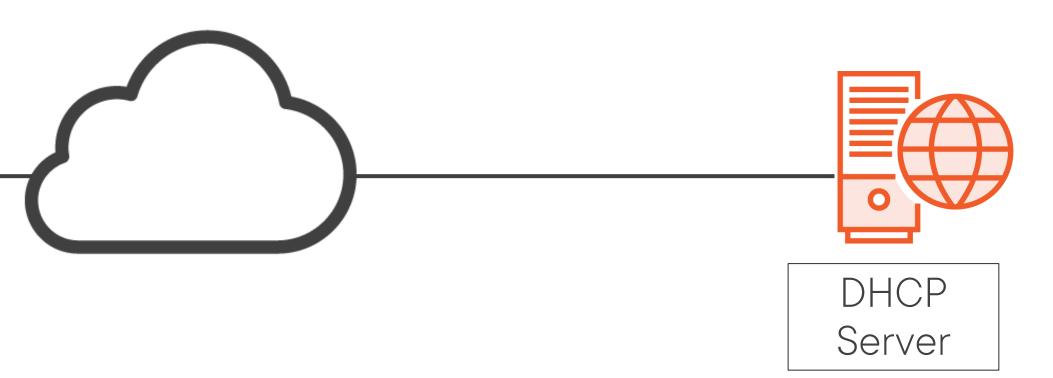






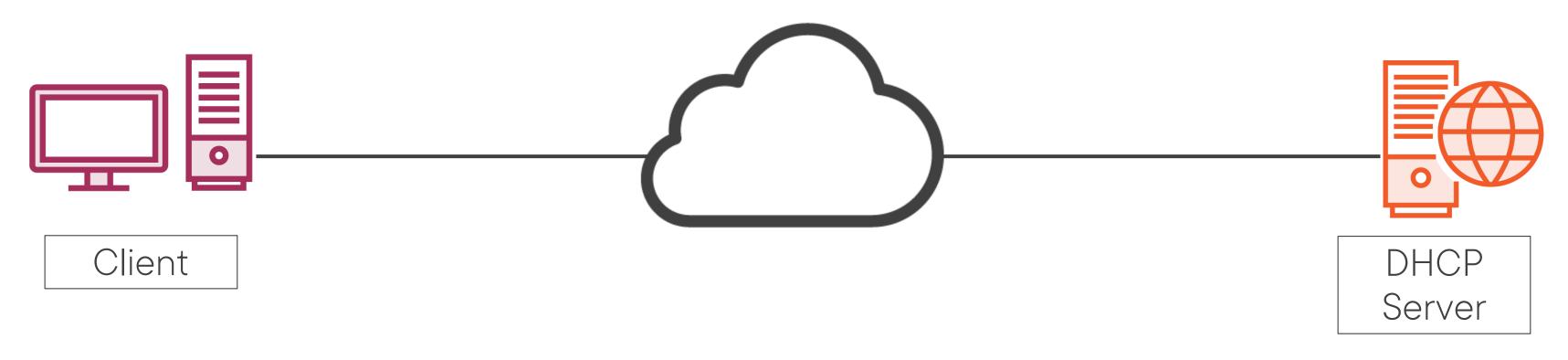
IP Address
Subnet Mask
Default Gateway
DNS Server
Other Information

