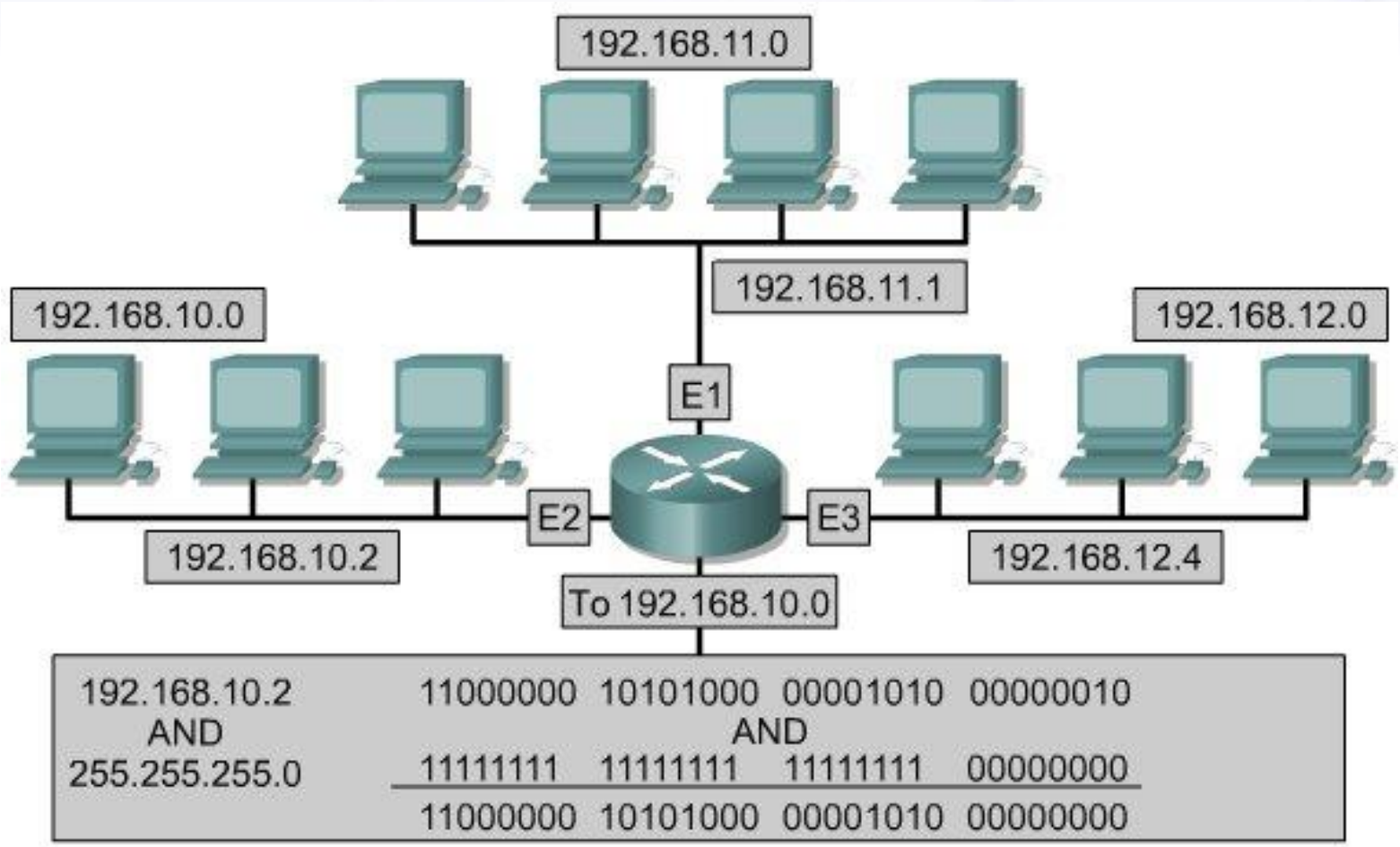
Fondamenti di routing e subnets

Routed Protocol

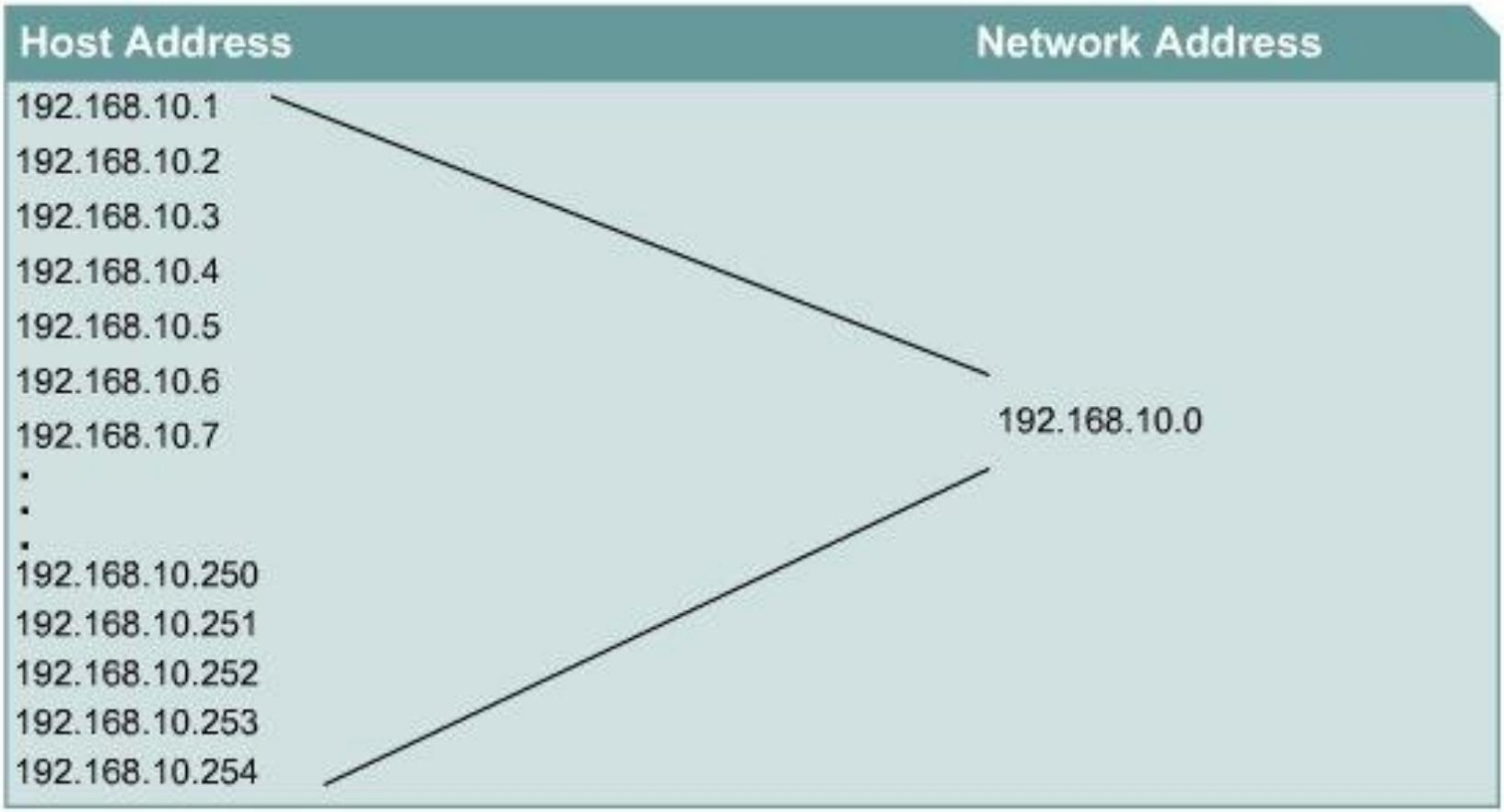
IP routing Protocol

Meccanismi di subnetting

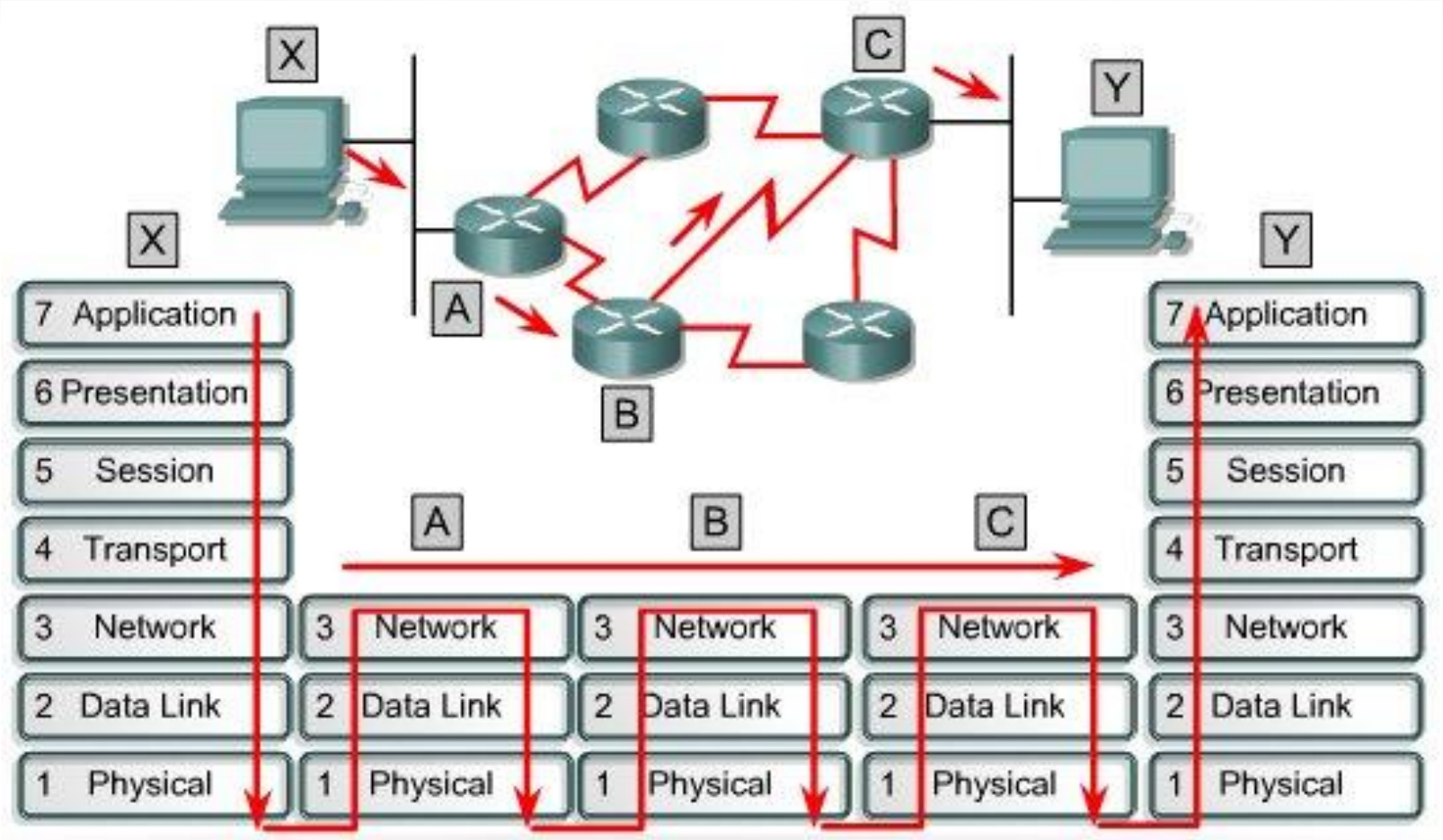
Fondamenti di routing e subnets