Client



DHCP





DHCP 67/68



Demo

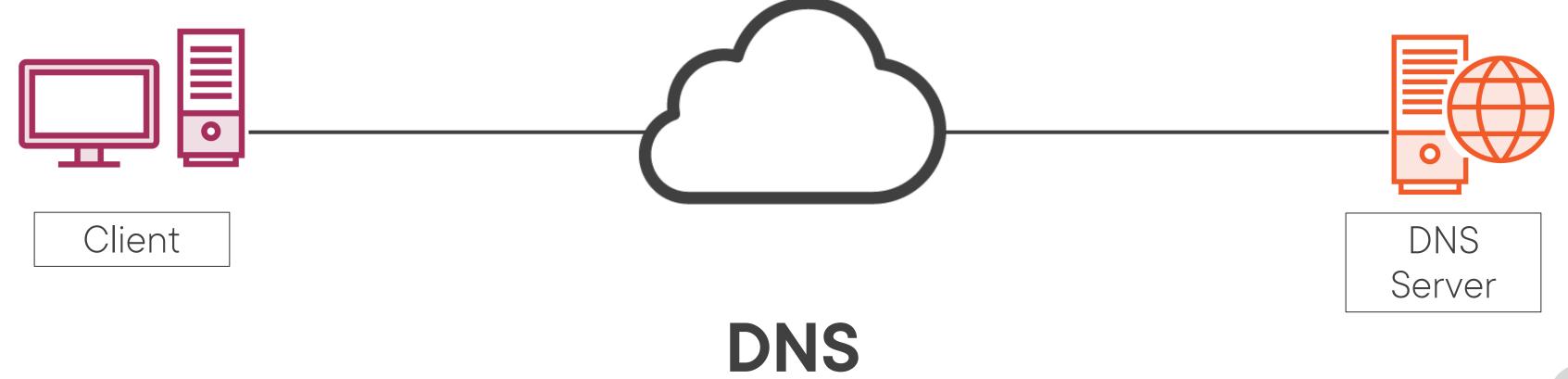


Examine IP configuration via DHCP

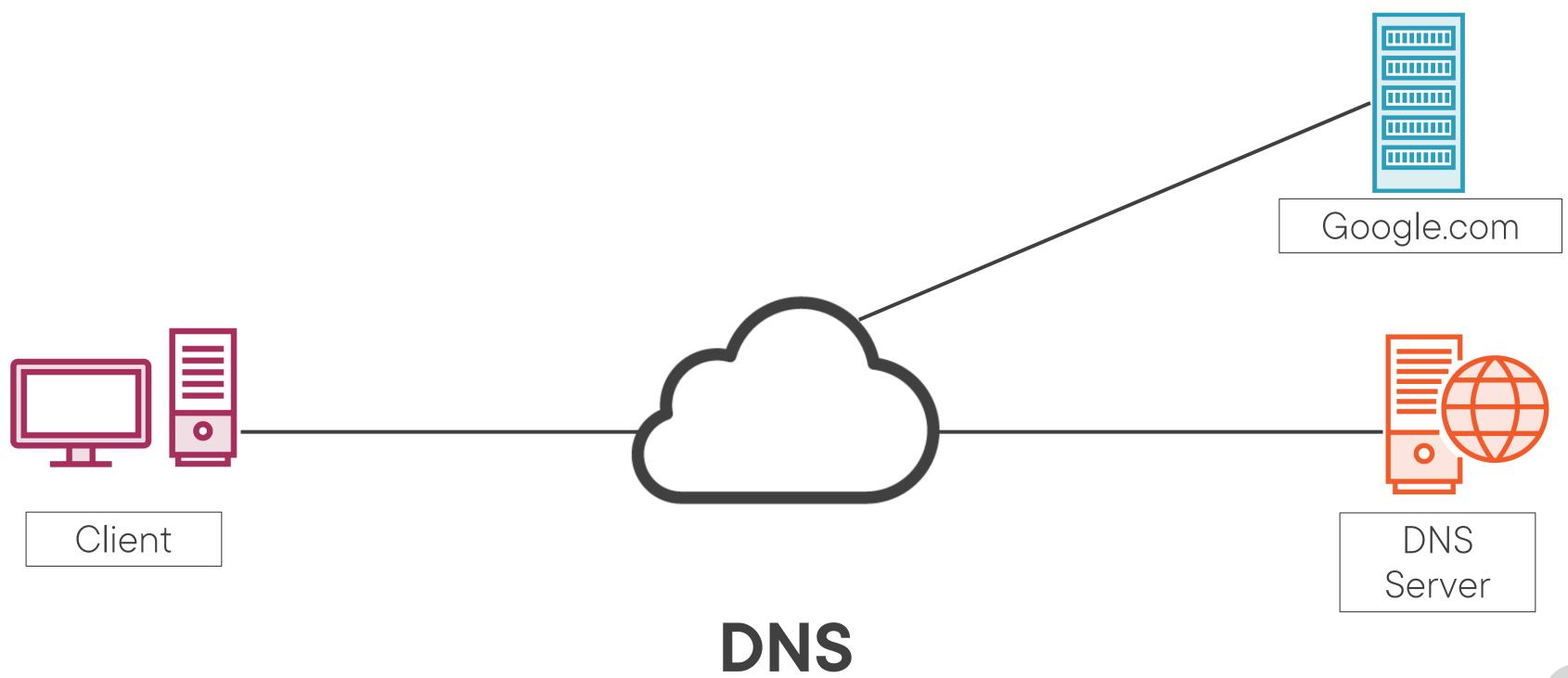




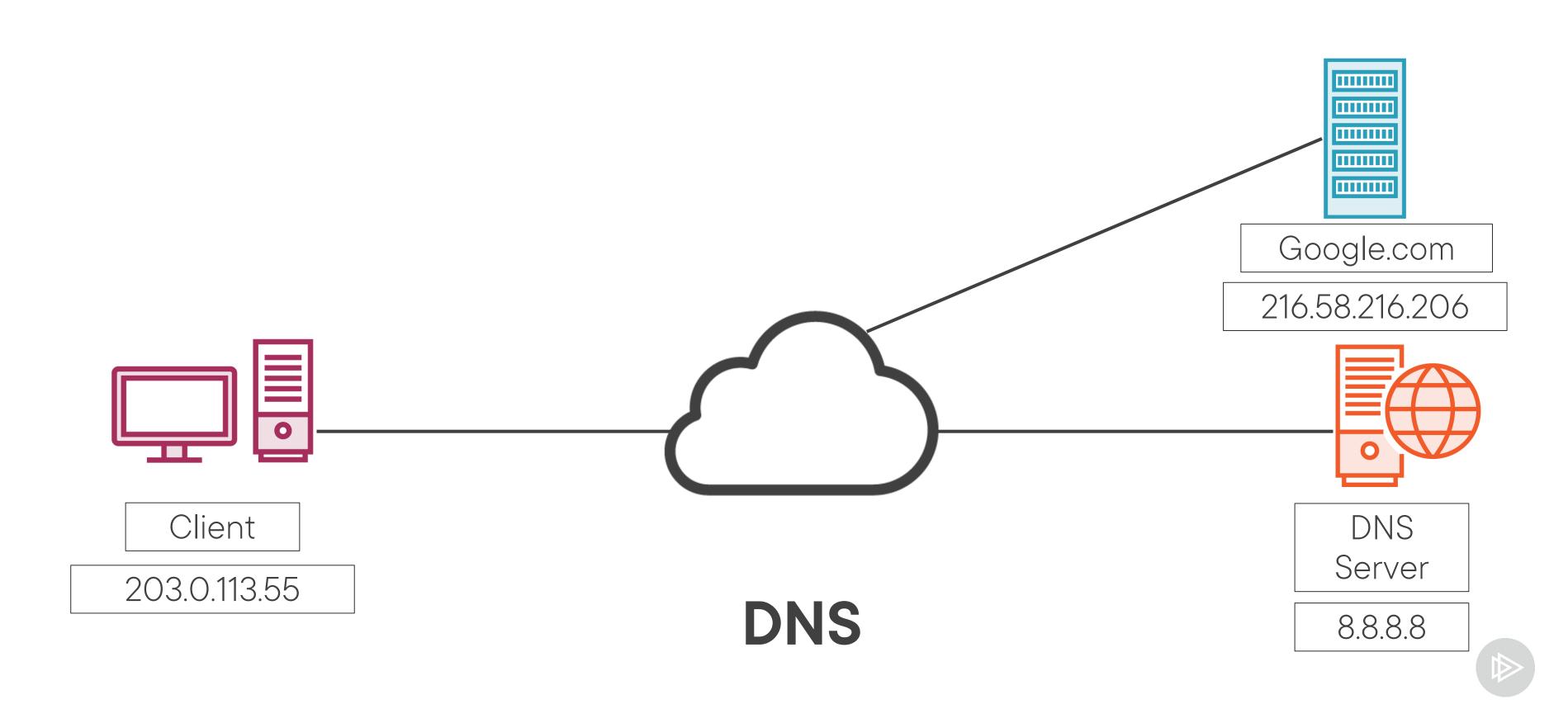
Domain Name System

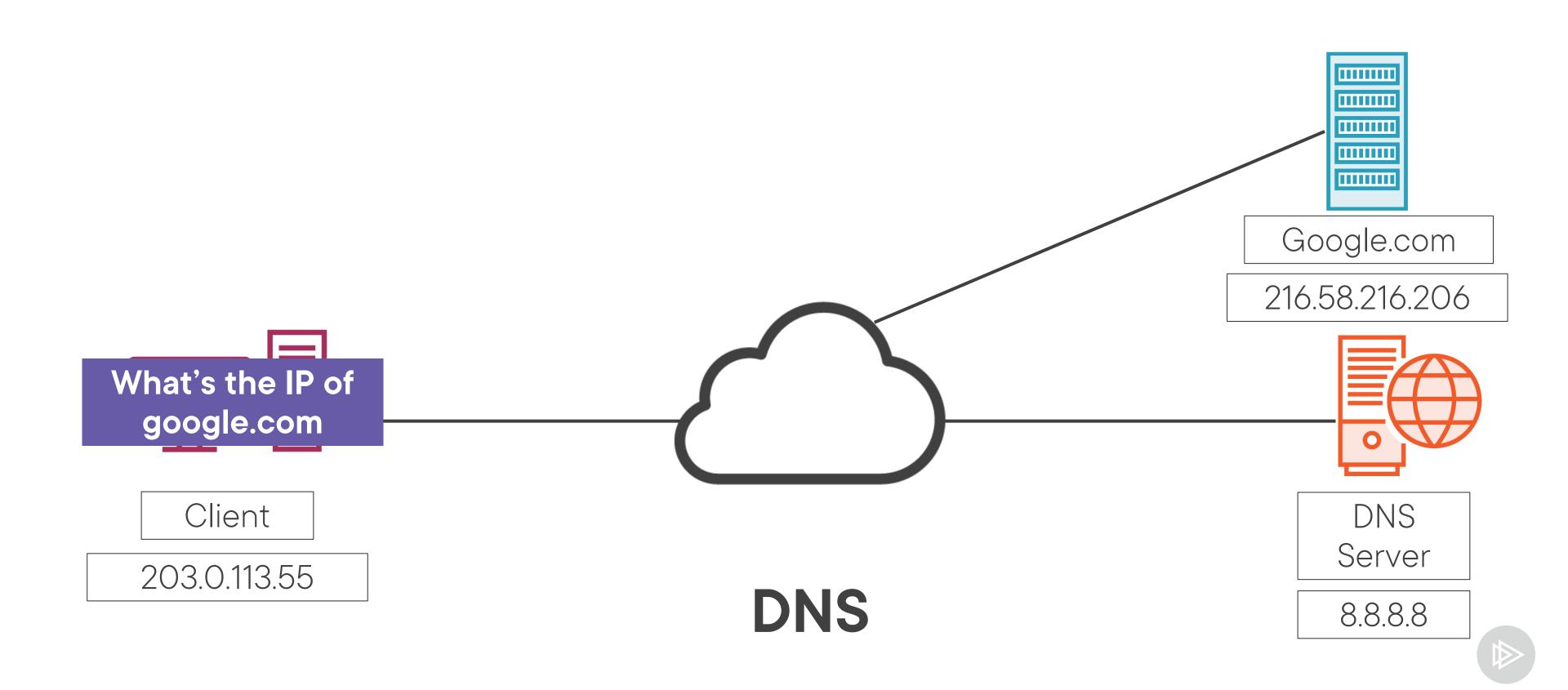


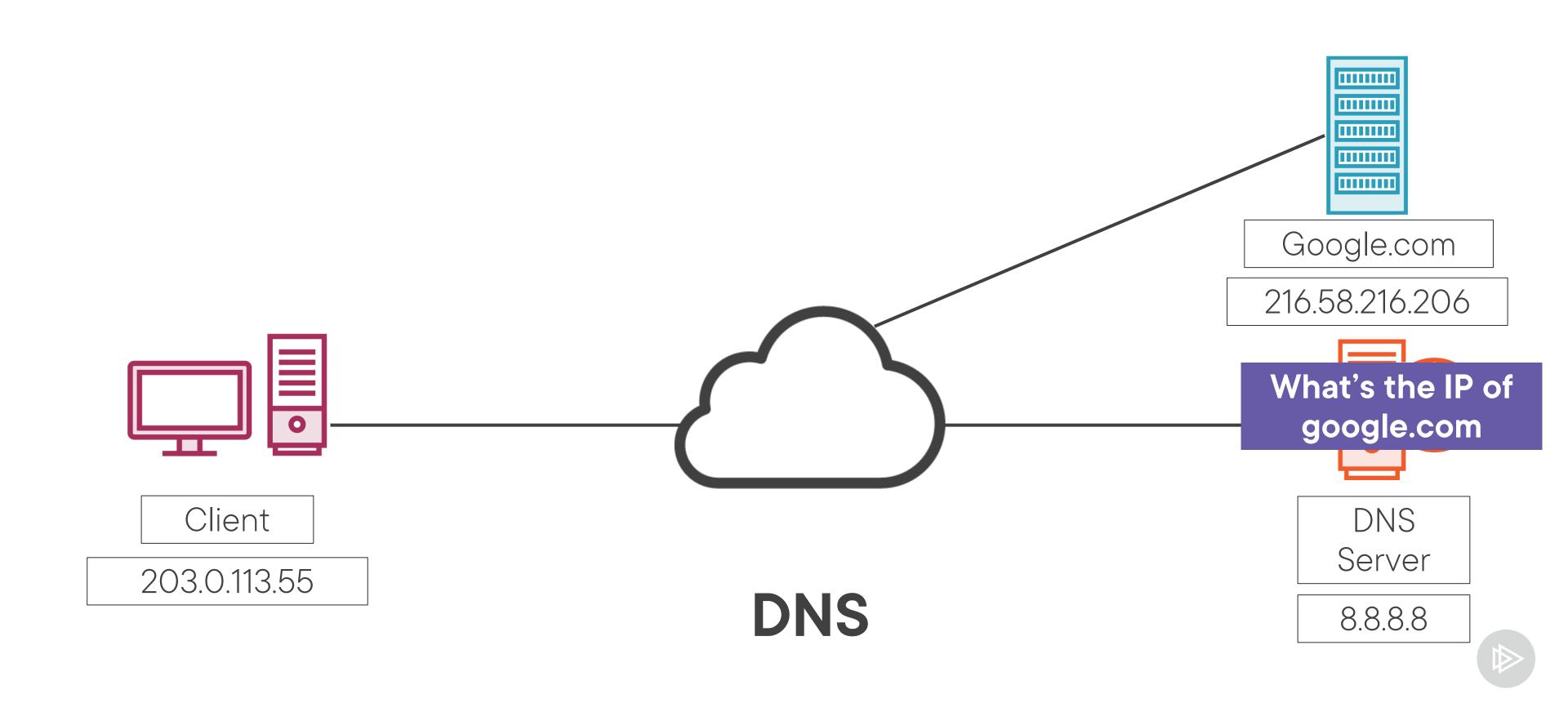


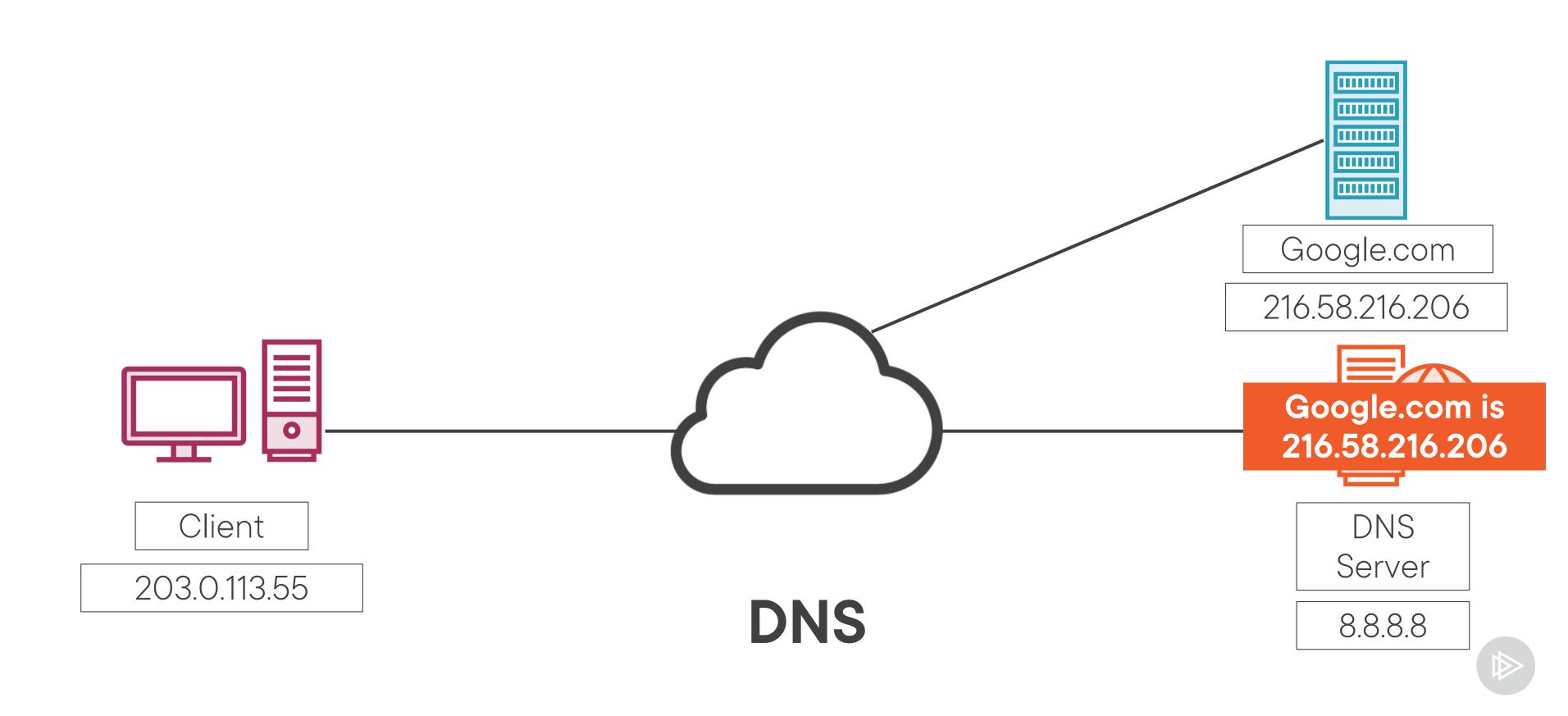


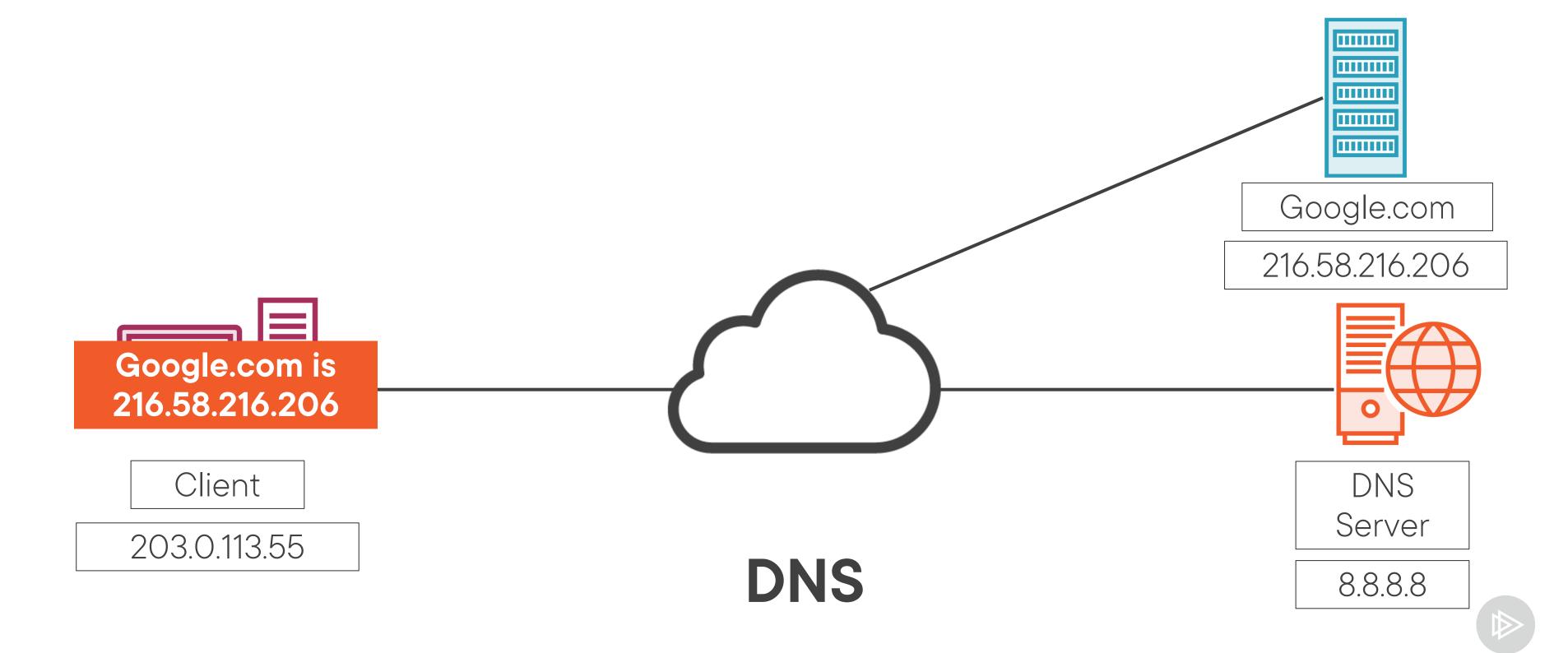


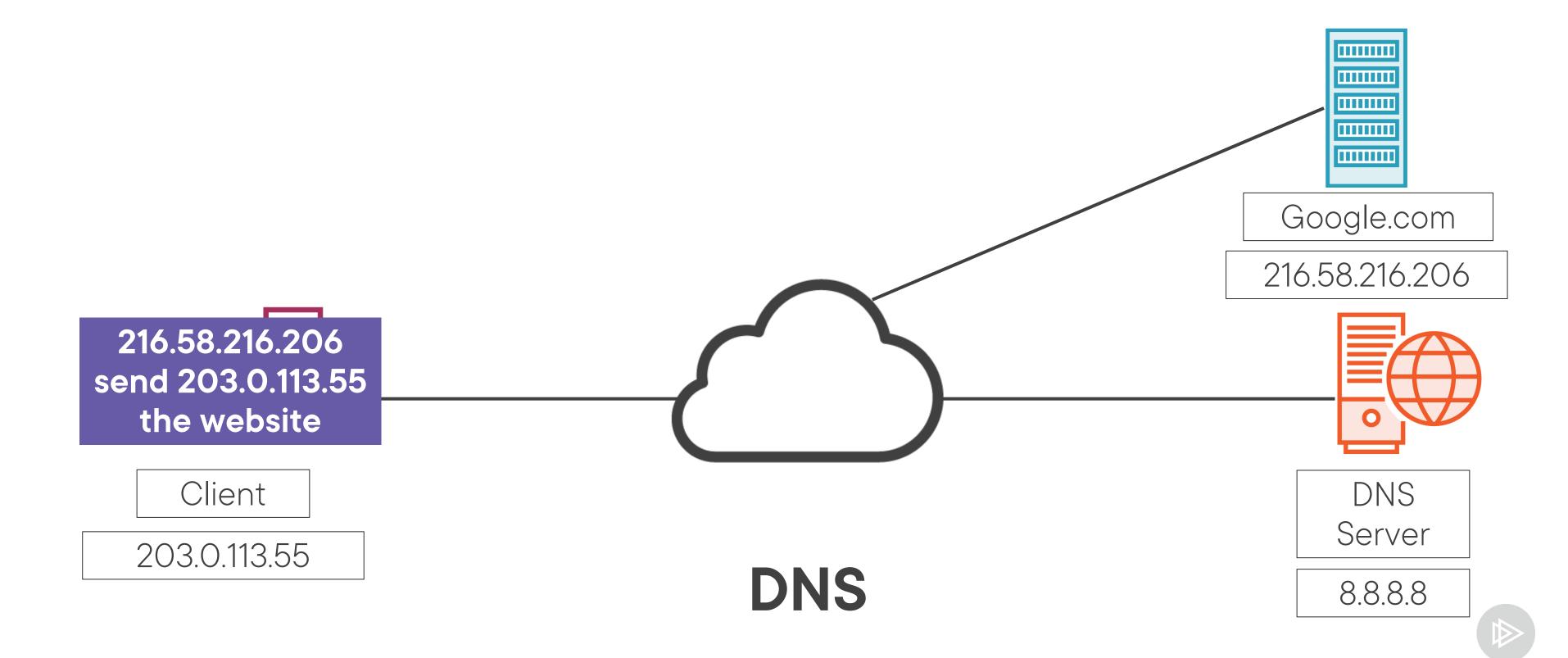