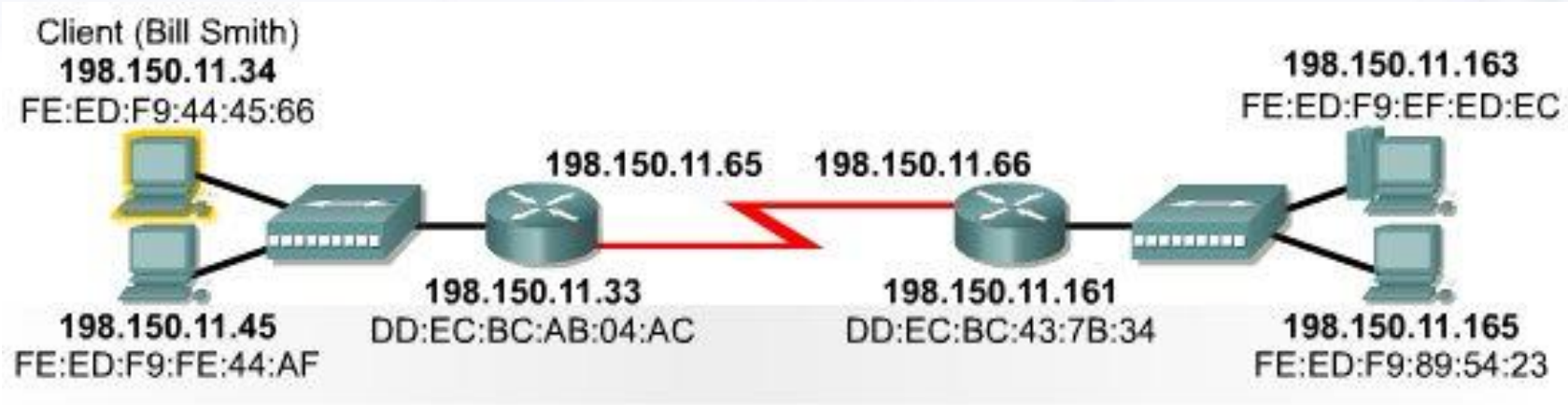
Fondamenti di routing e subnets

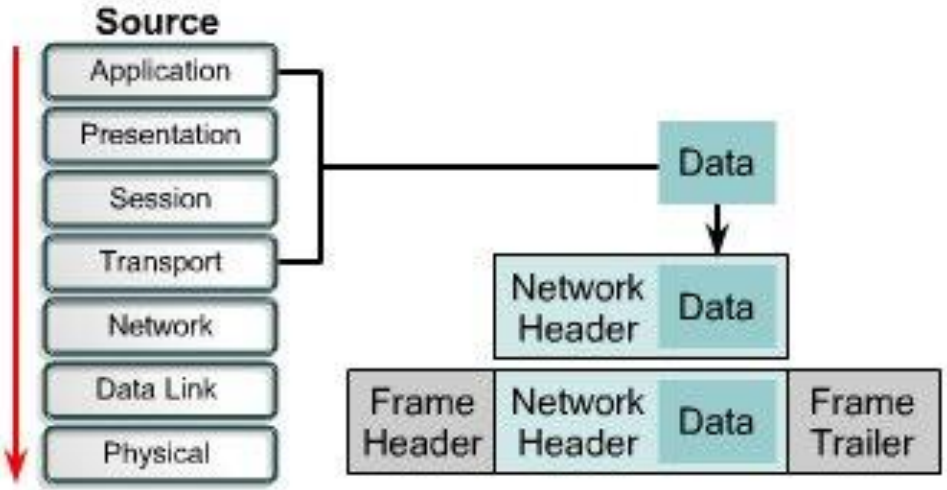


Fondamenti di routing e subnets

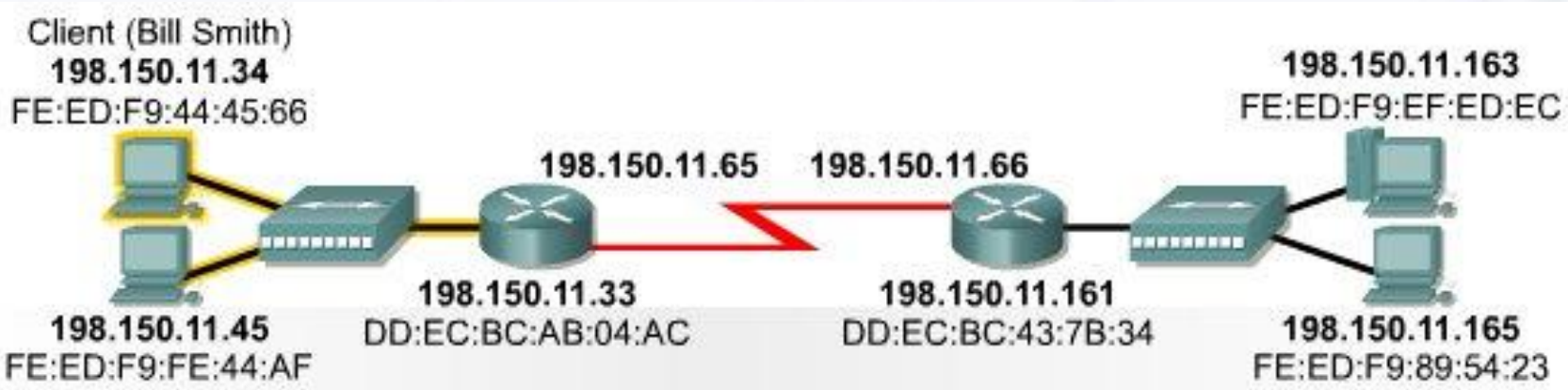


Esempio di trasmissione dati



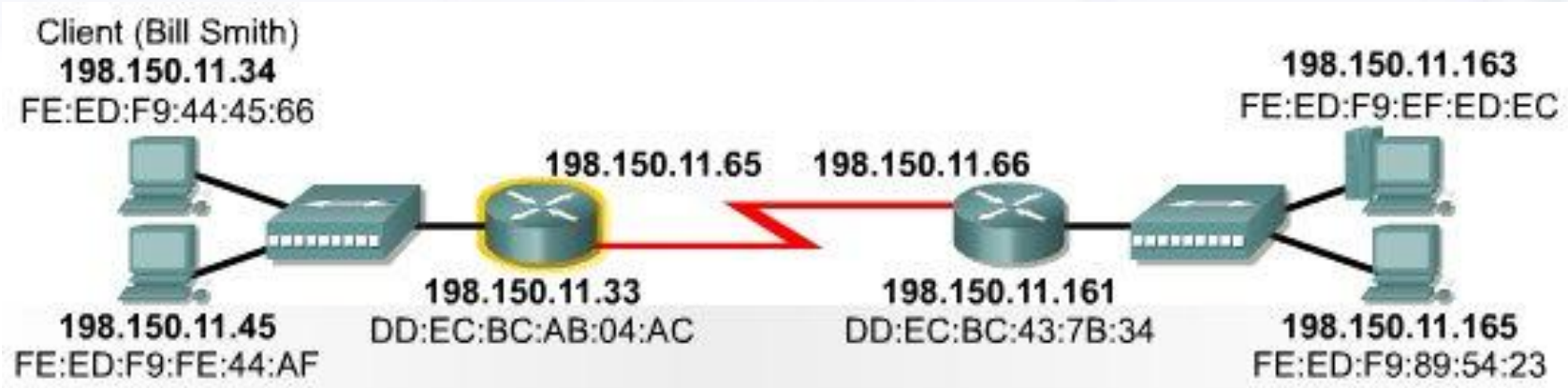