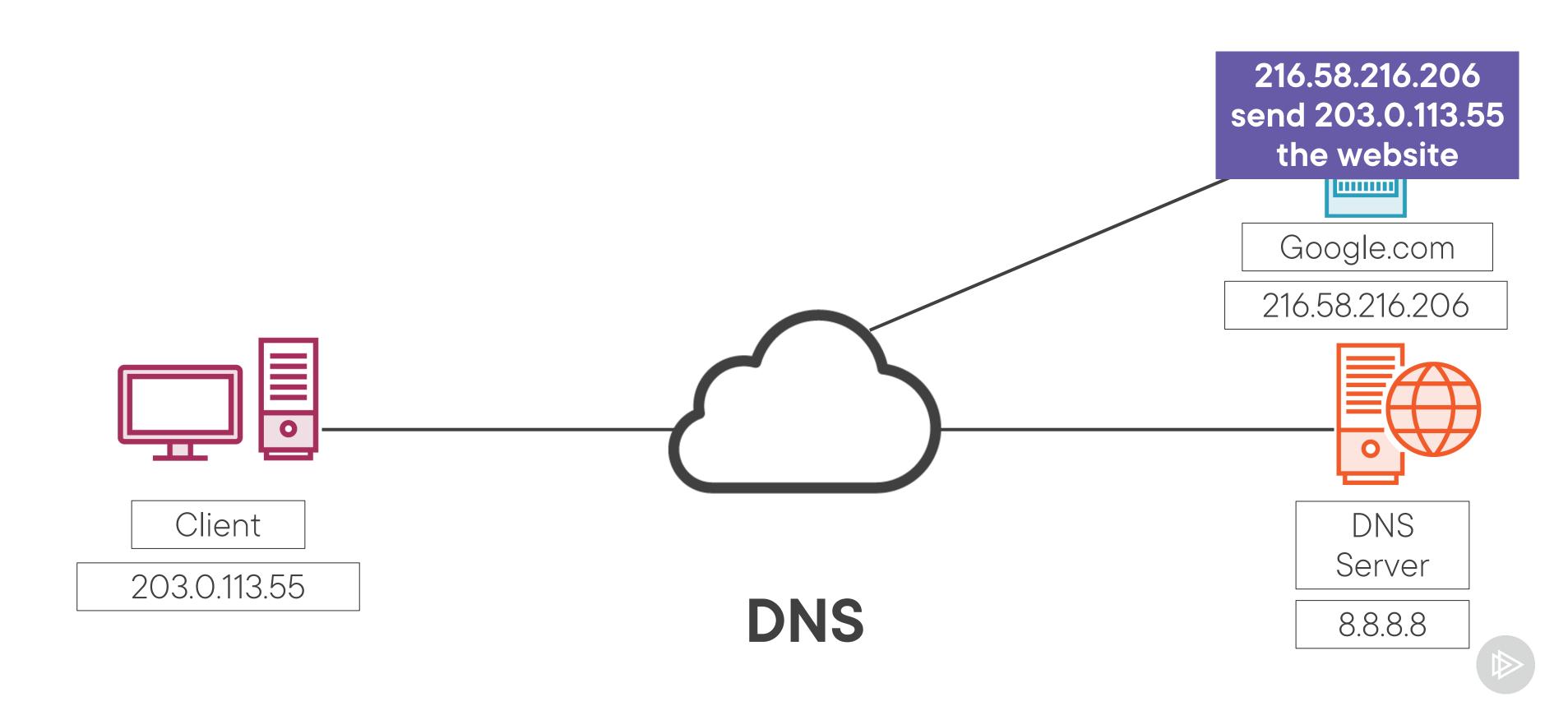


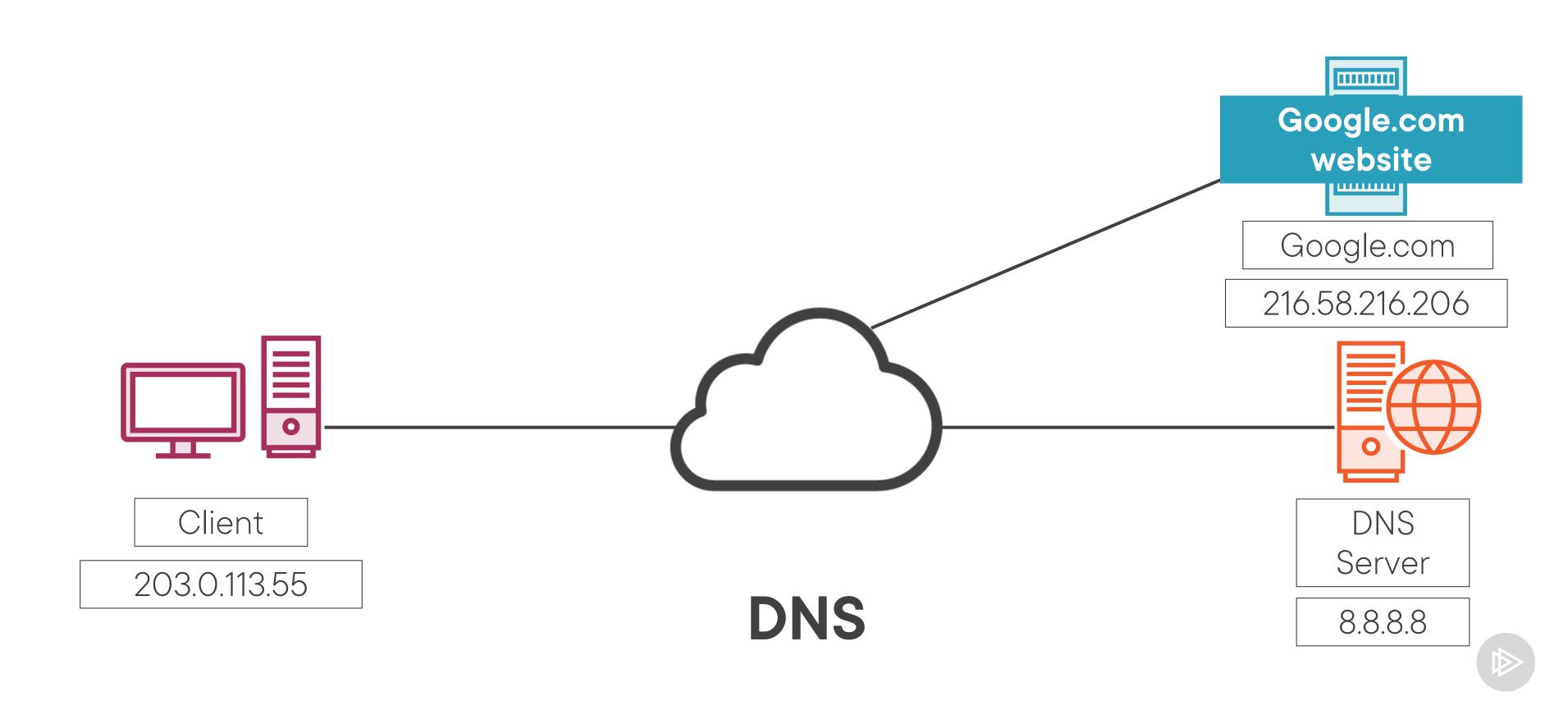


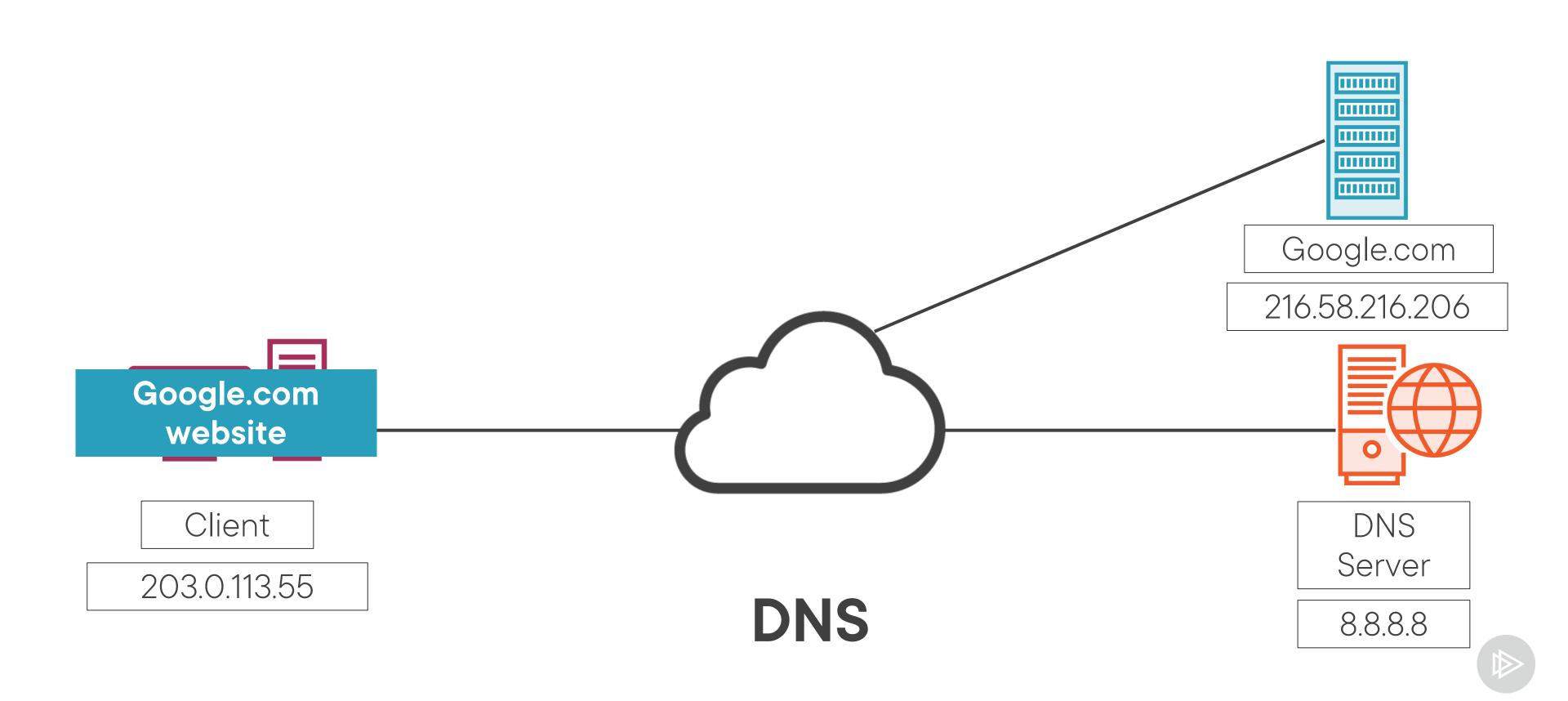


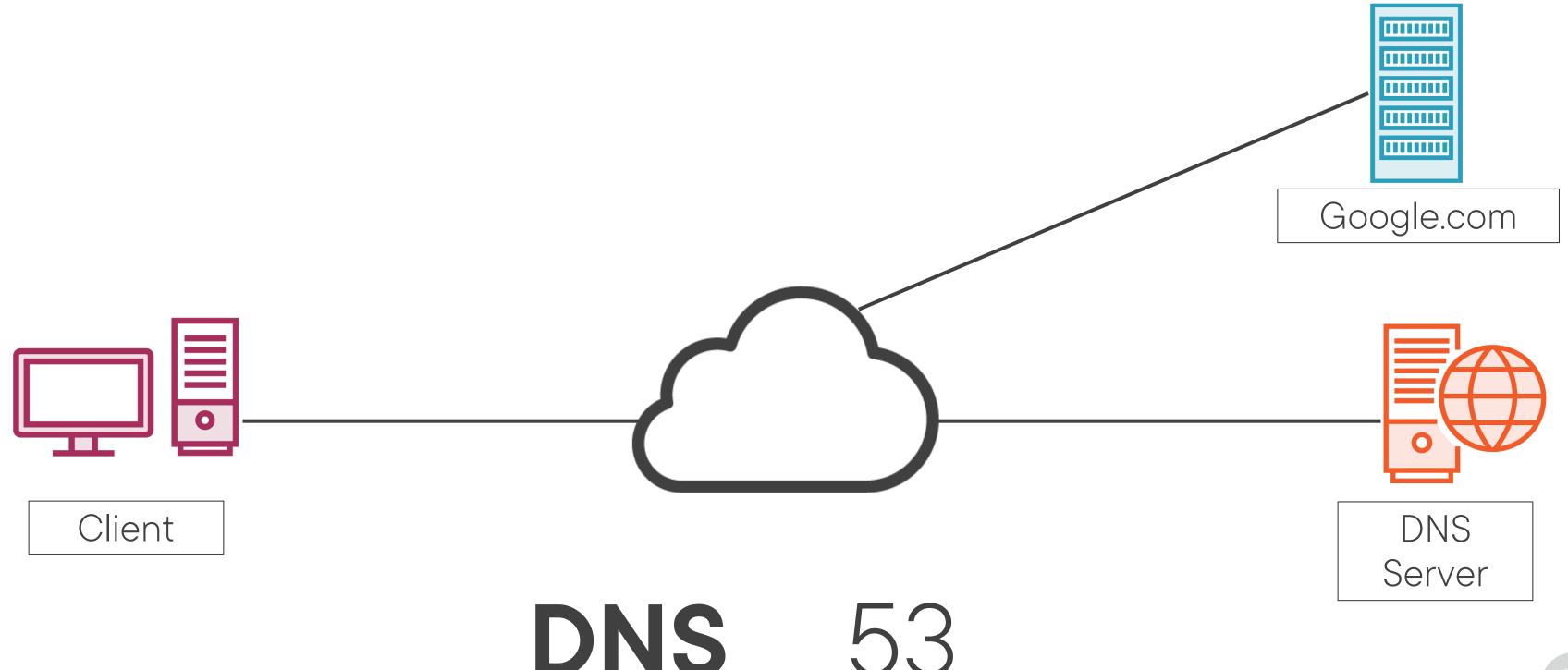












DNS 53



Demo

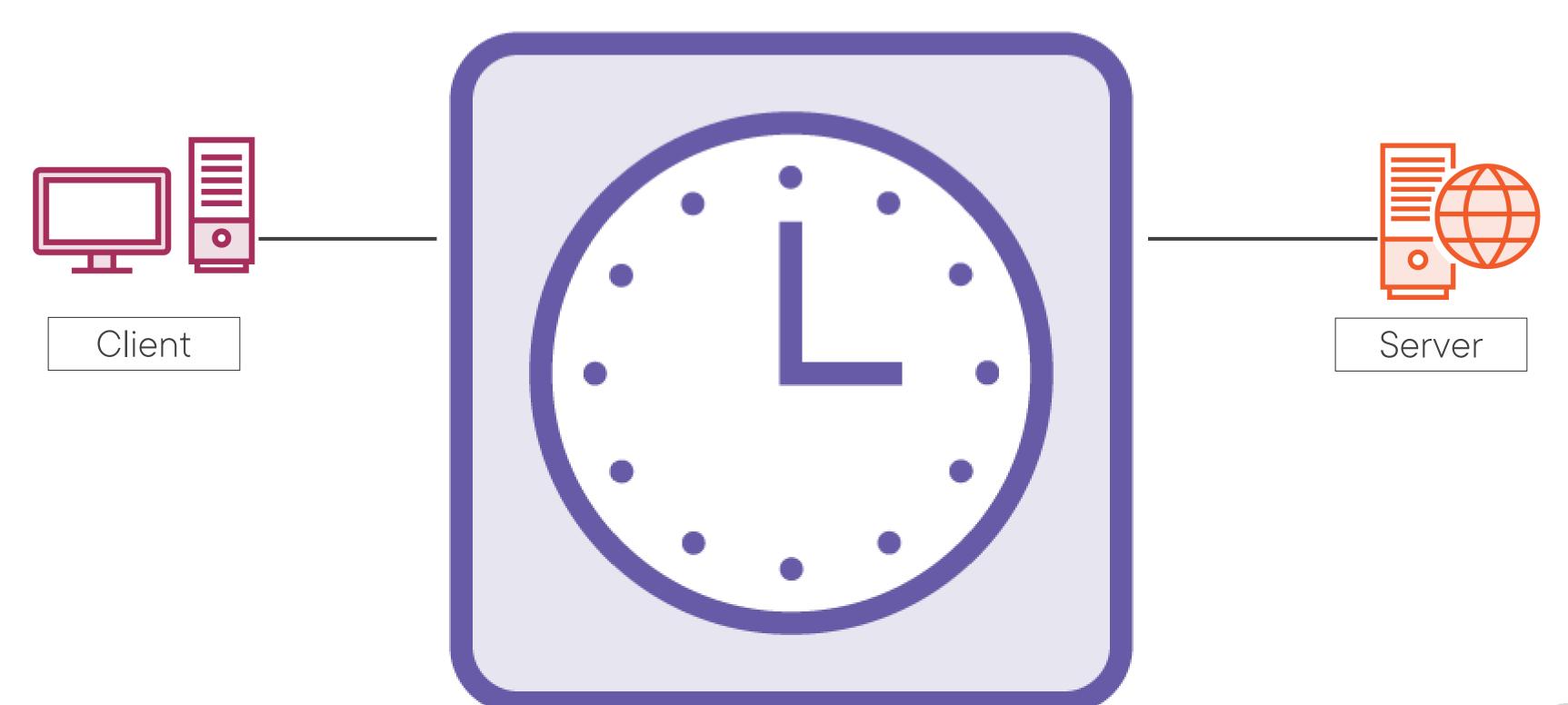


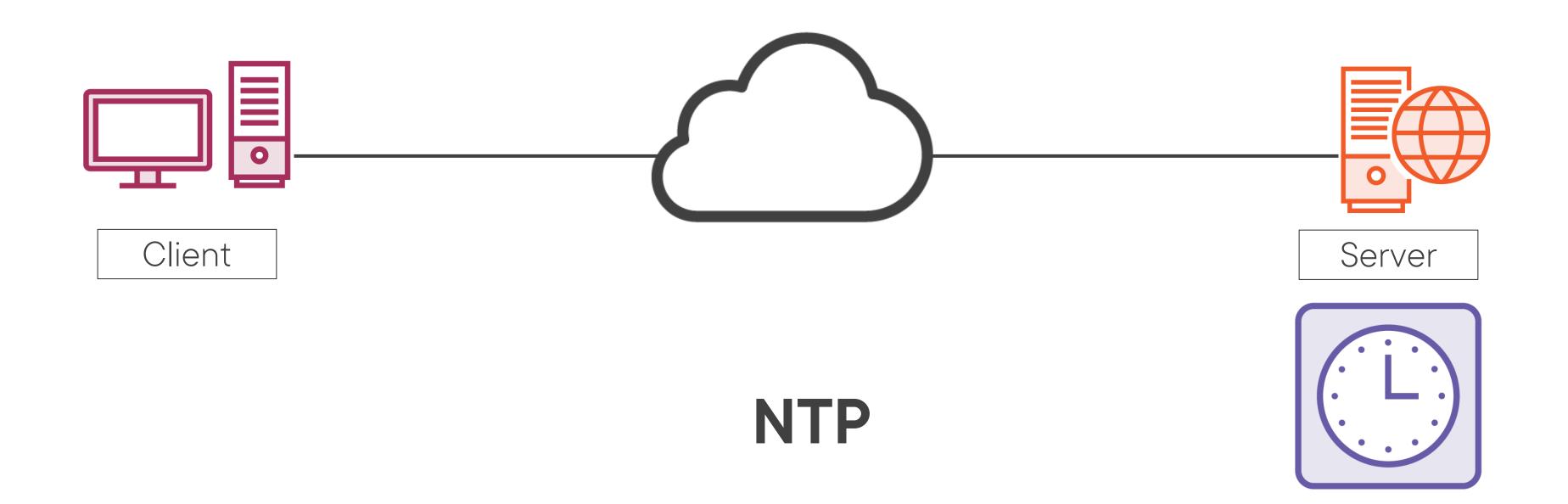
Examine DNS with NSlookup





Network Time Protocol







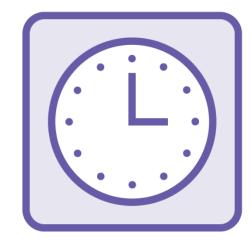
Client

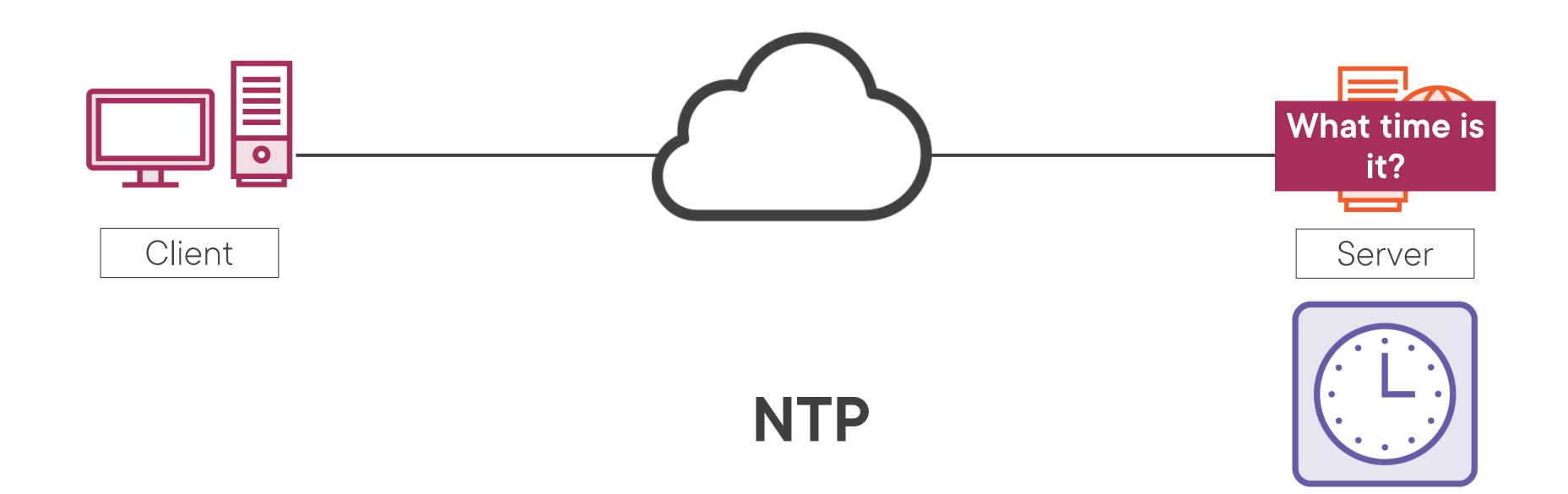


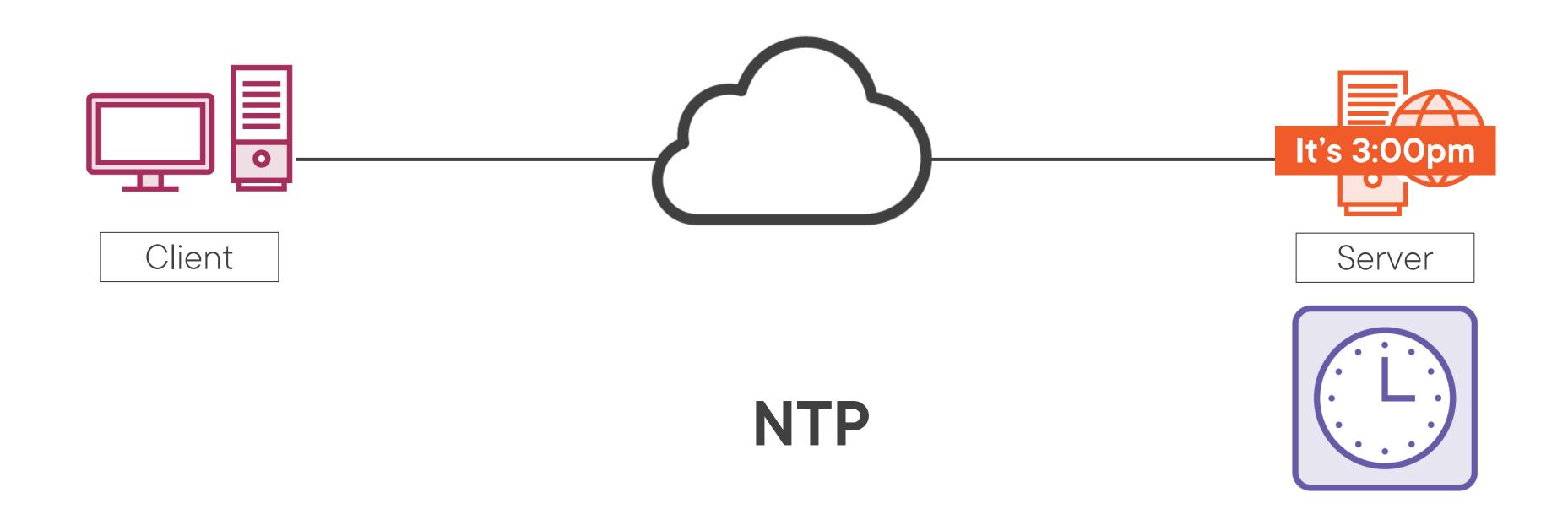


Server









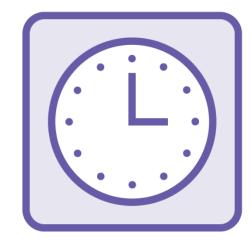




Server

Client

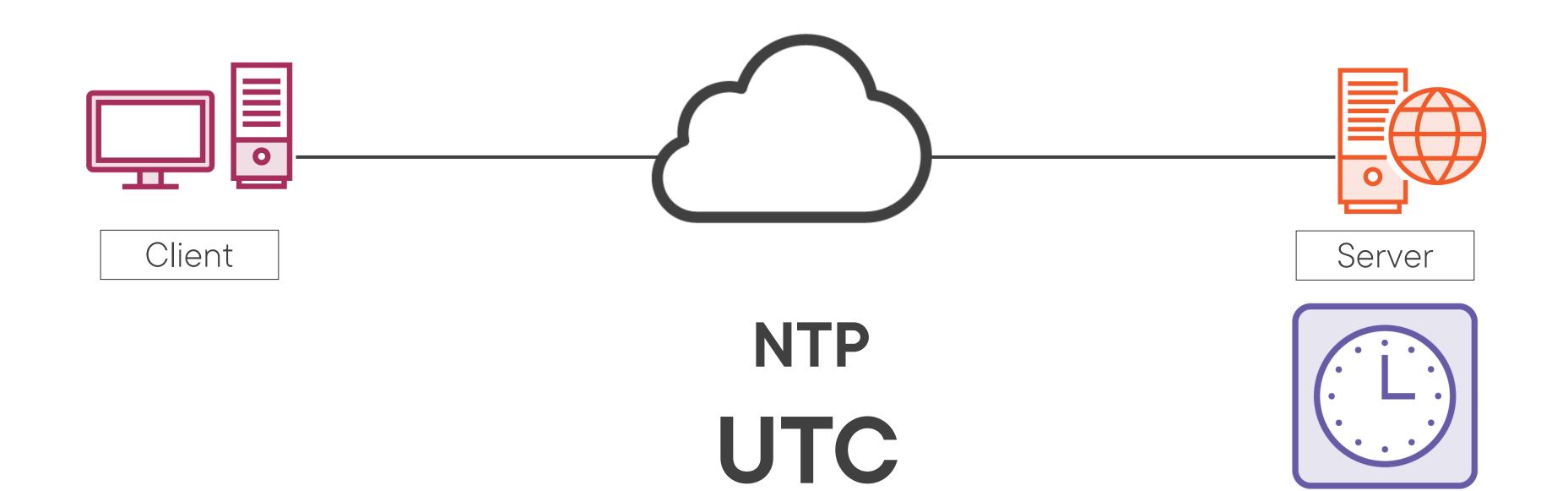
NTP

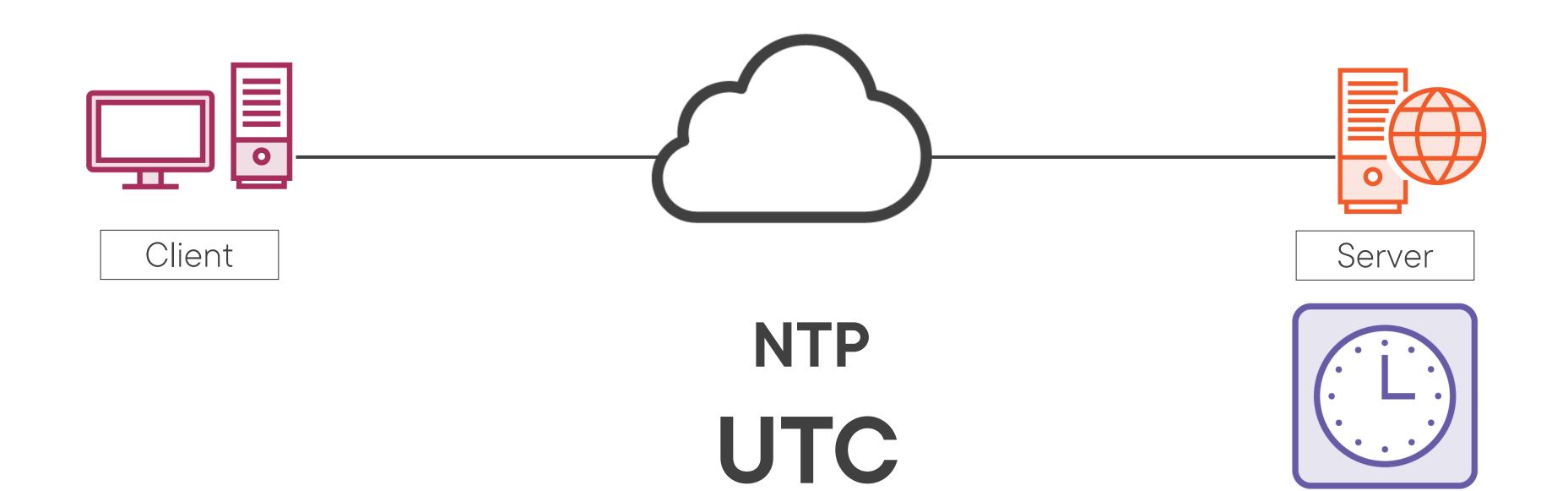




Coordinated Universal Time

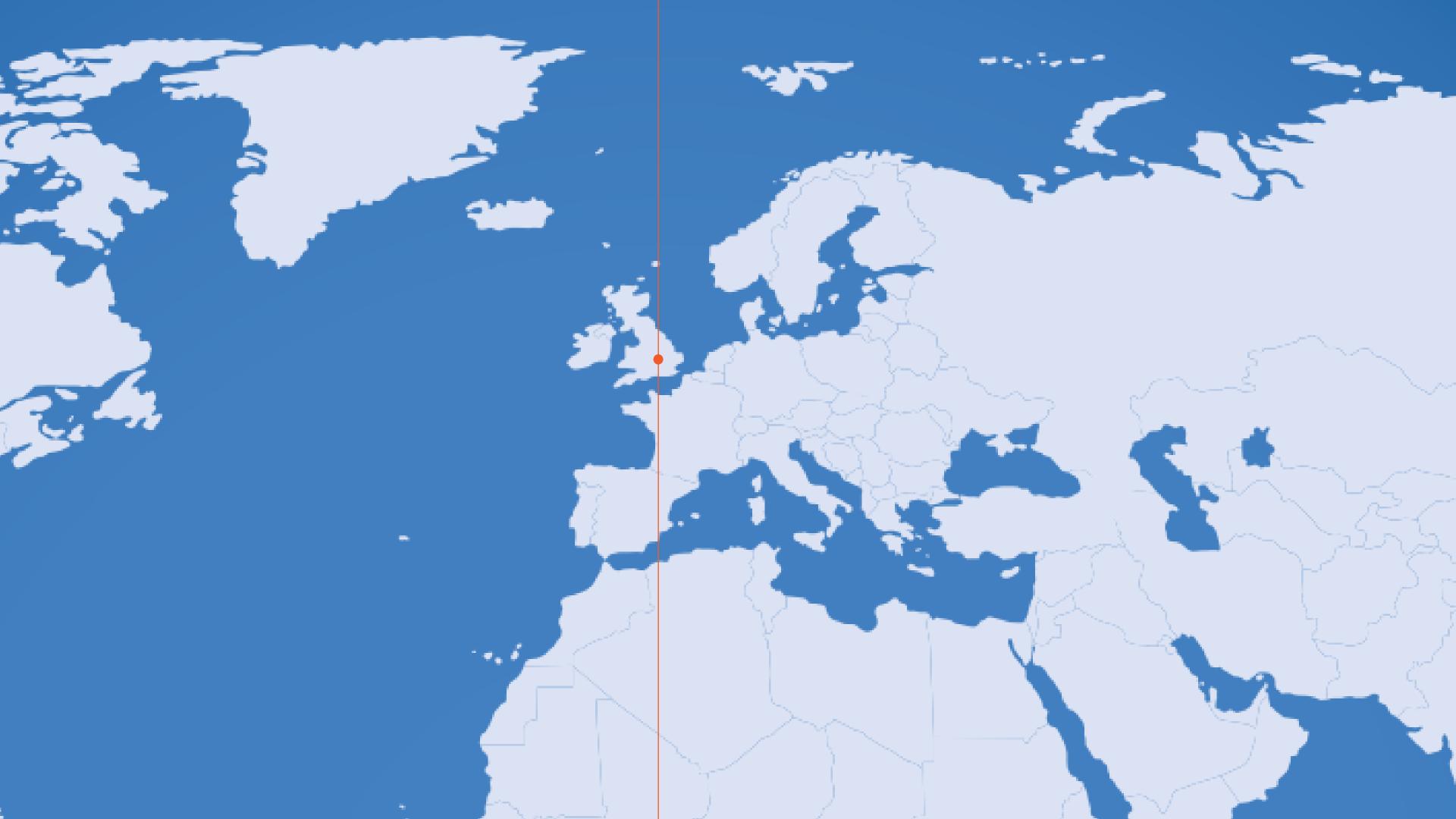










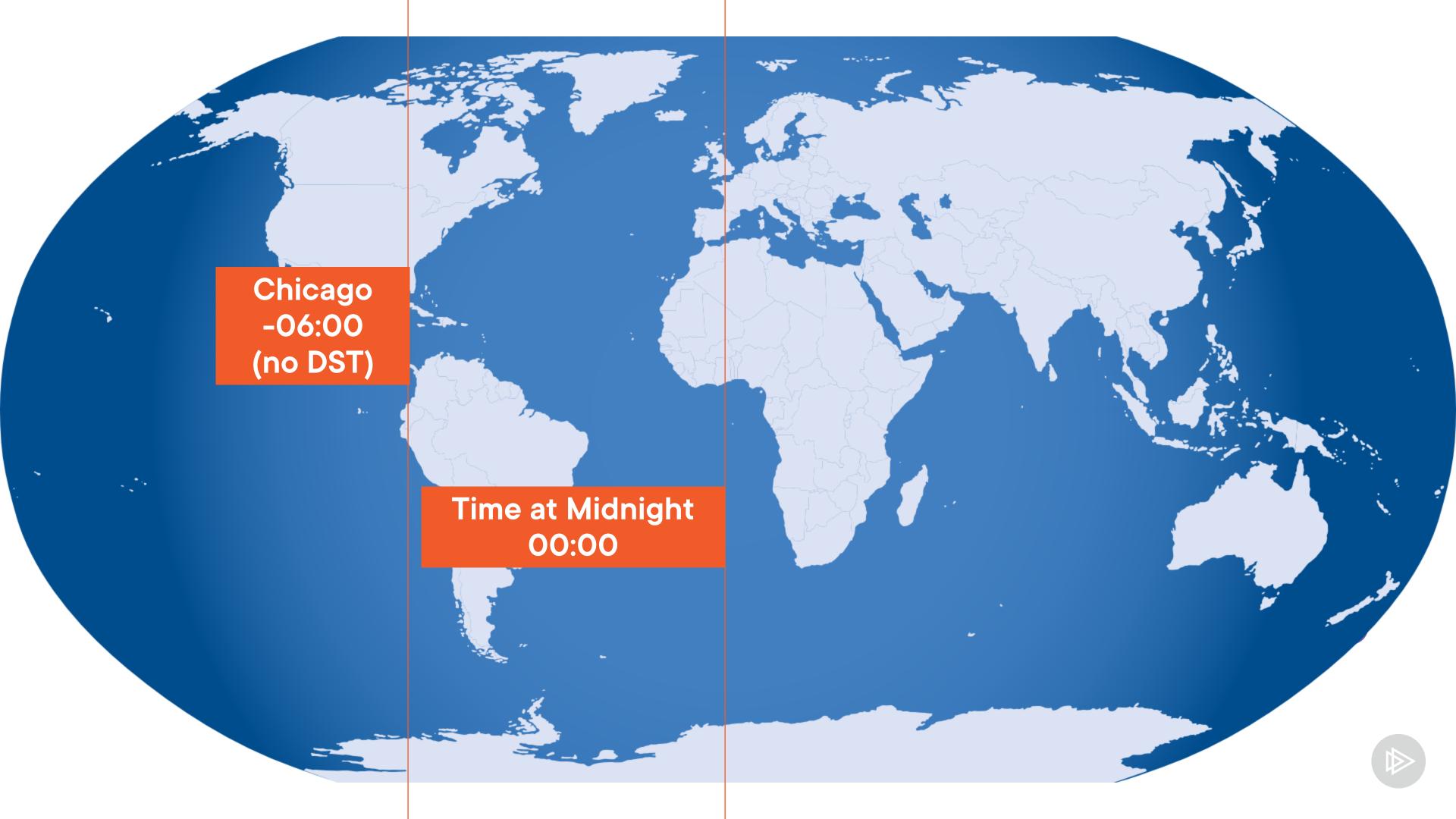






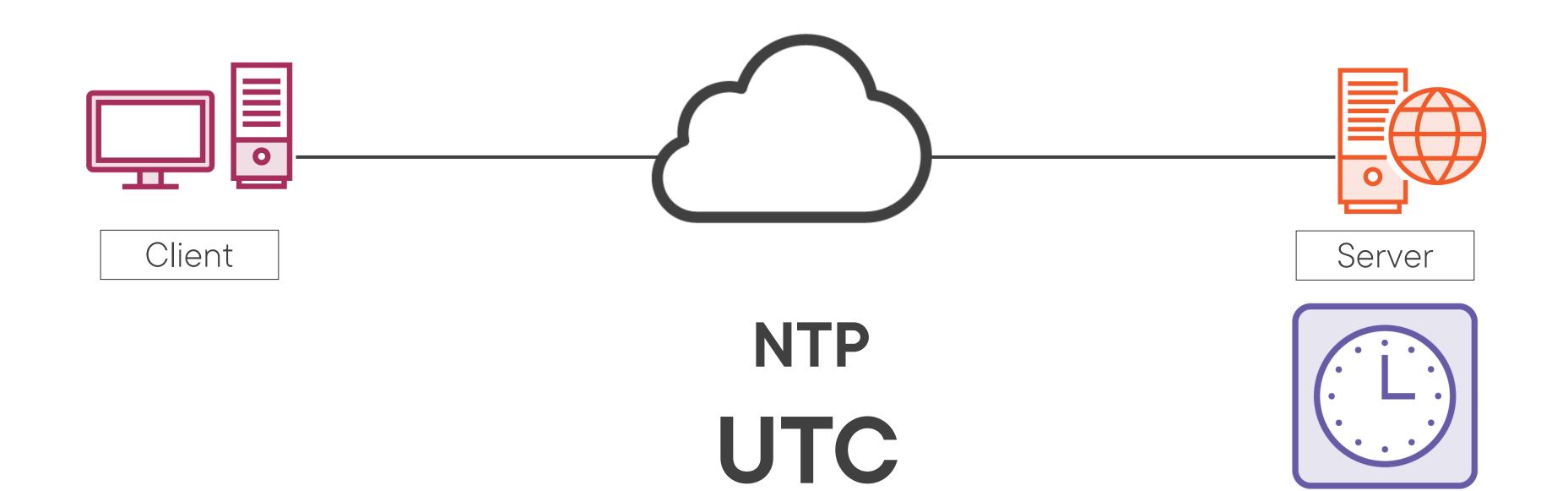


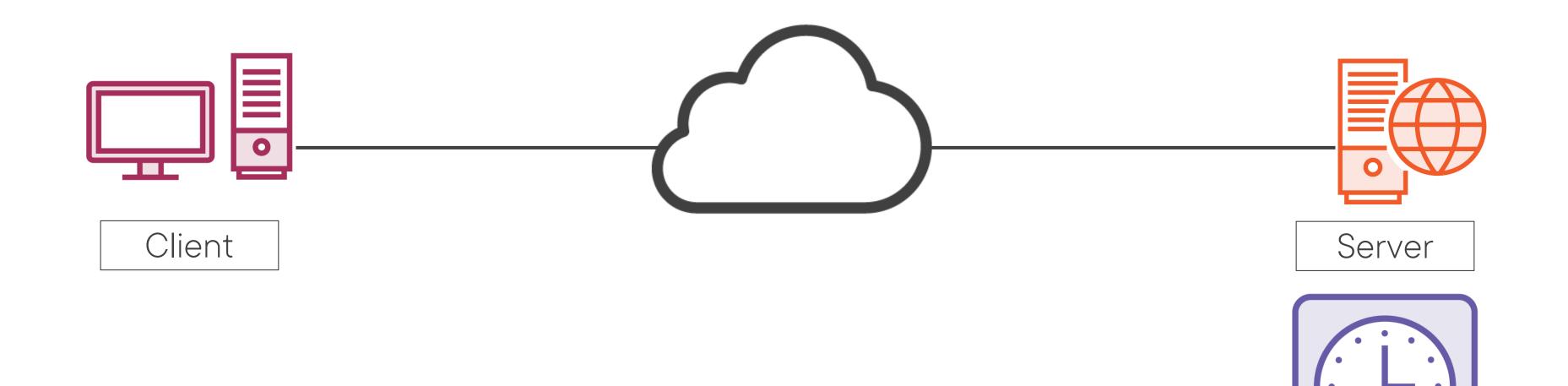












NTP

Network Management



Telnet Secure Shell