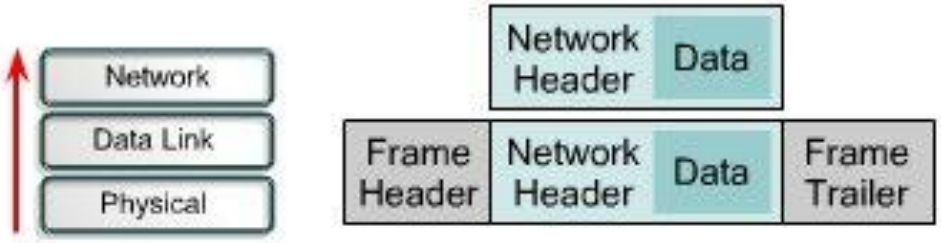
Esempio di trasmissione dati



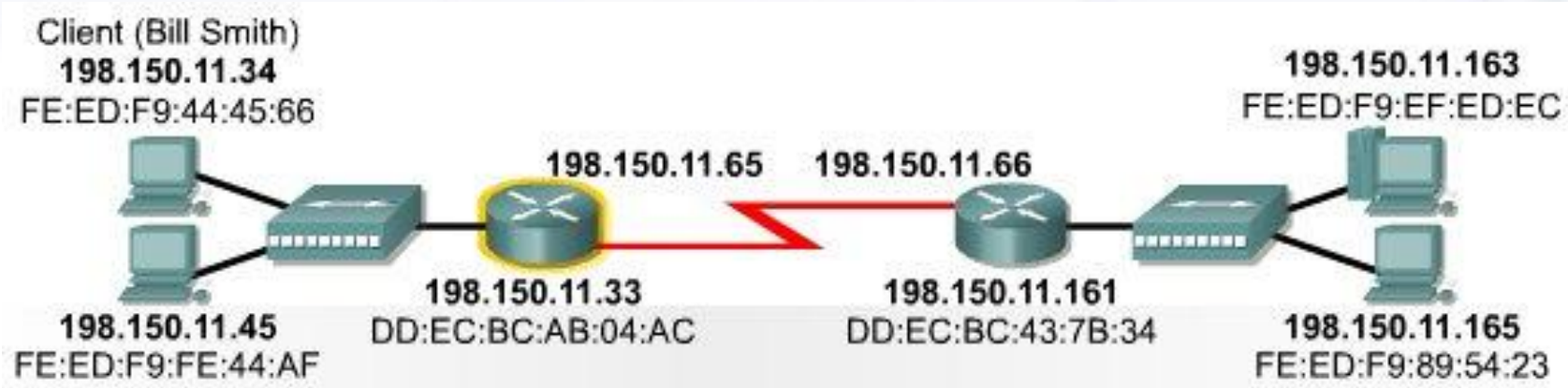
Frame Header		Network Header		Data	Frame Trailer
Destination	Source	Source	Destination		
DD:EC:BC:AB:04:AC	FE:ED:F9:44:45:66	198.150.11.34	198.150.11.163	E-mail Data	CRC-32