SSH encrypted





23

SSH

22

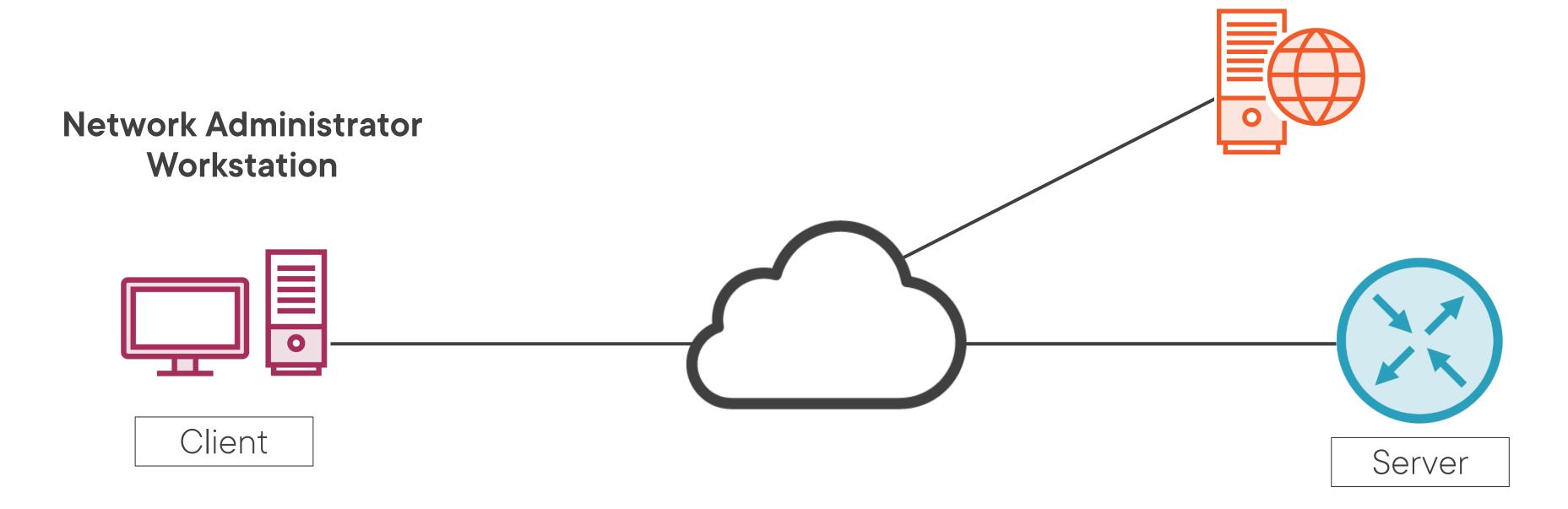


Network Administrator Workstation

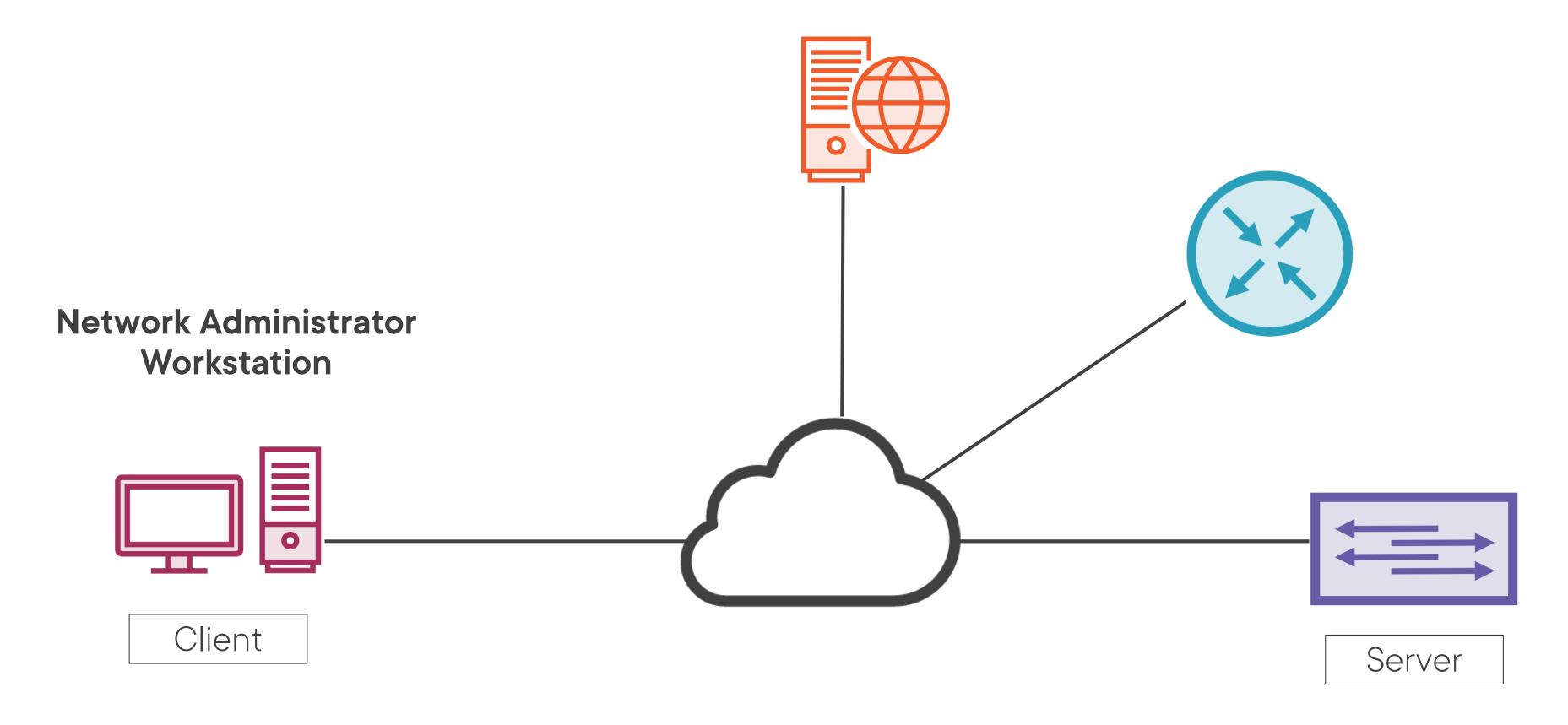


Telnet

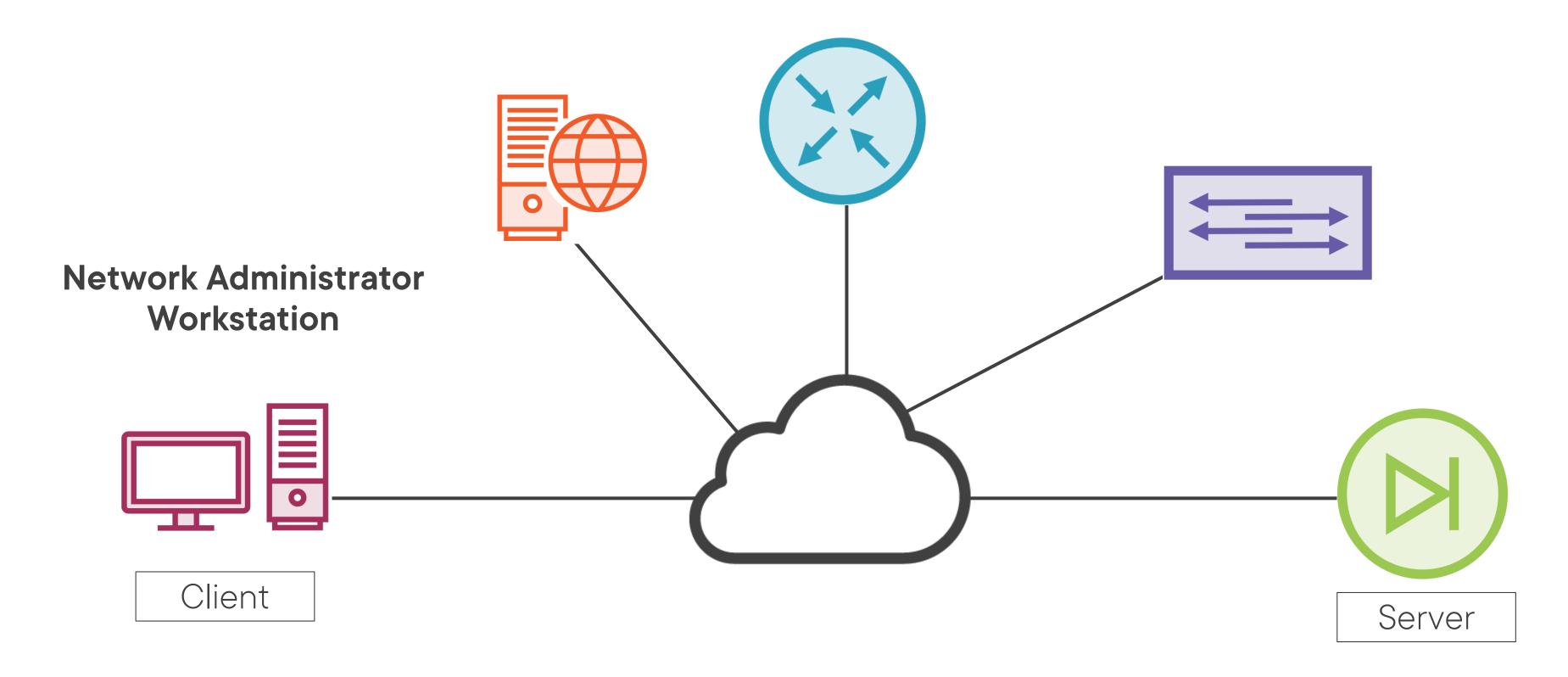




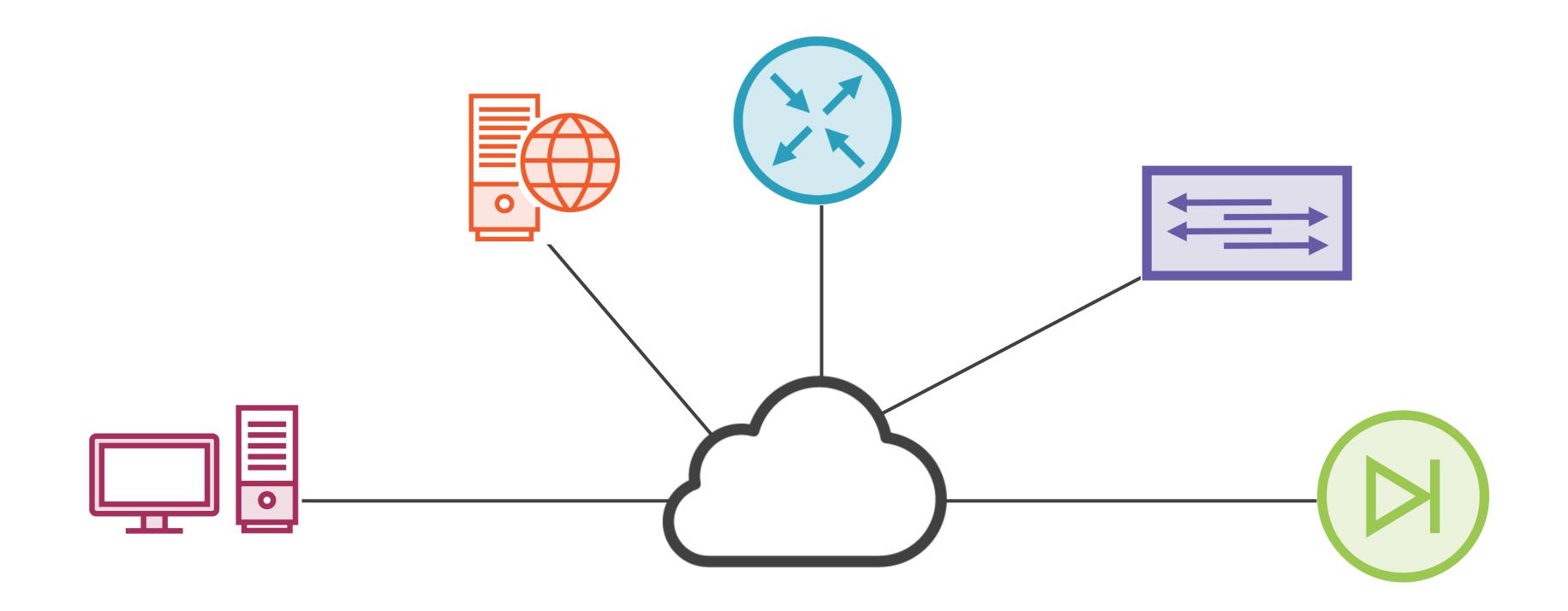






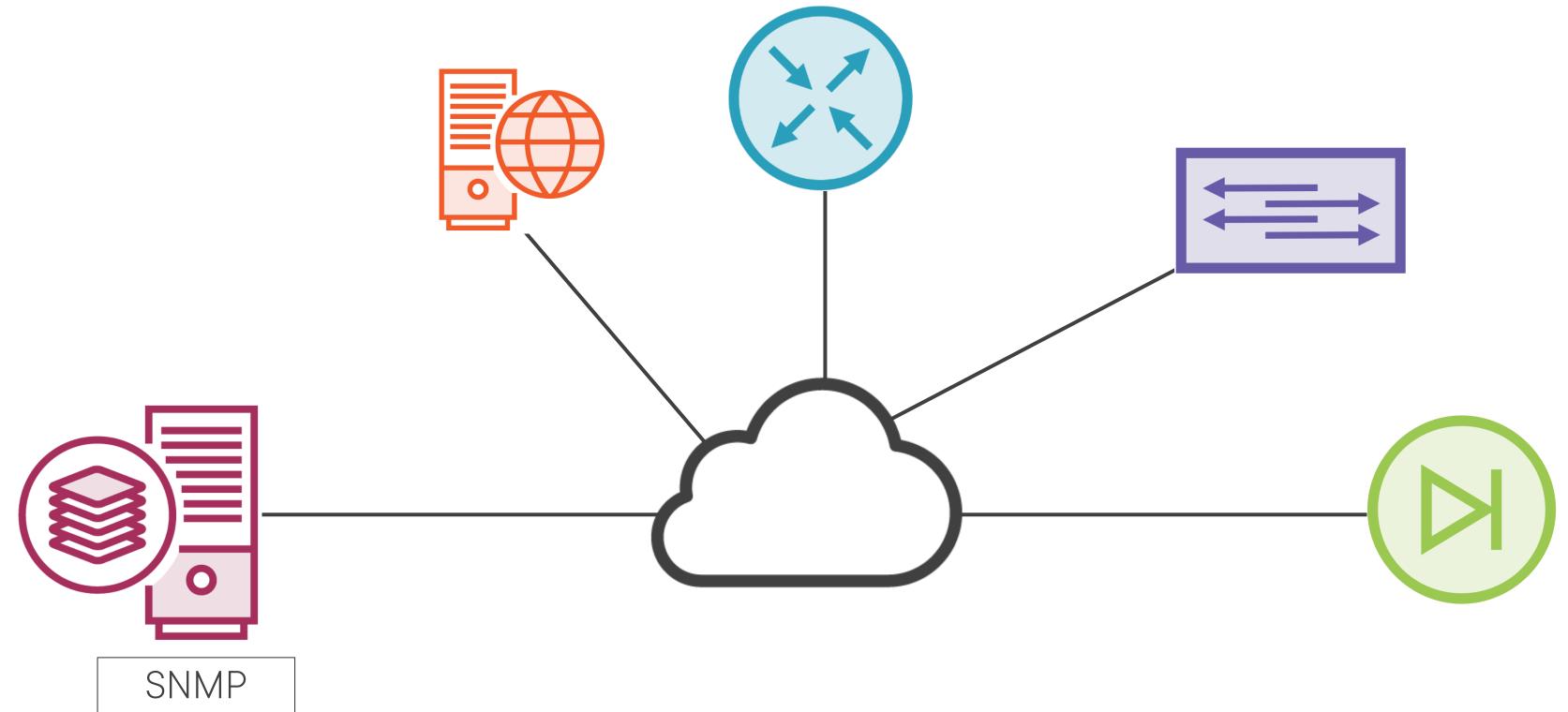






SNMP

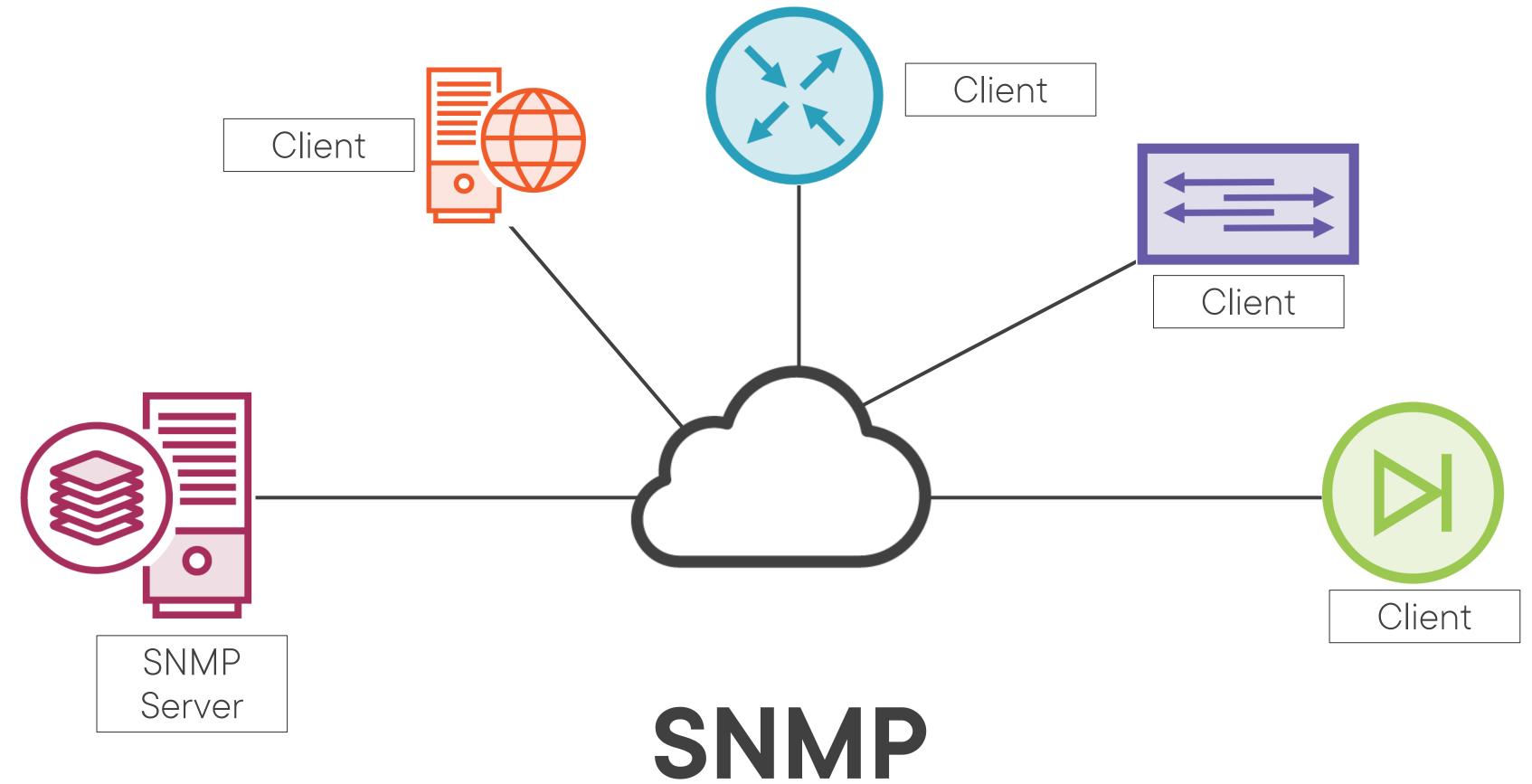




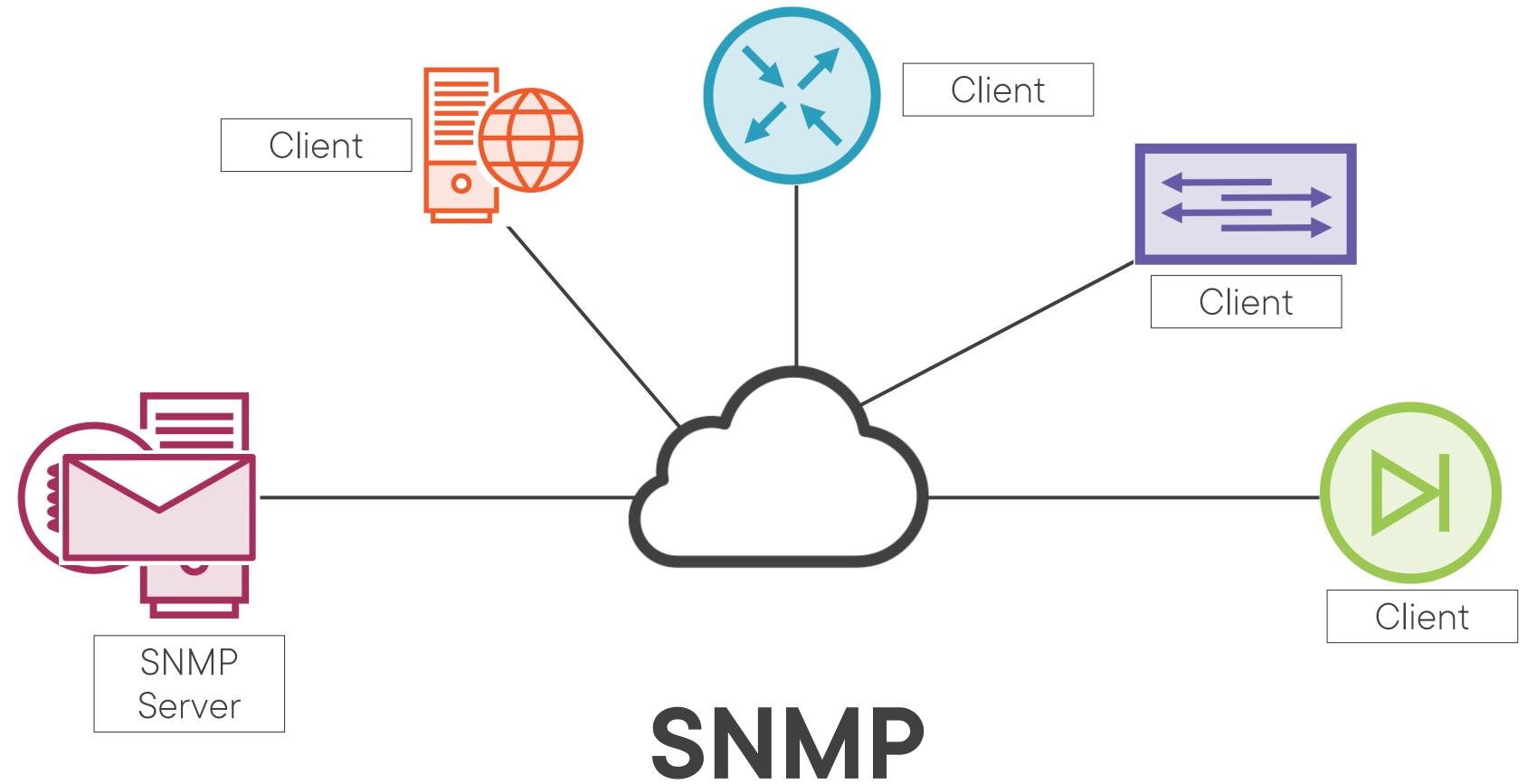
Server

SNMP

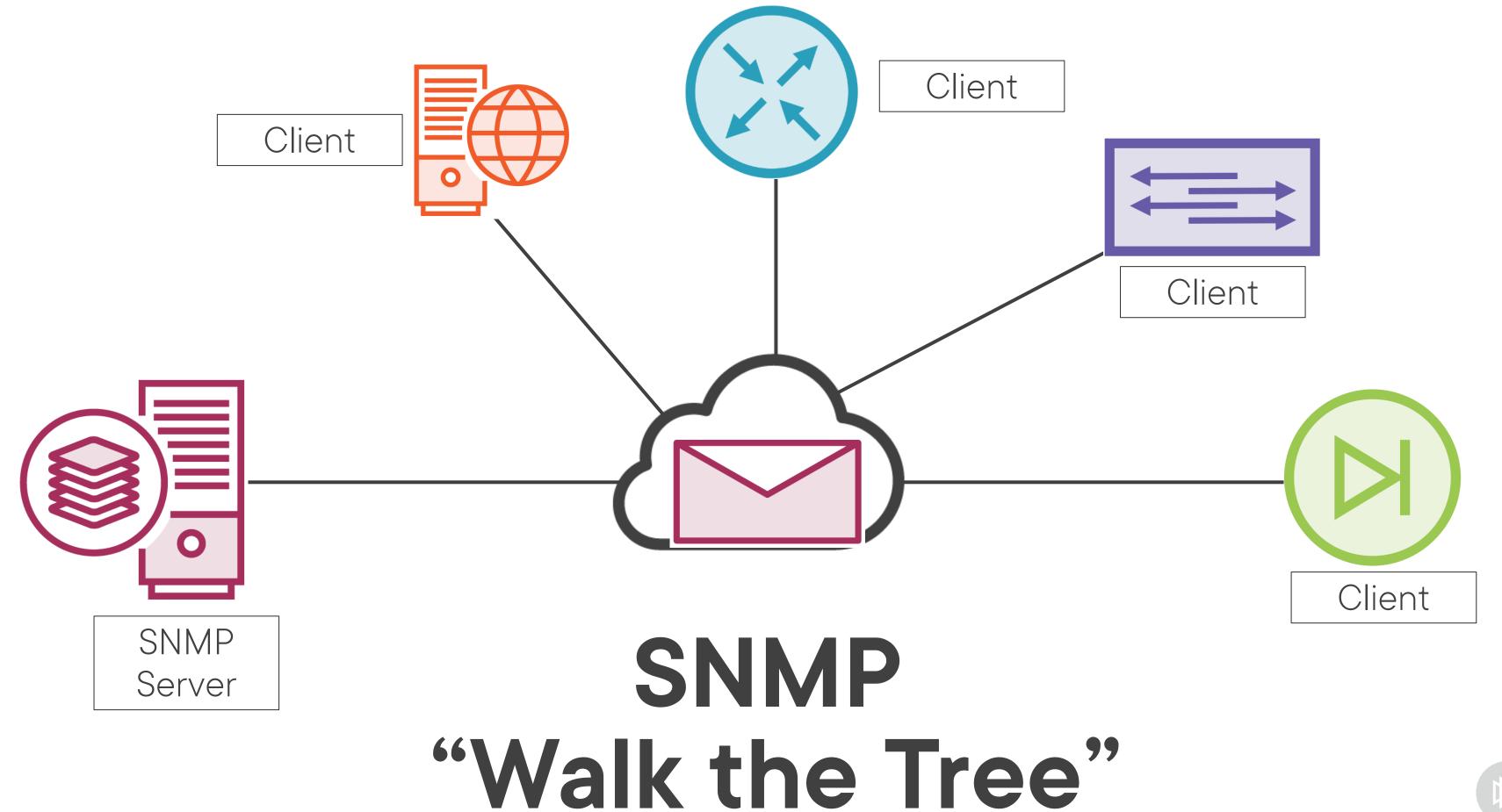