Esempio di trasmissione dati



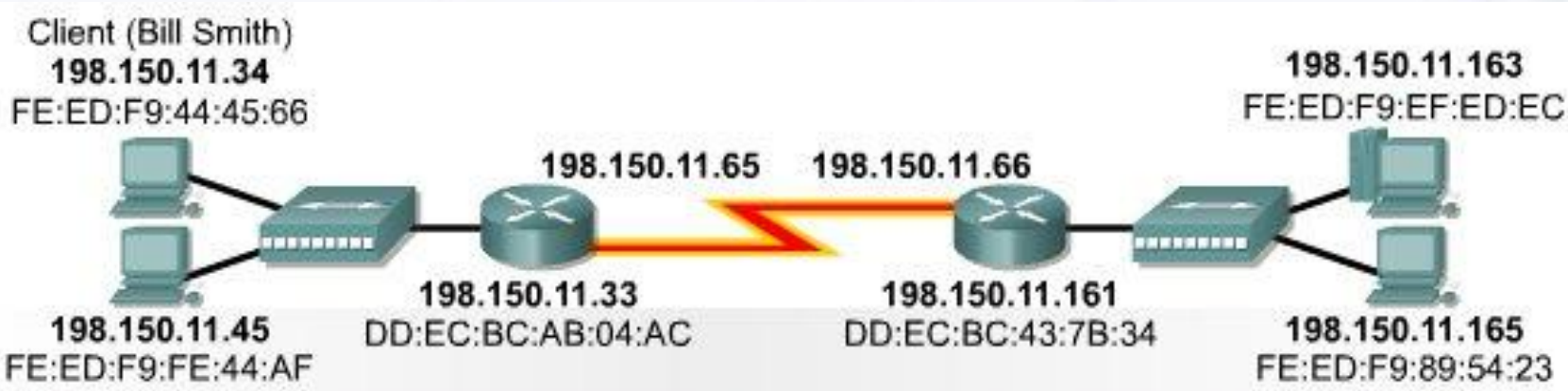


Esempio di trasmissione dati

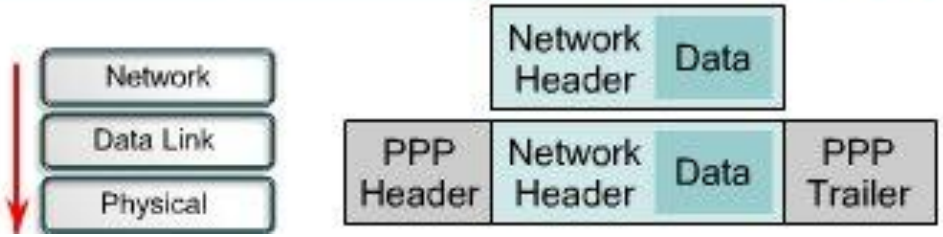


198.150. 11.163	**IP Address**
255.255.255.224	**Subnet mask**
198.150. 11.160	**Result**

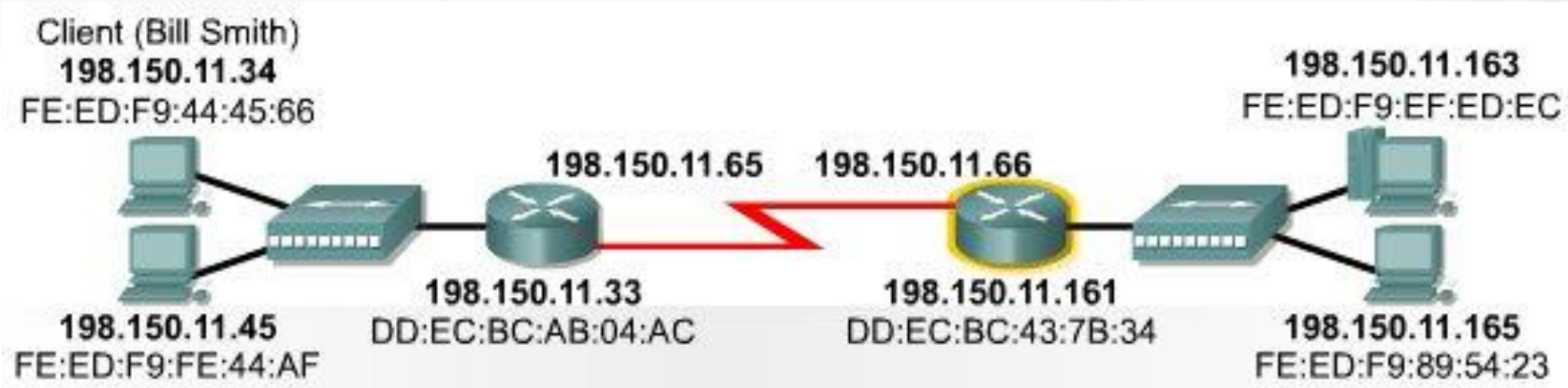
Esempio di trasmissione dati

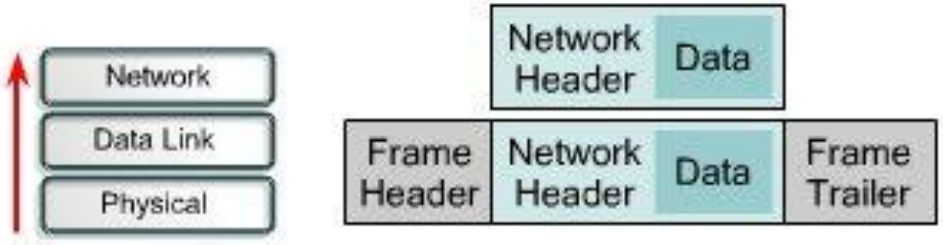


Frame Header		Network Header		Data	Frame Trailer
Destination	Source	Source	Destination		
PPP	PPP	198.150.11.34	198.150.11.163	E-mail	CRC-32