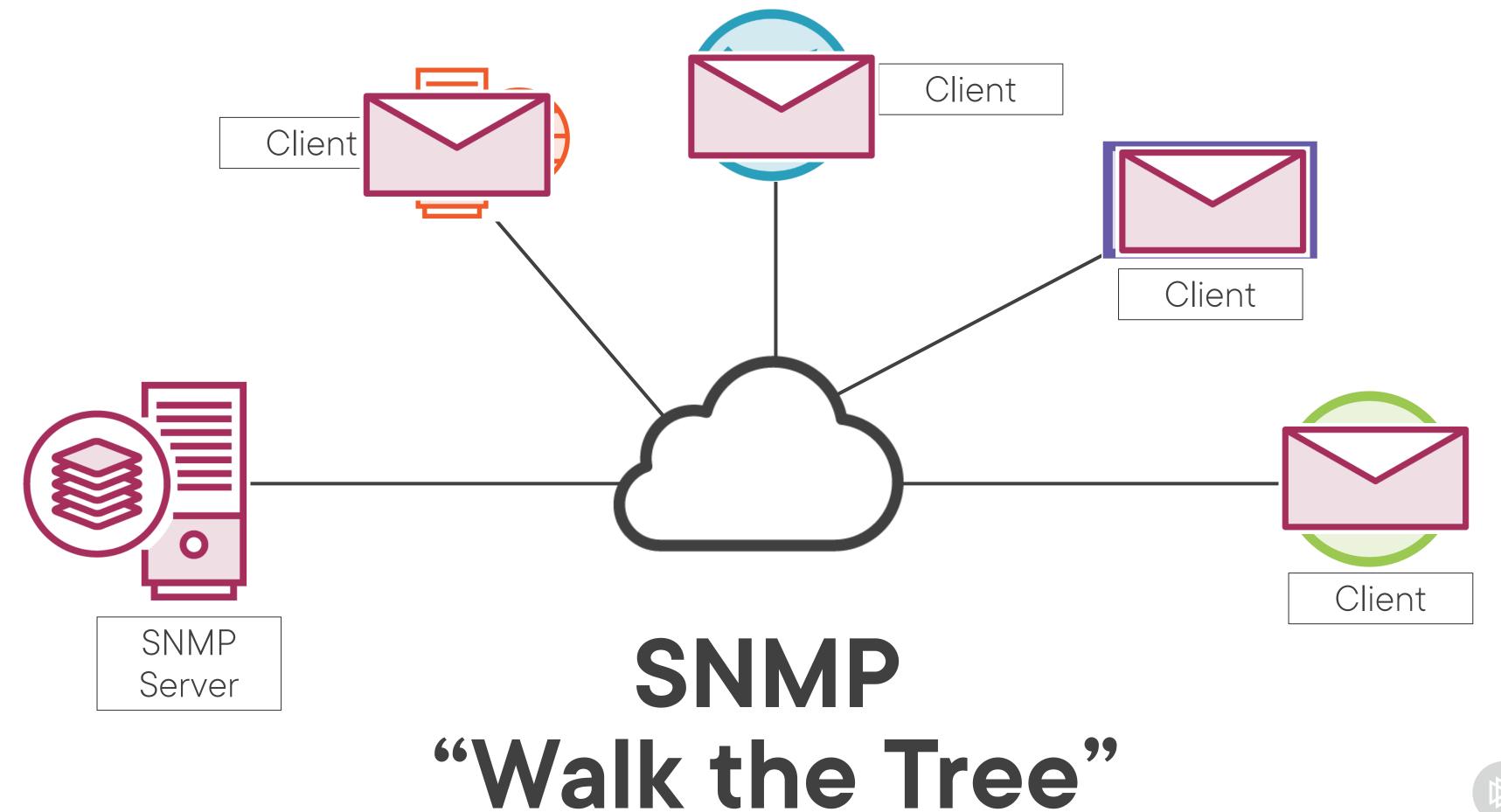




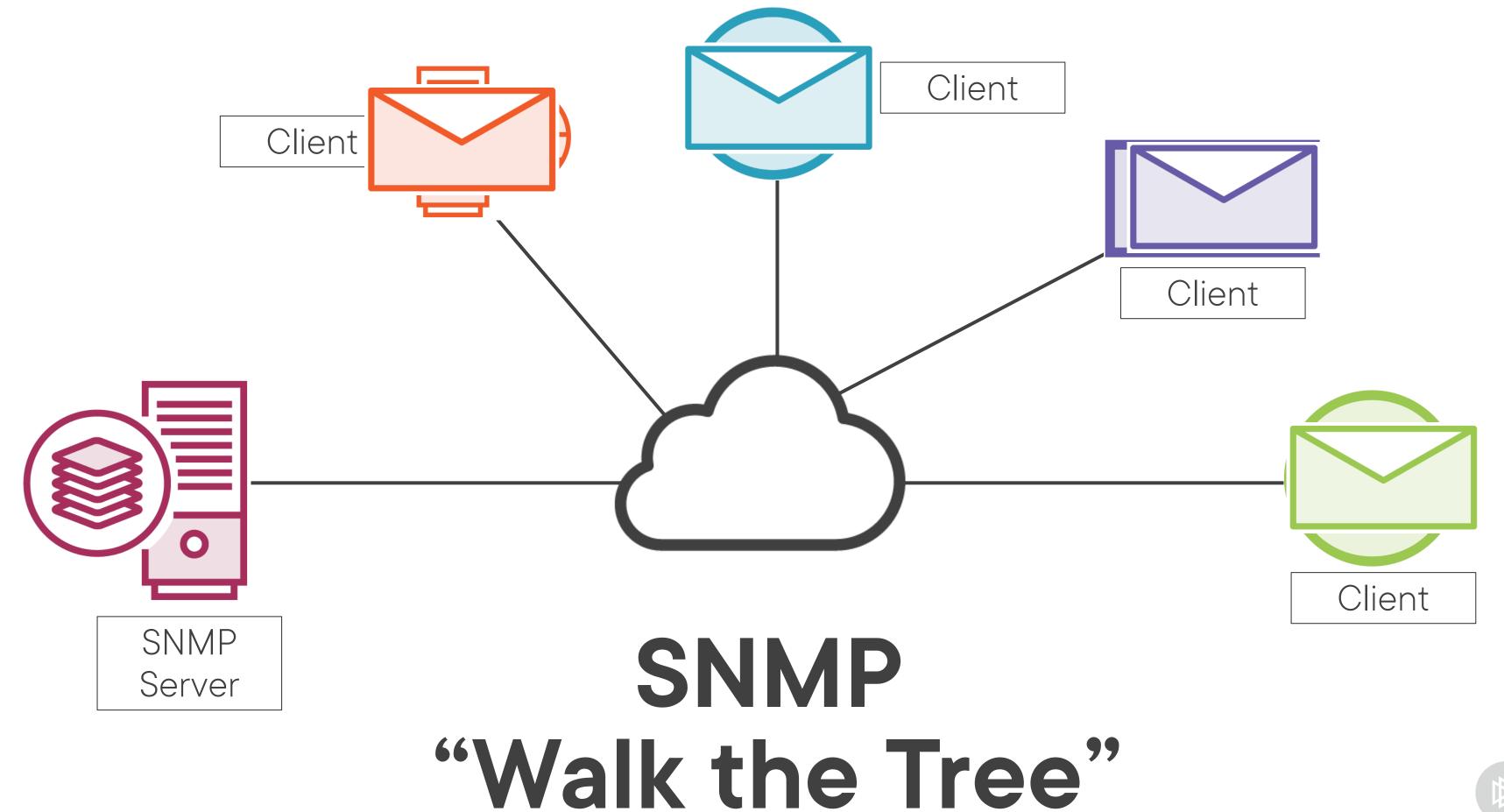




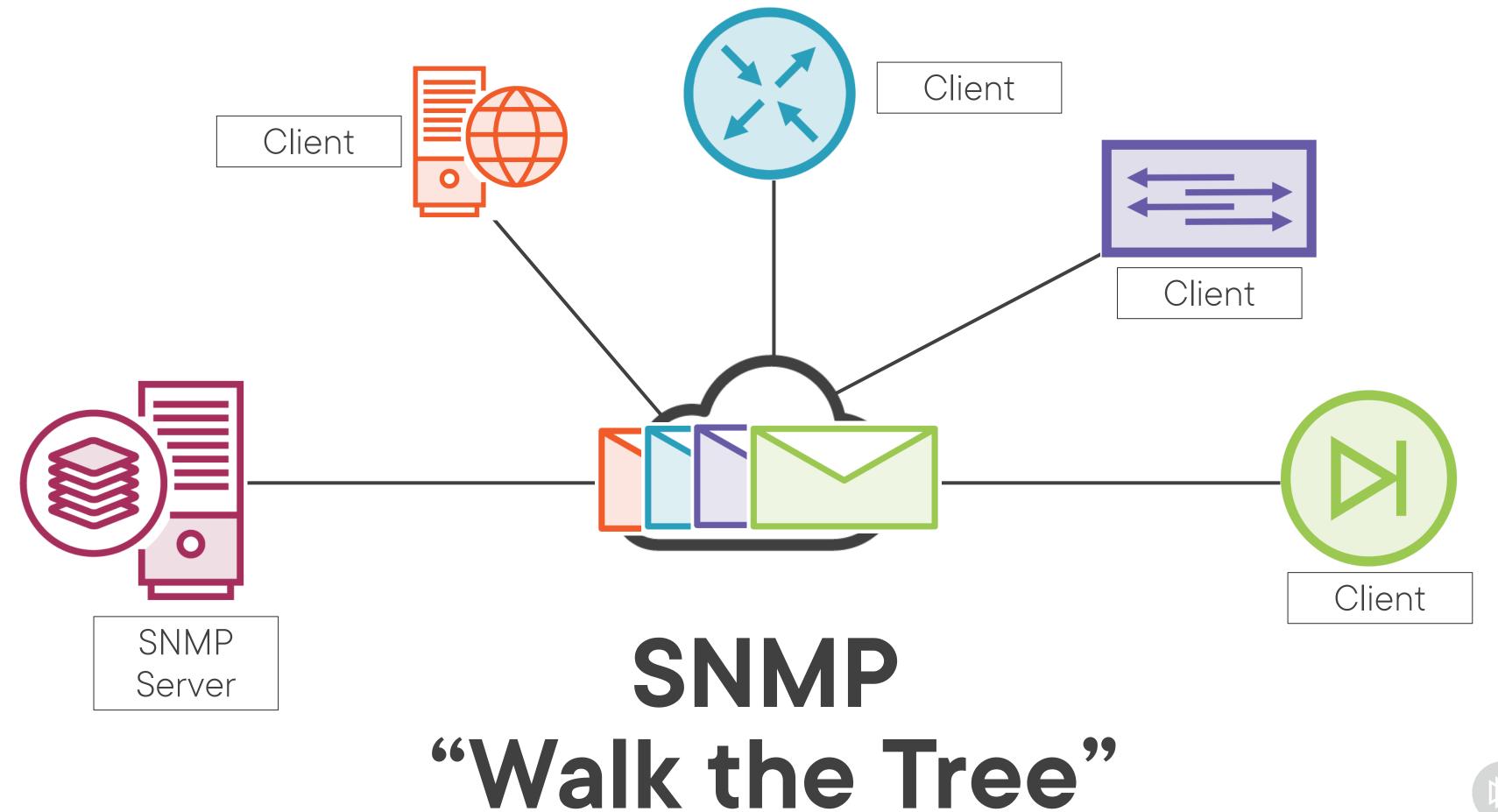




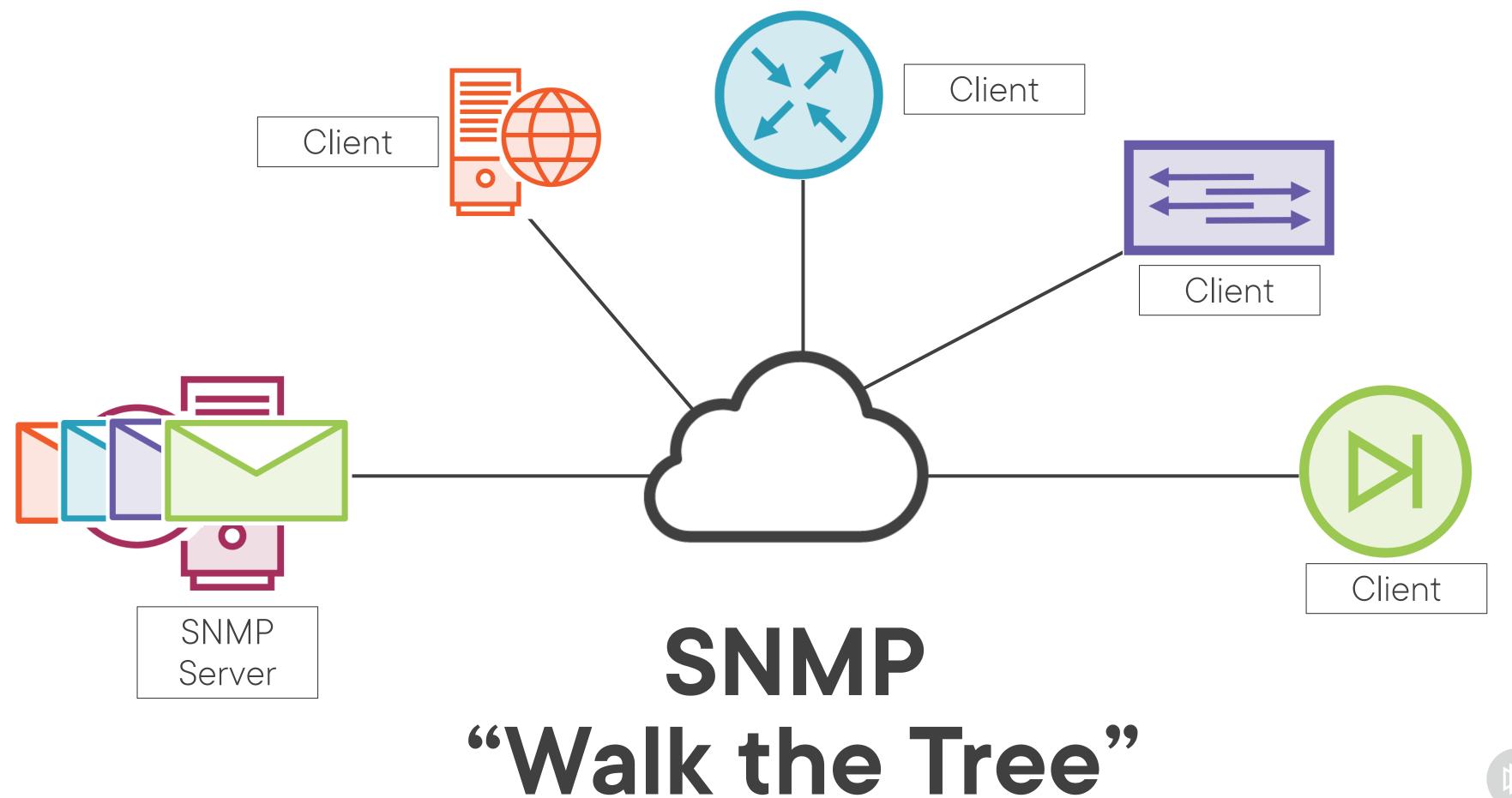




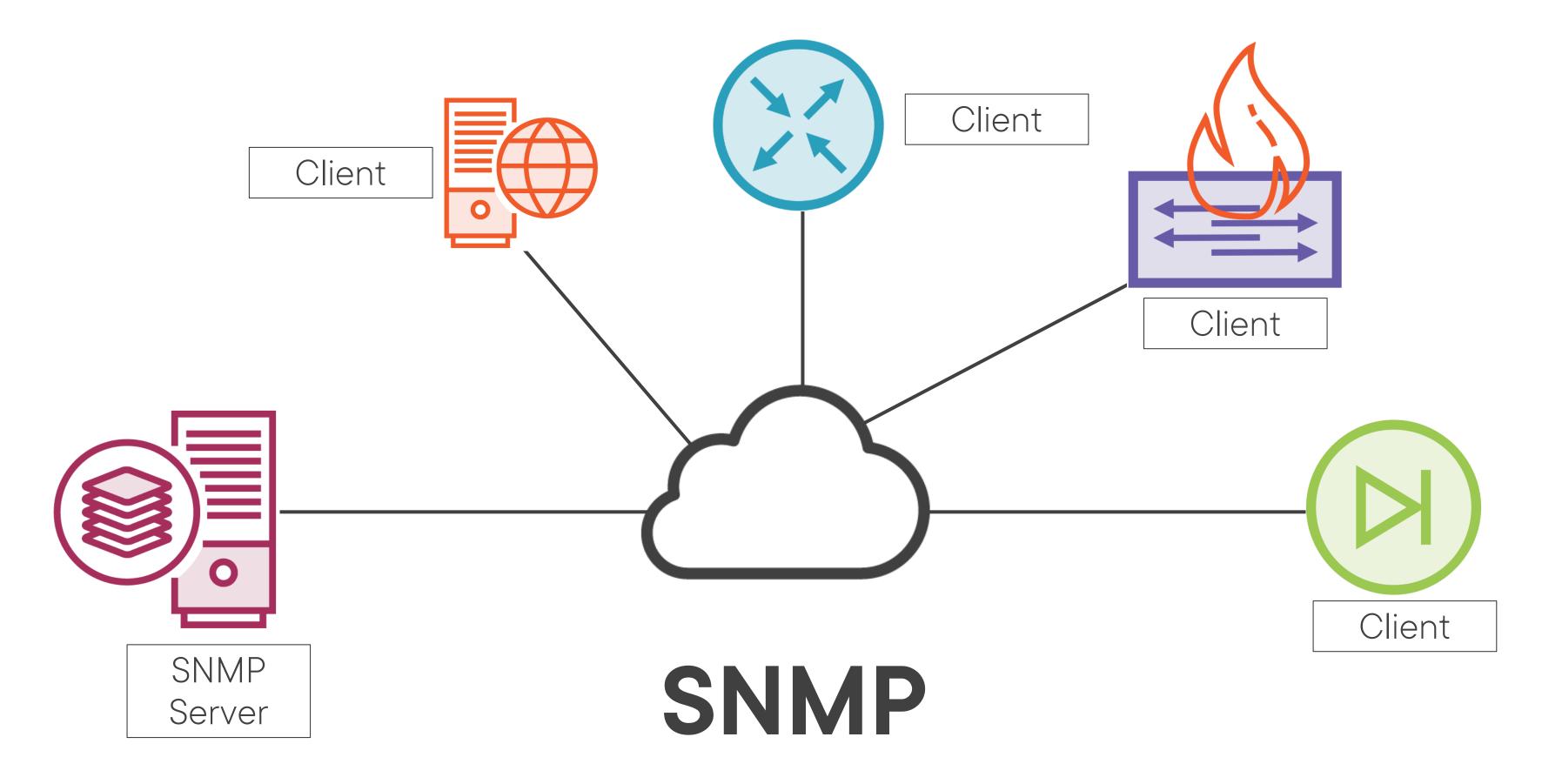


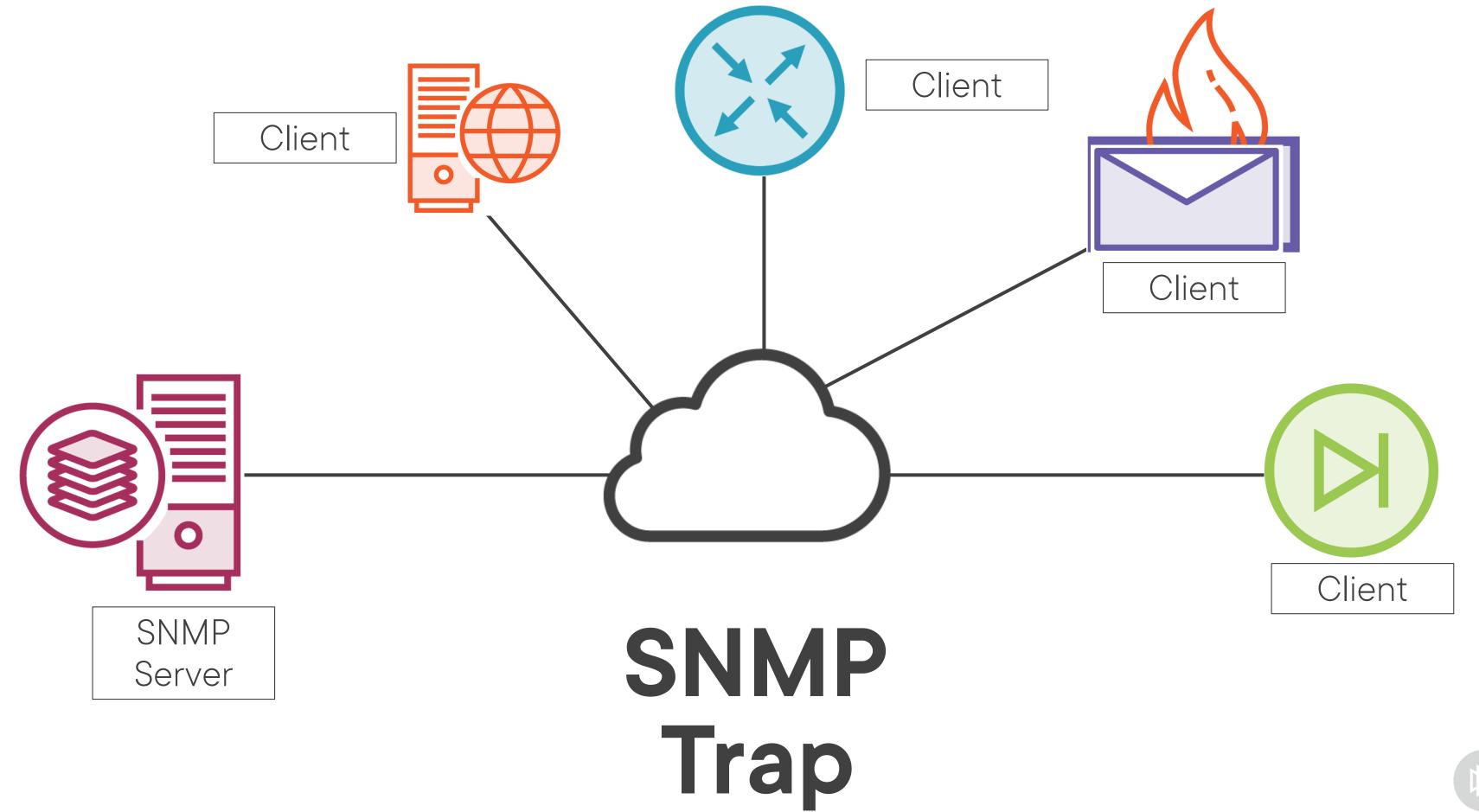




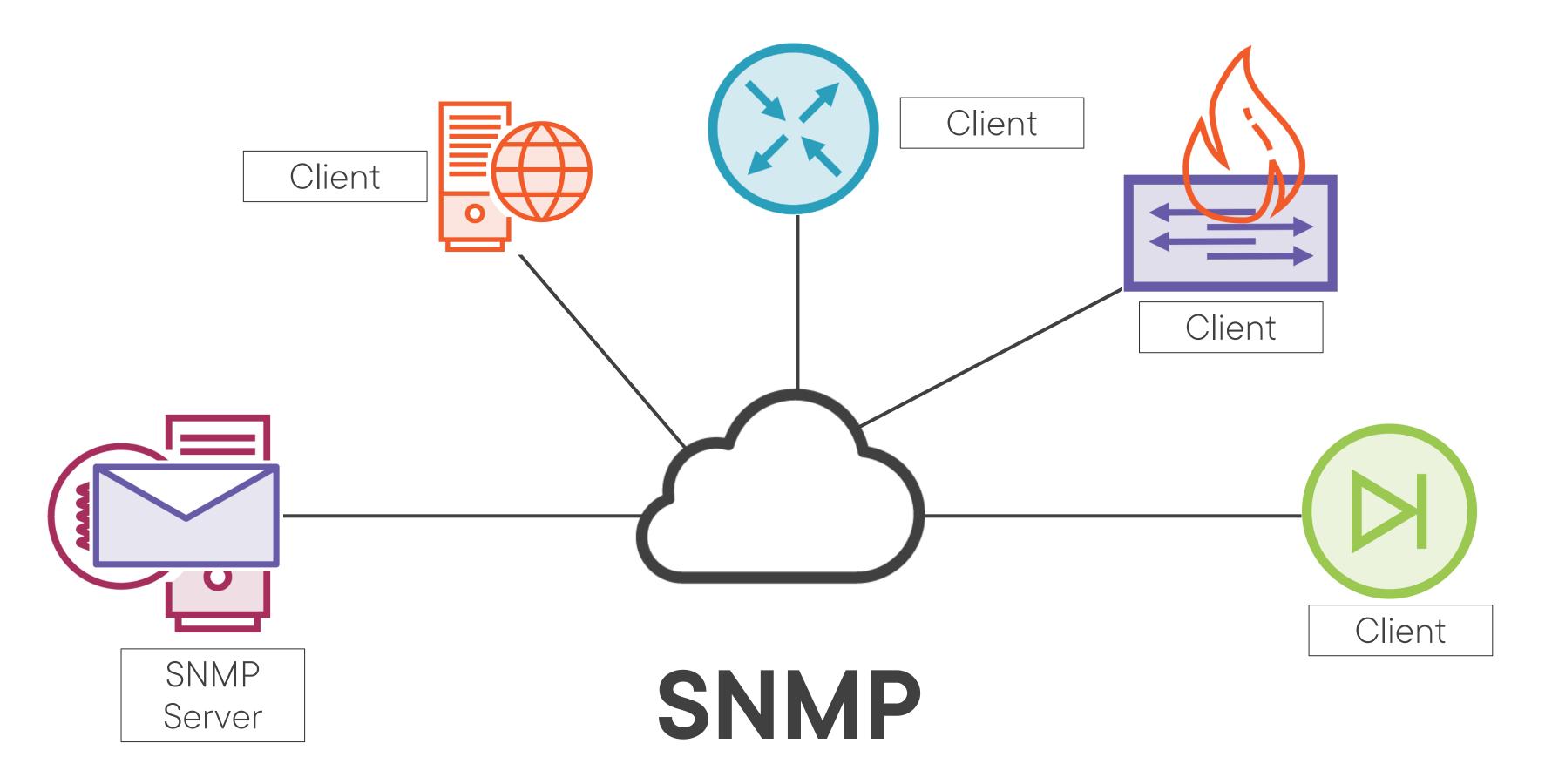


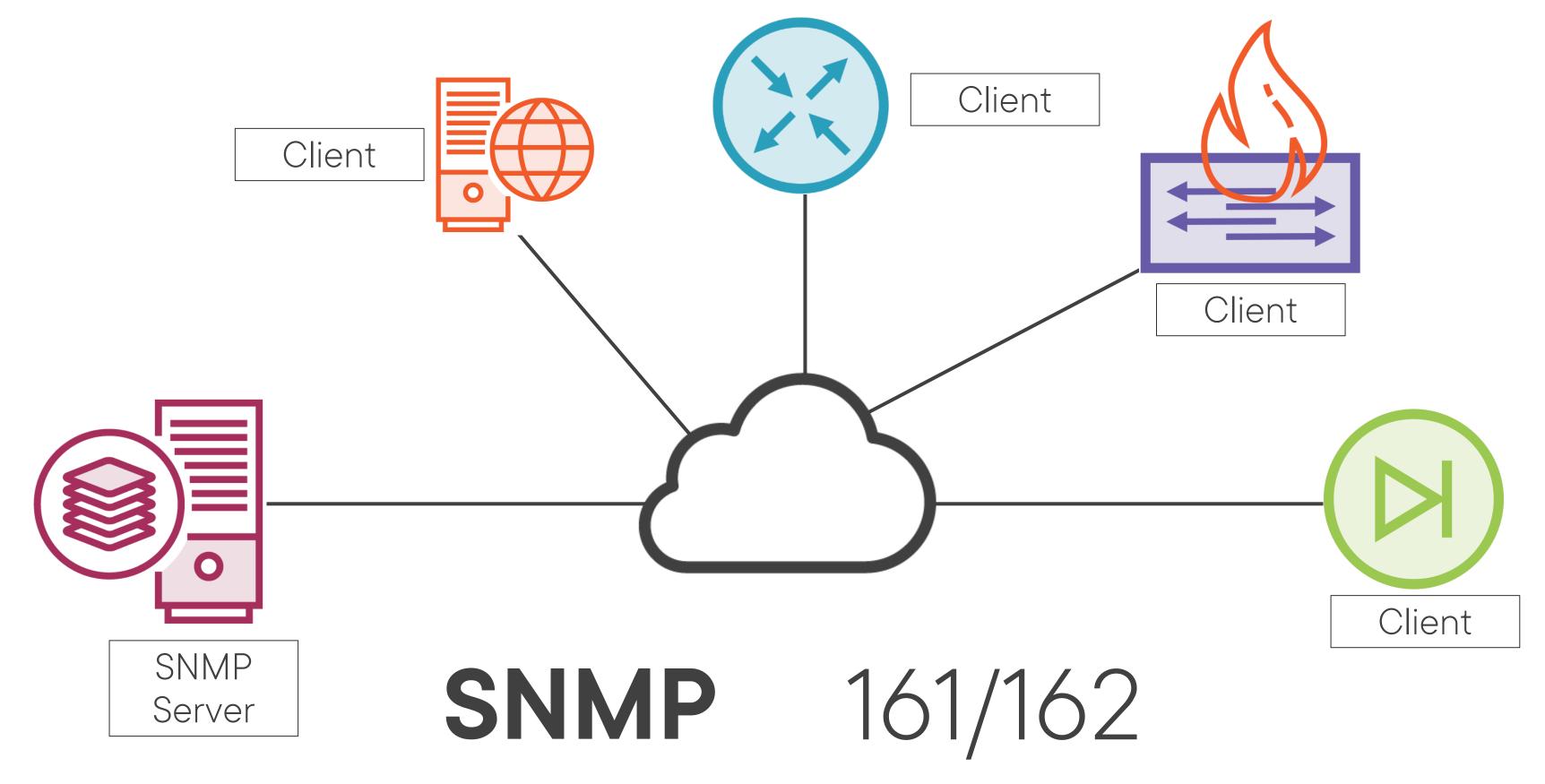


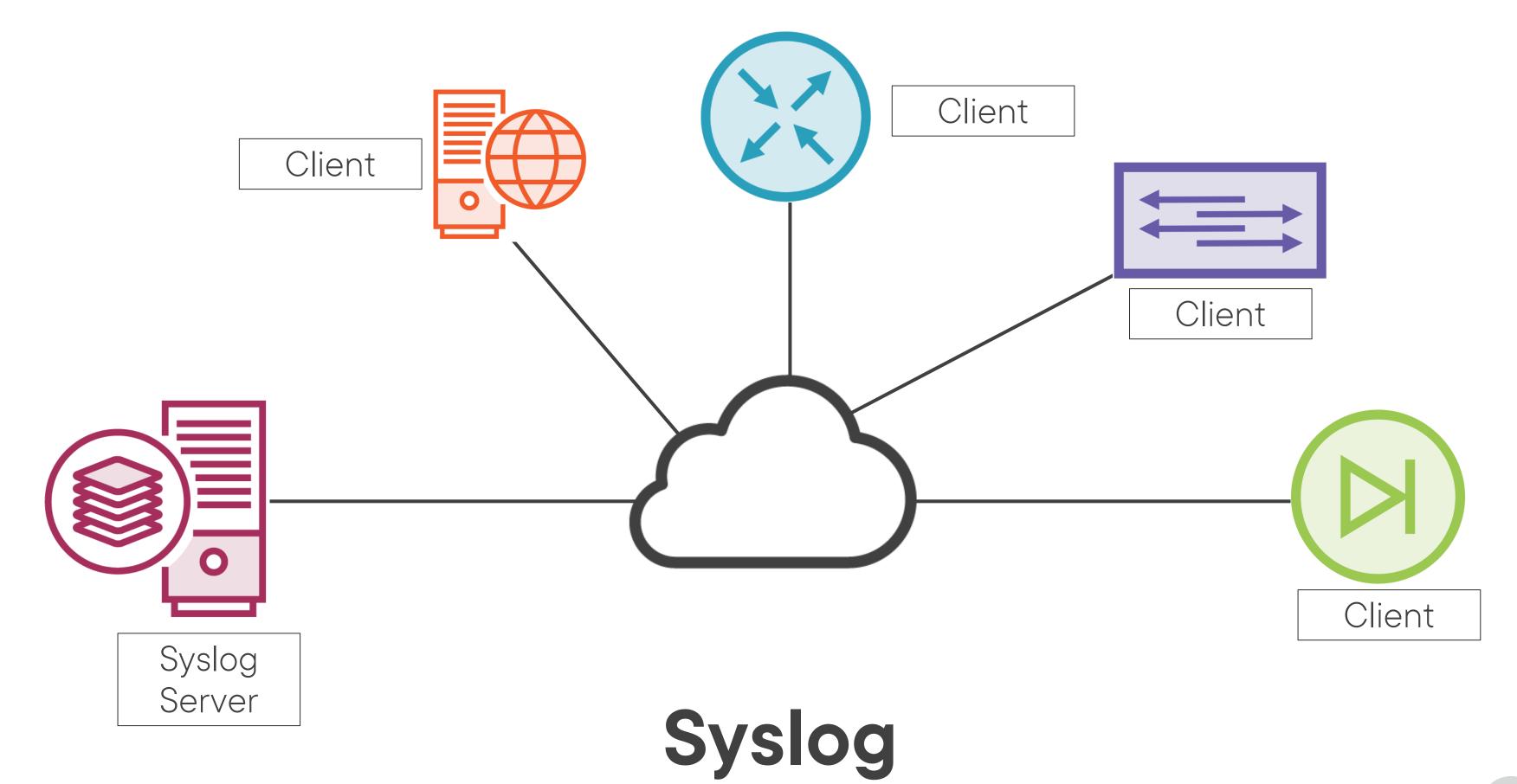




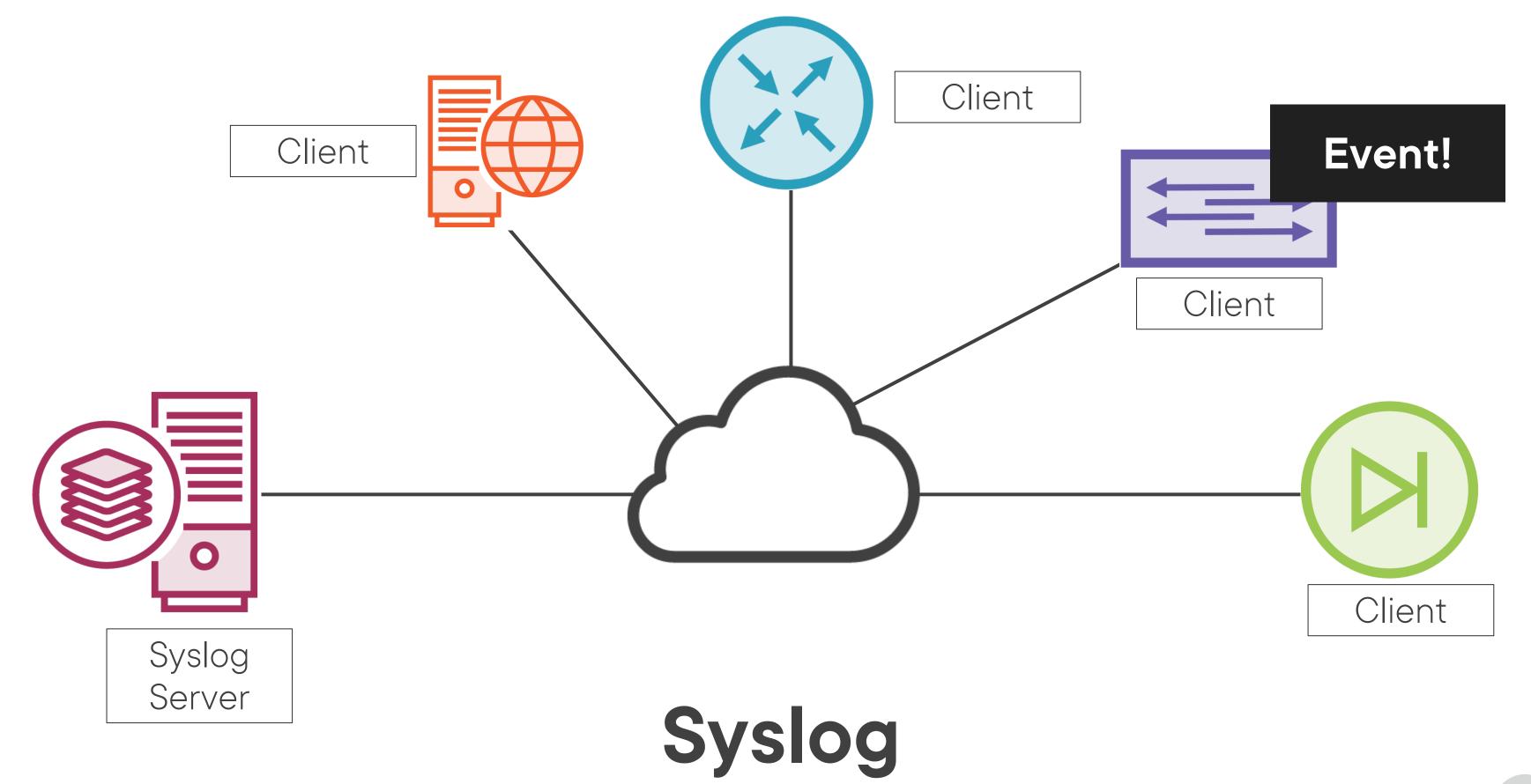


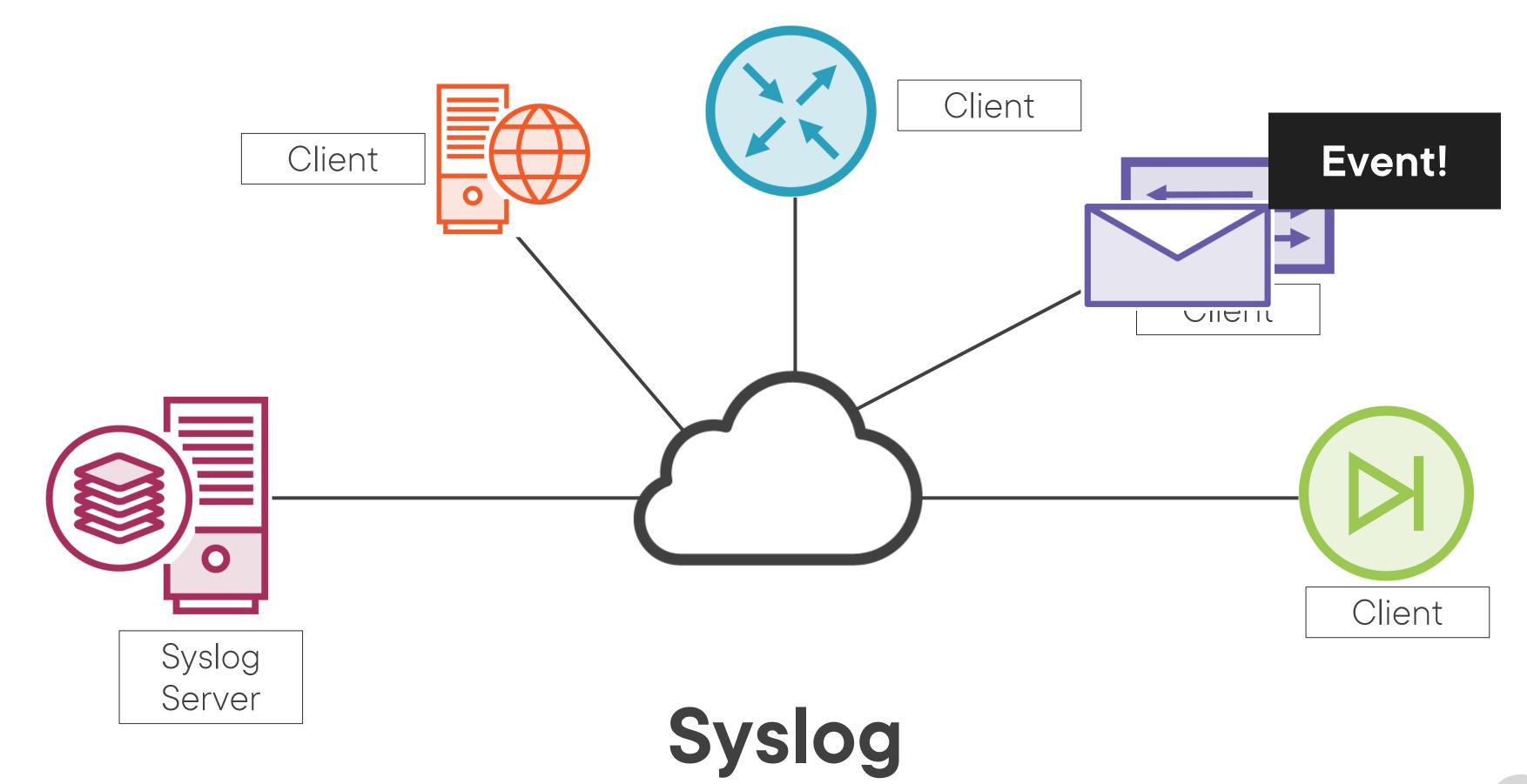




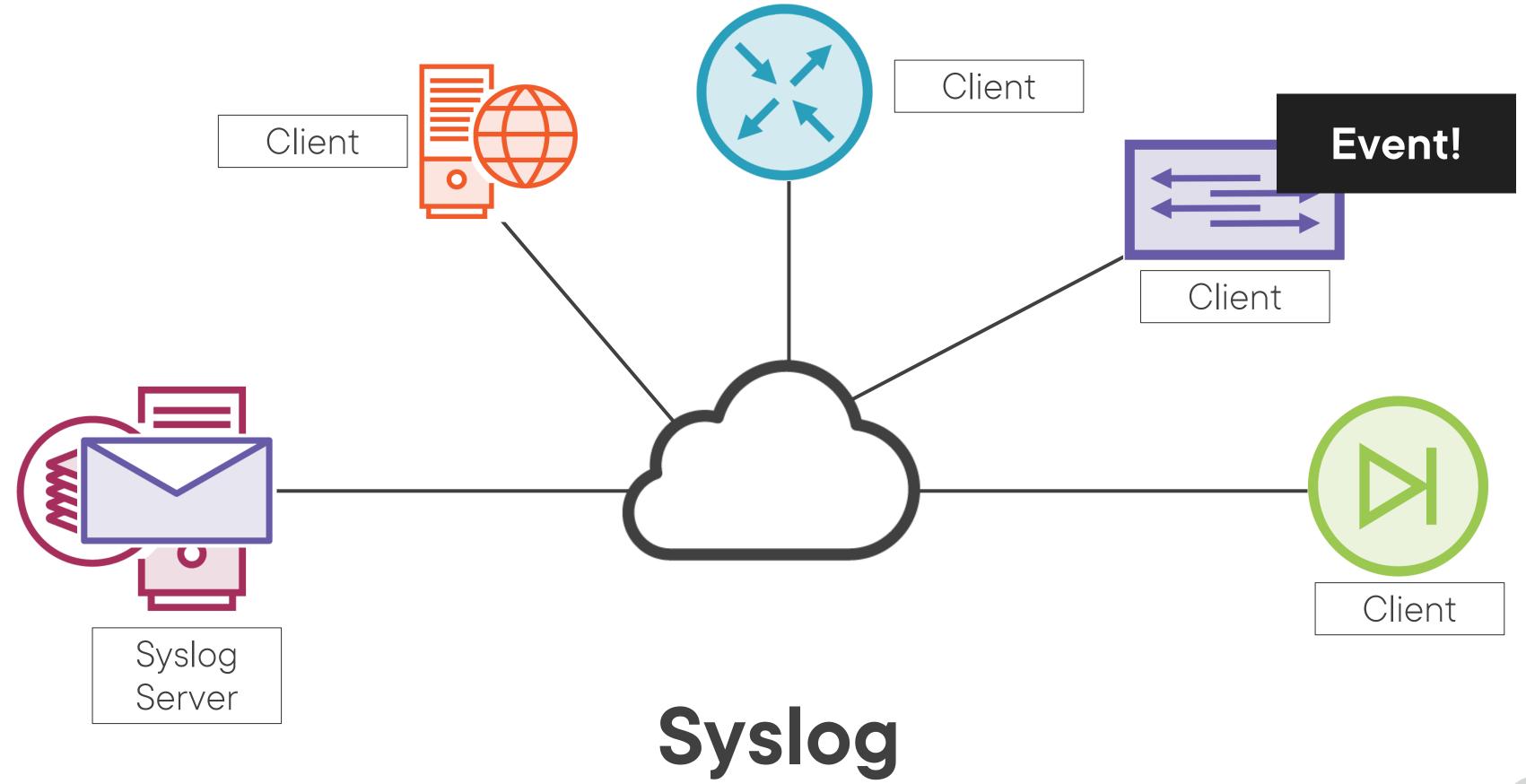




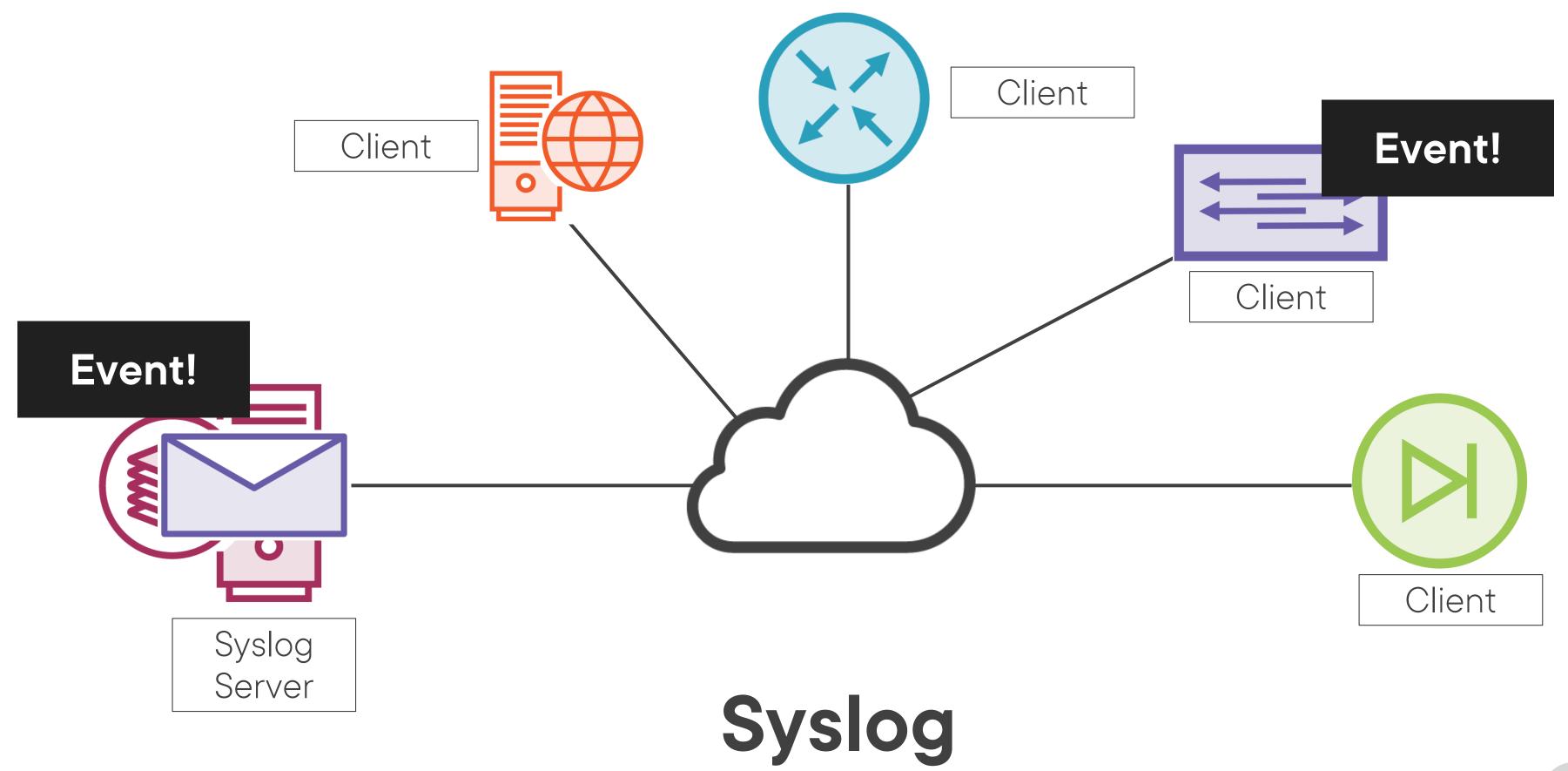




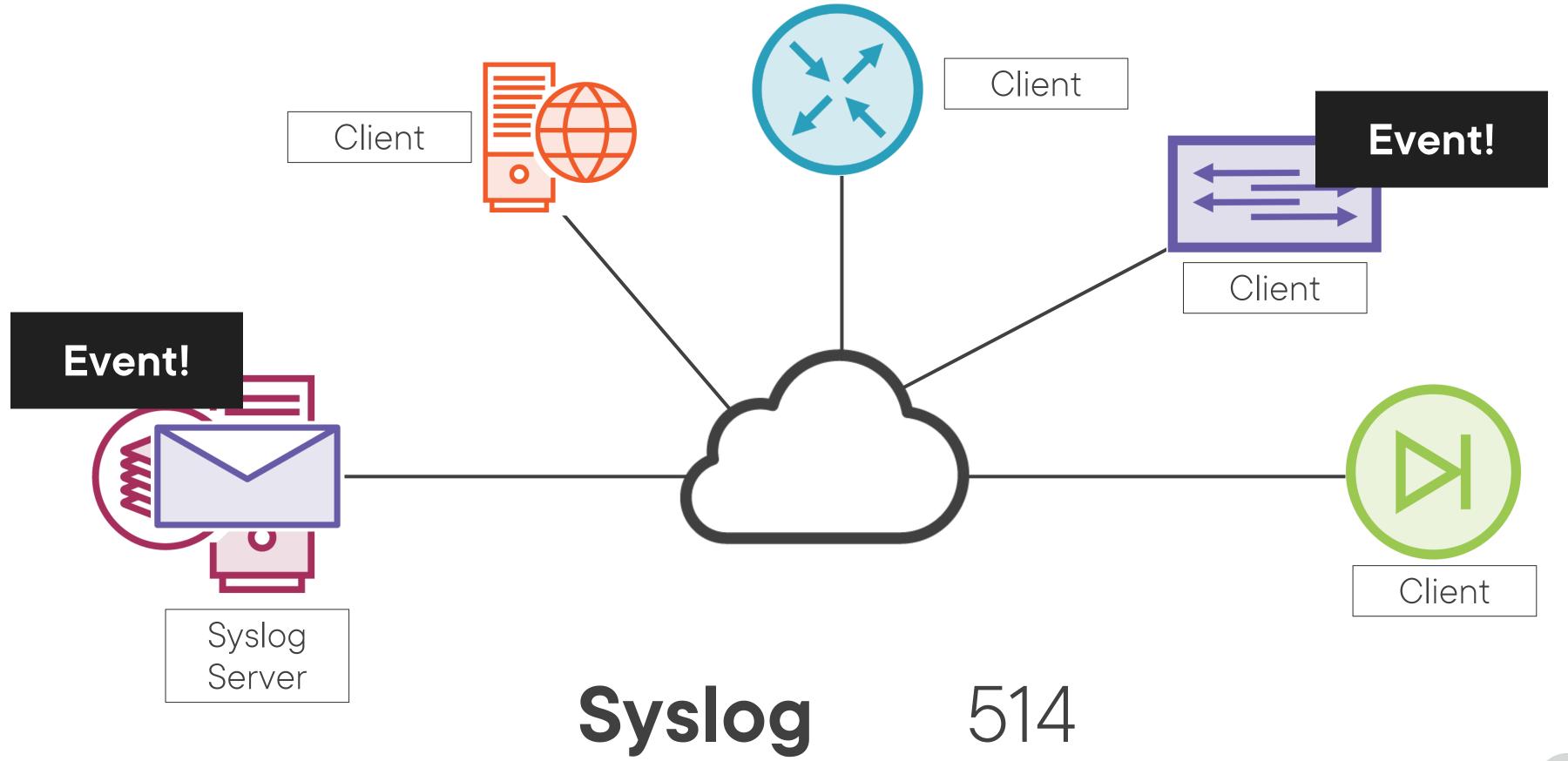






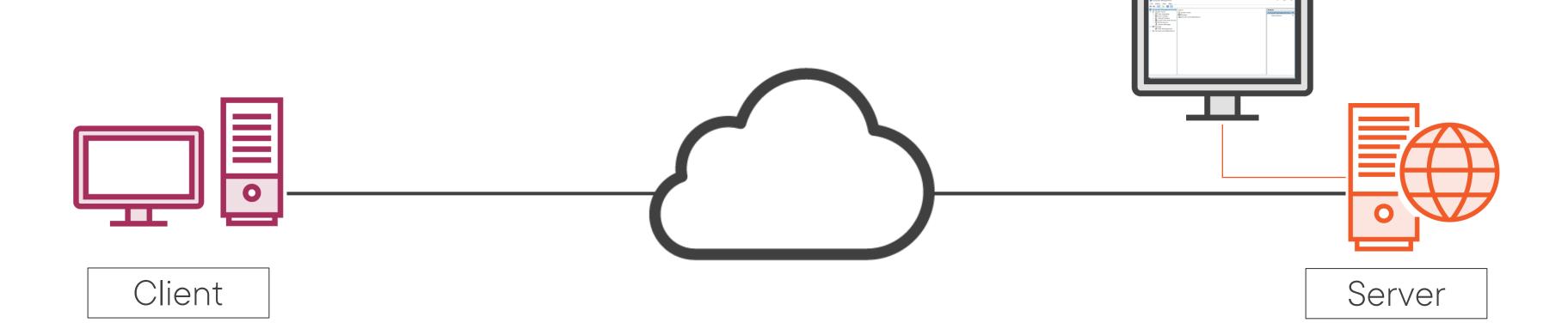


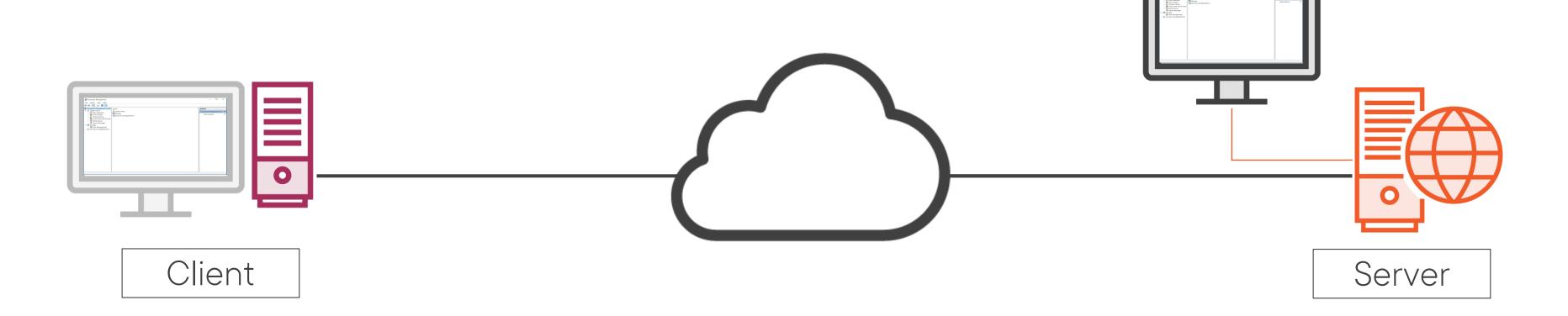






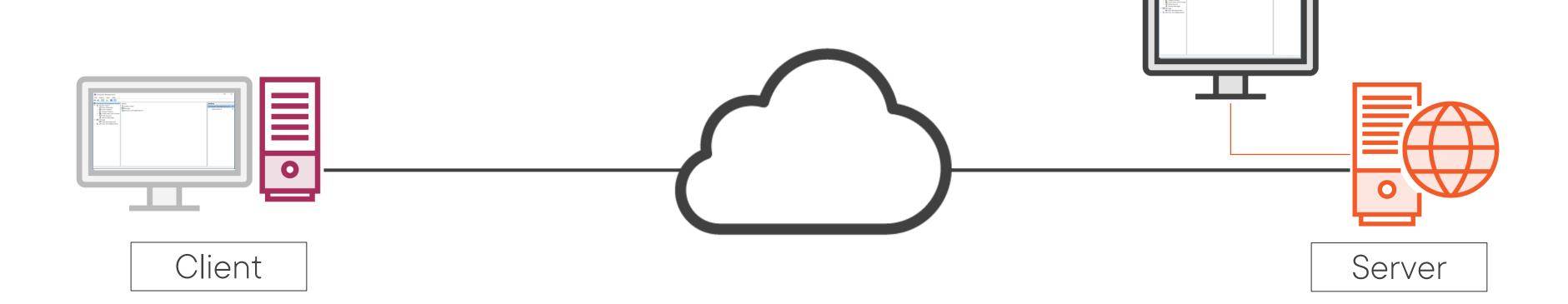






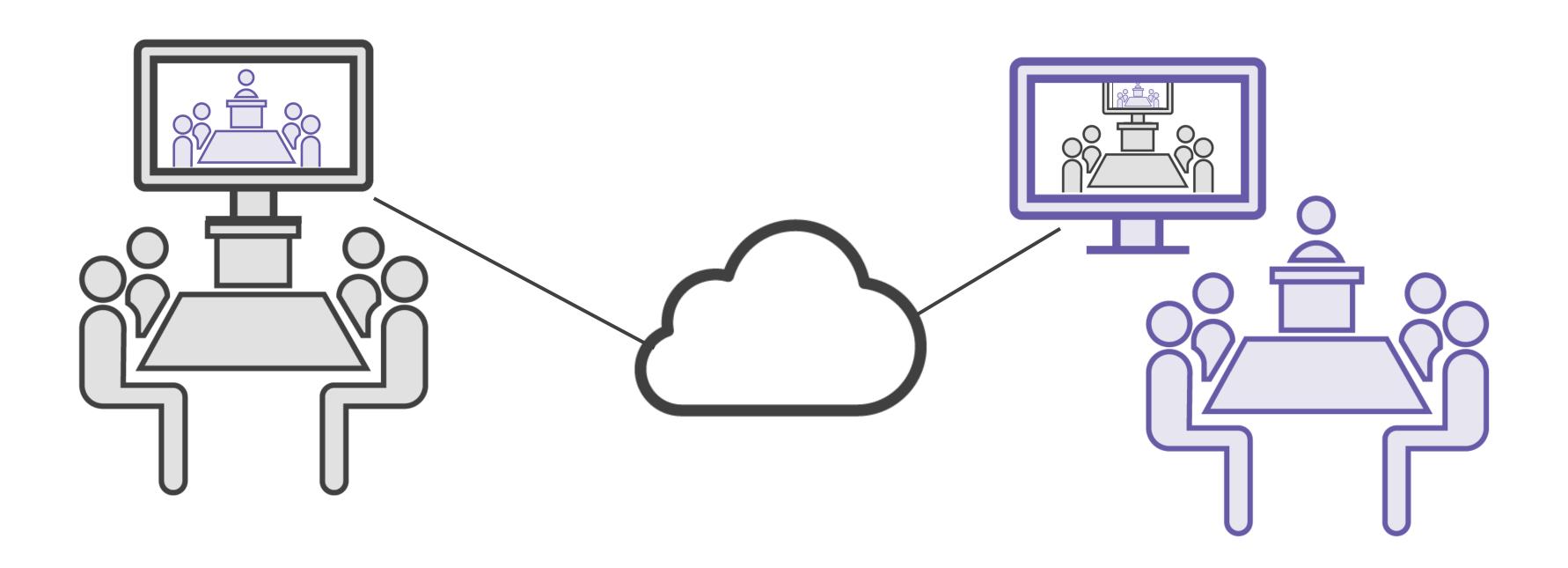


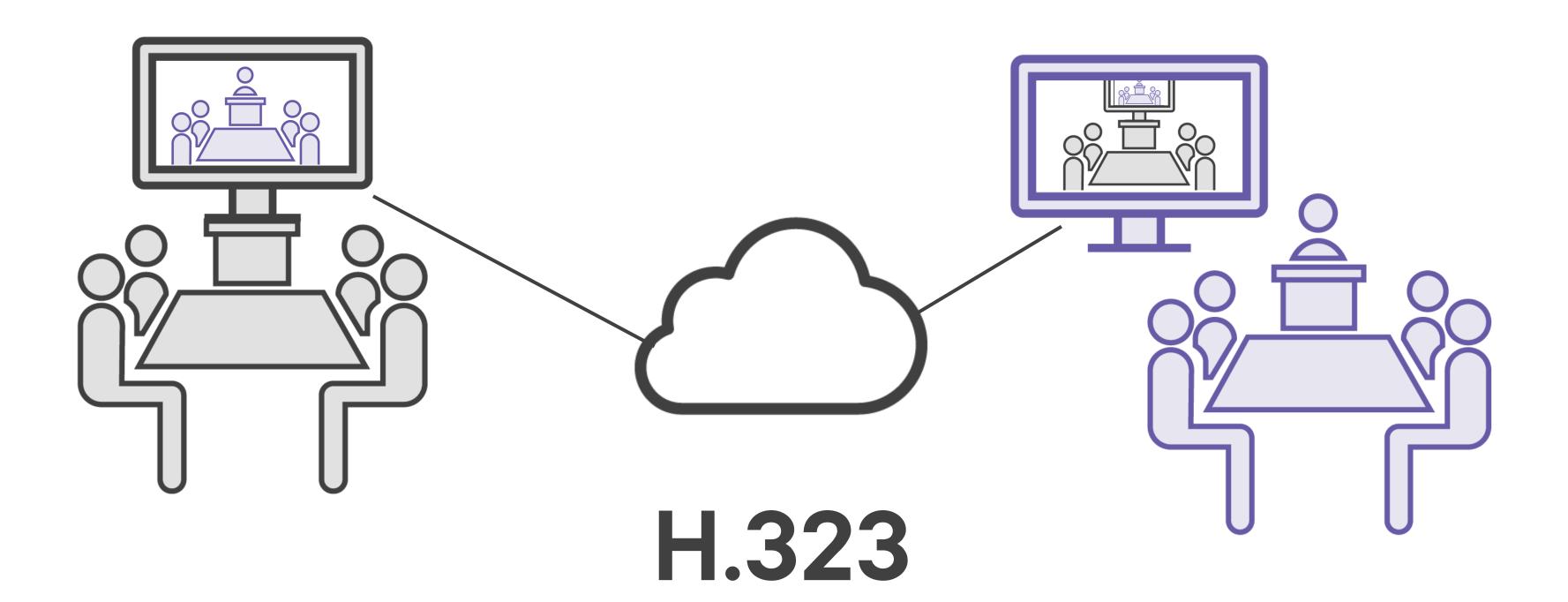
3389

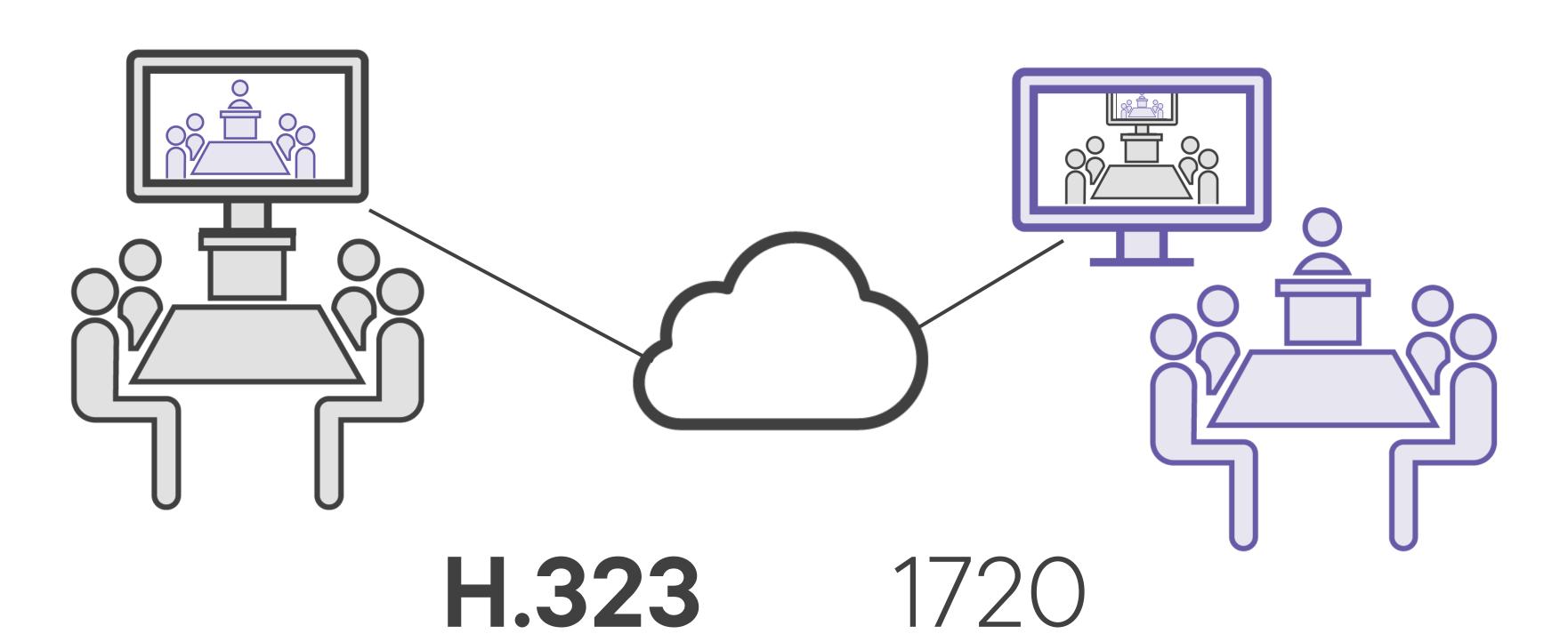