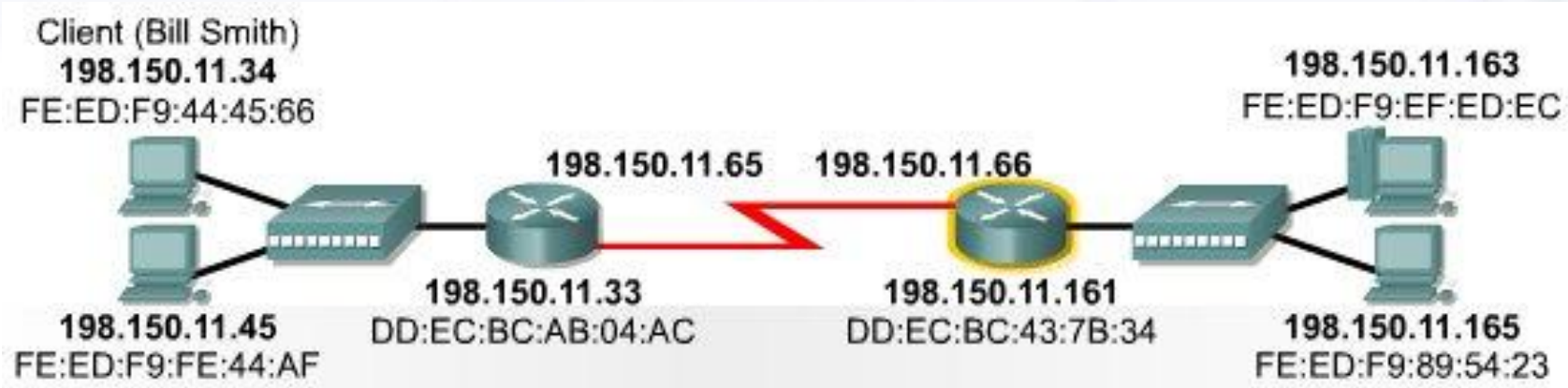


Esempio di trasmissione dati



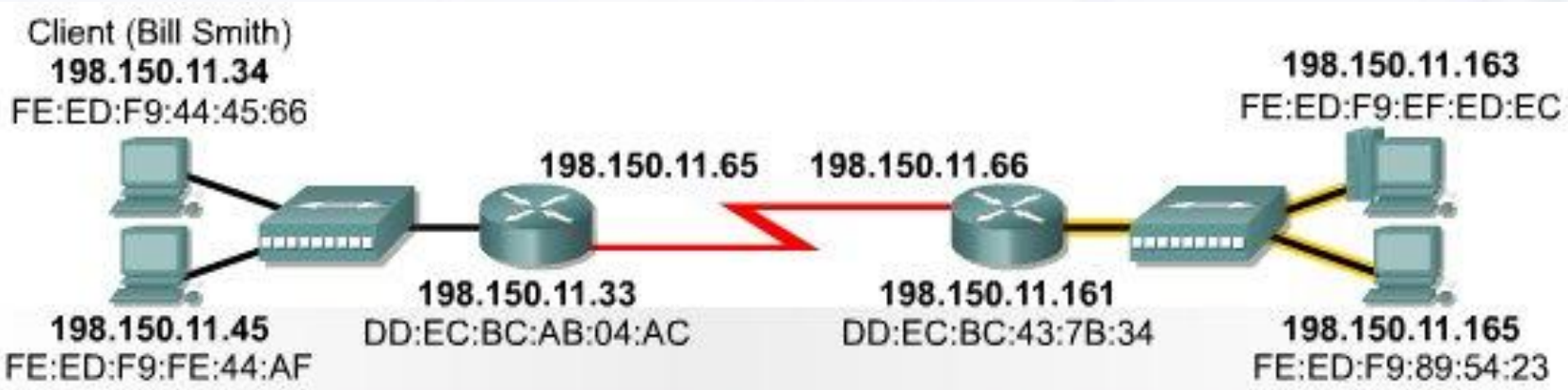


Esempio di trasmissione dati

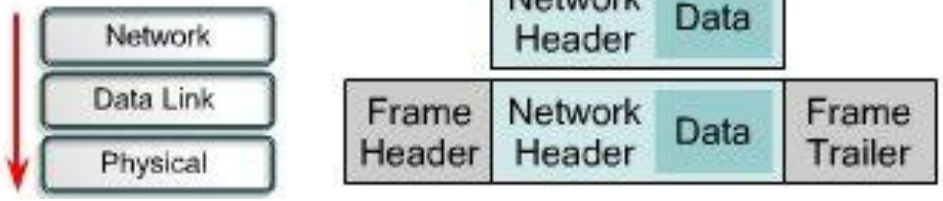


198.150. 11.163	**IP Address**
255.255.255.224	**Subnet mask**
198.150. 11.160	**Result**

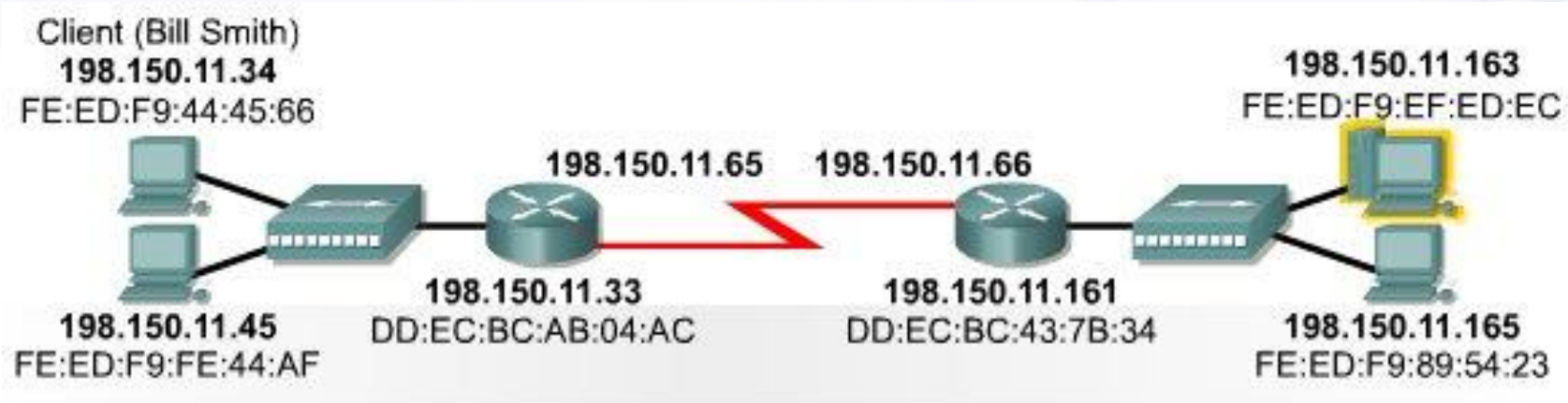
Esempio di trasmissione dati

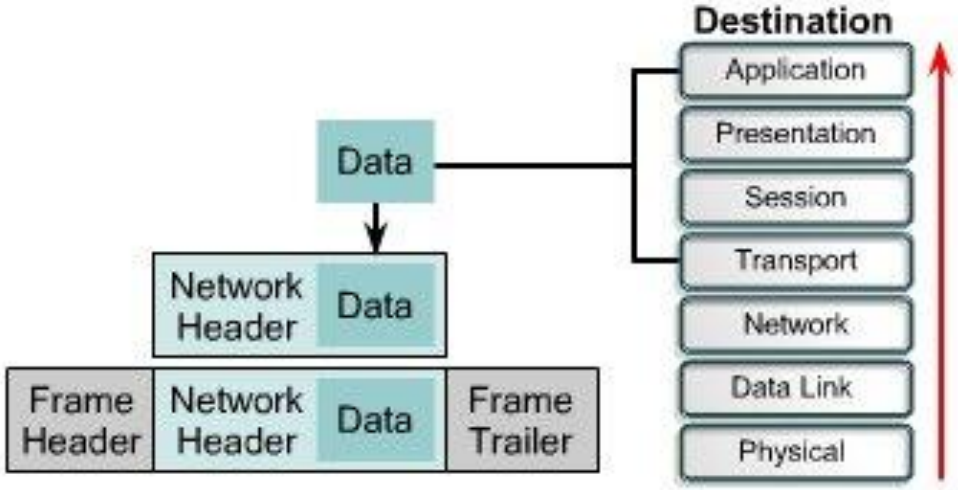


Frame Header		Network Header		Data	Frame Trailer
Destination	Source	Source	Destination		
FE:ED:F9:EF:ED:EC	DD:EC:BC:43:7B:34	198.150.11.34	198.150.11.163	E-mail	CRC-32