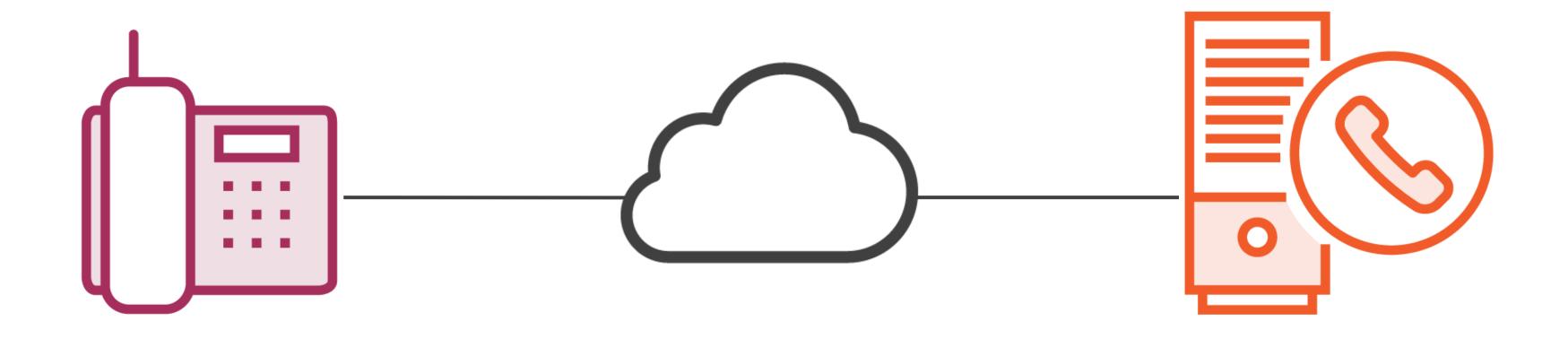
Audio/Visual











SIP

5060/5061

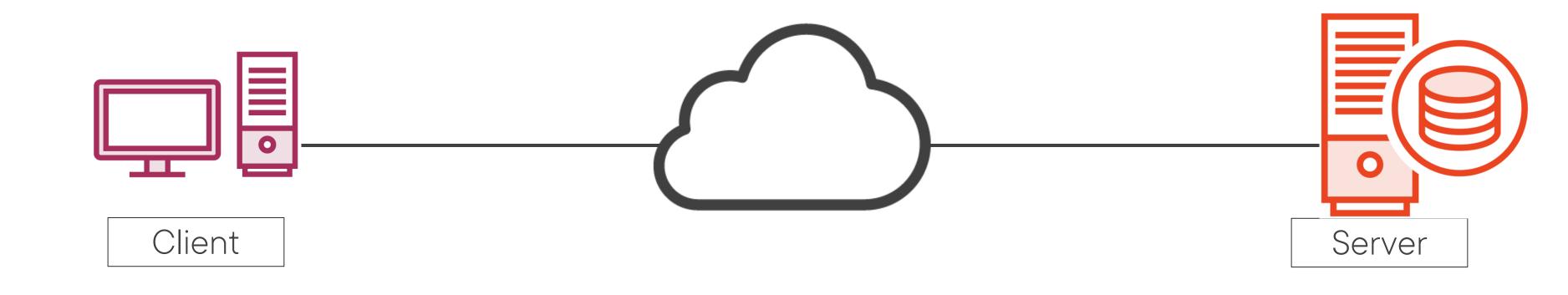


SQL Databases



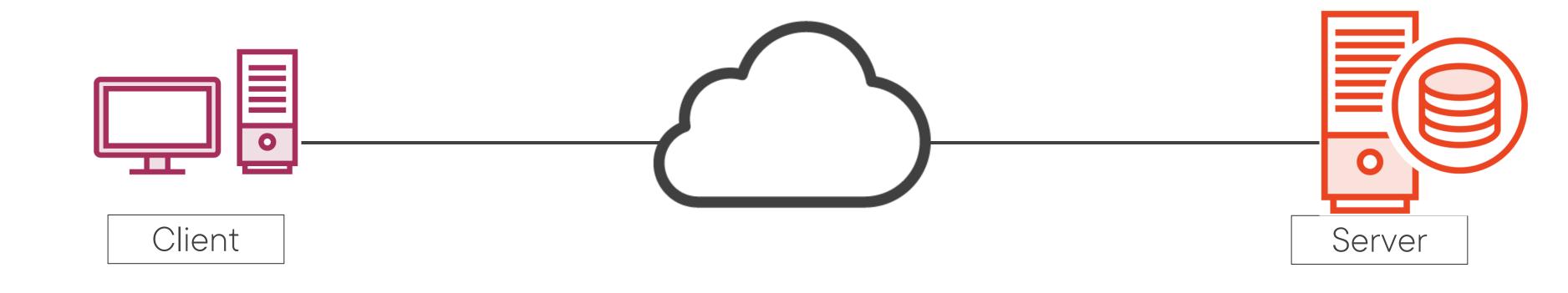
SQL Structured Query Language





mySQL SQLnet SQL Server





mySQL SQLnet SQL Server



Summary



Application Layer Protocols

- Data Transfer Protocols
- Authentication Protocols
- Network Service Protocols
- Network Management Protocols
- Audio/Visual Protocols
- Database Protocols