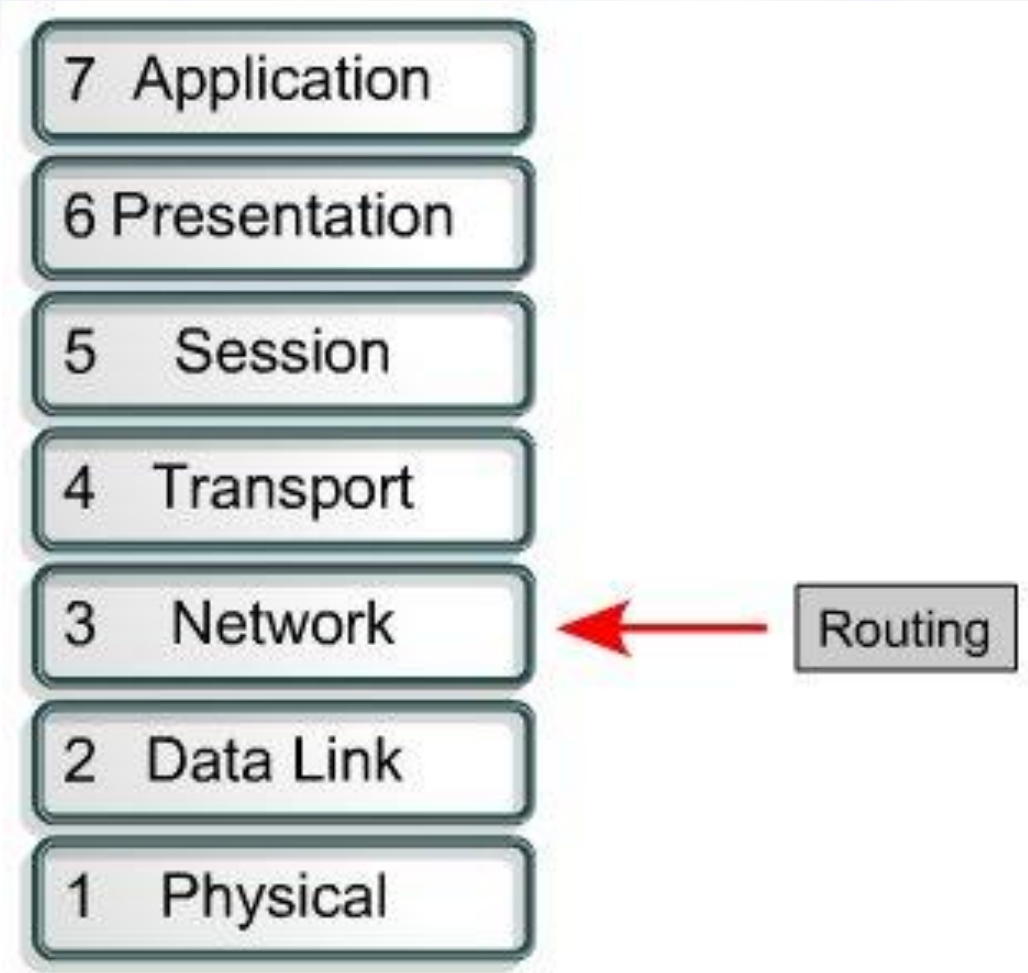


Esempio di trasmissione dati

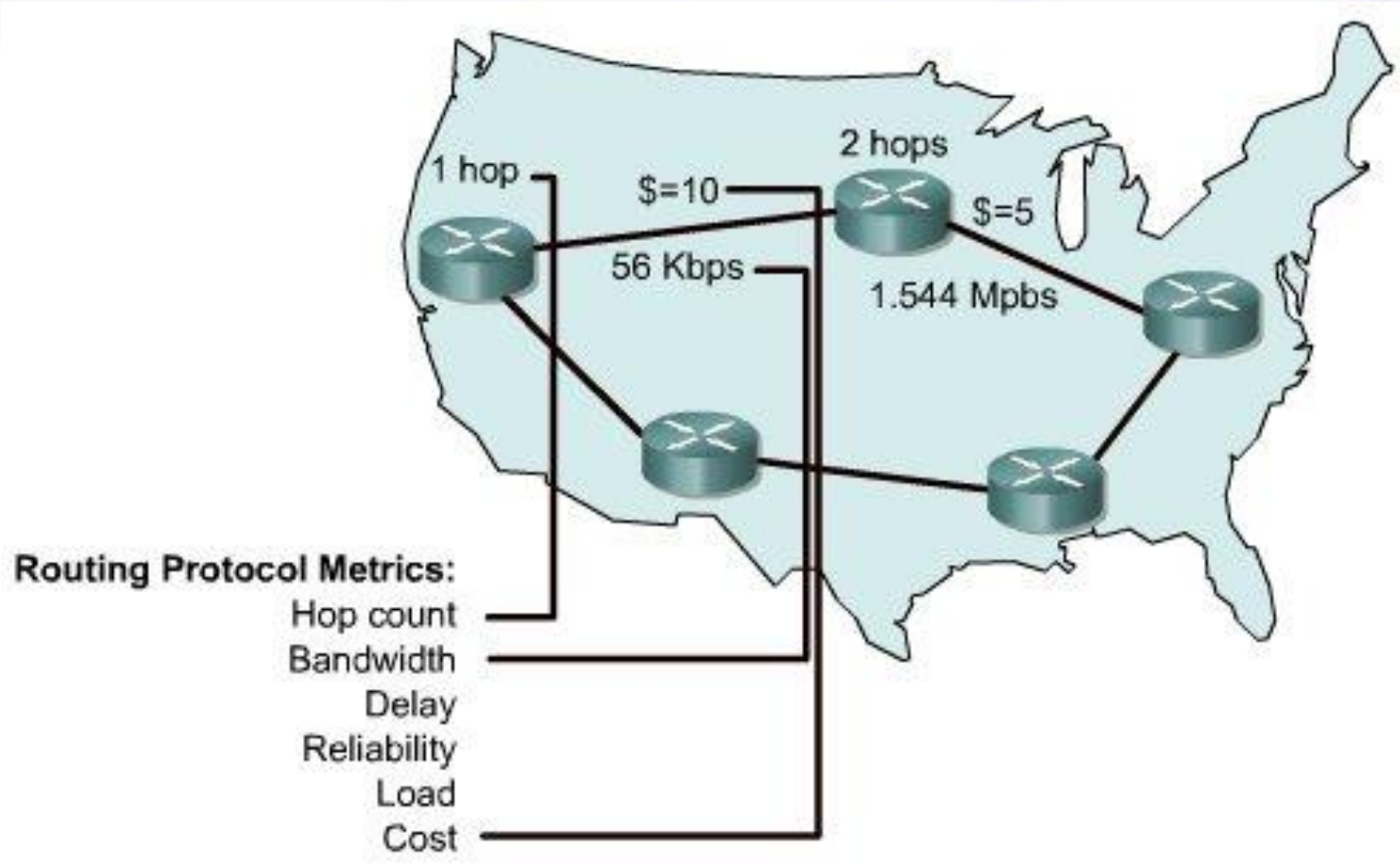




Routing

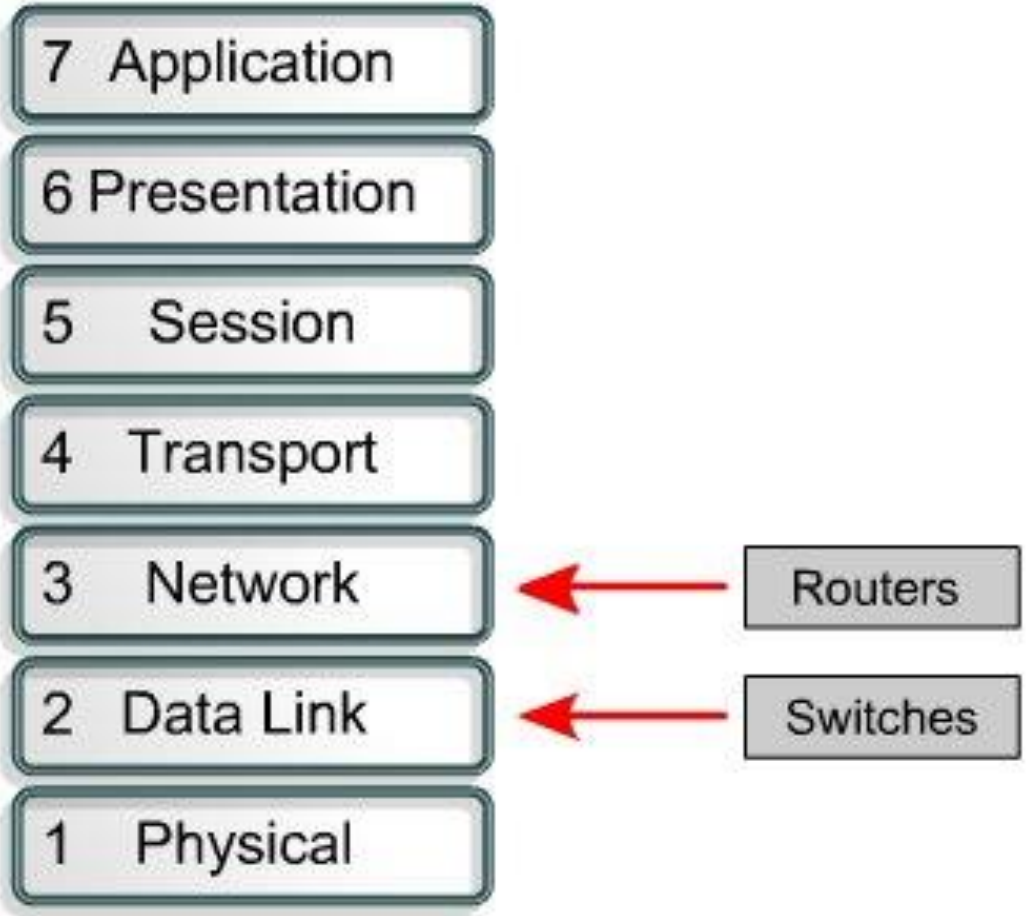

7 Application
6 Presentation
5 Session
4 Transport
3 Network
2 Data Link
1 Physical
Routing

Metrica del Protocollo di Routing



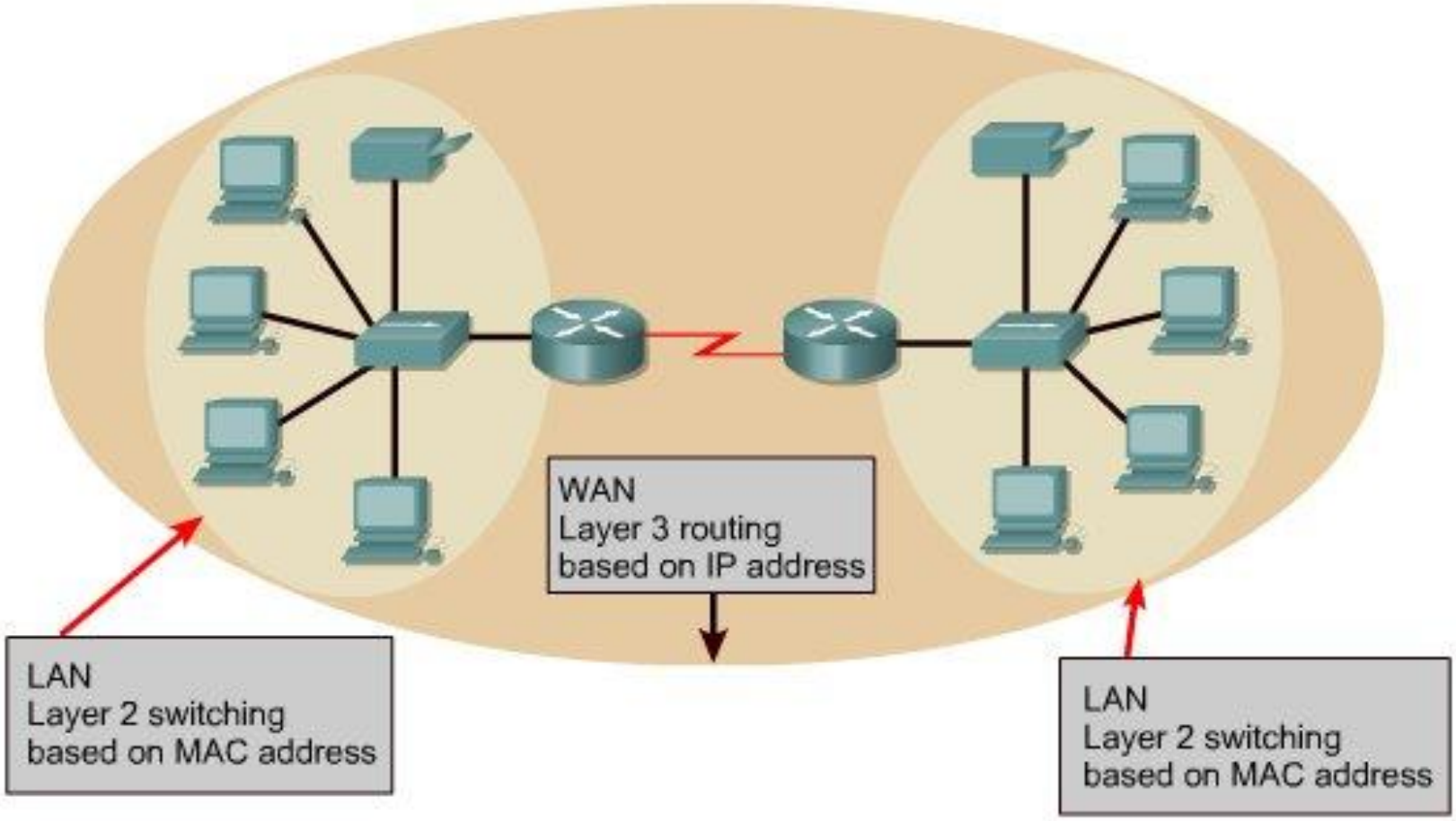
Routing VS Switching

Network Layer



Routing VS Switching

Network Layer



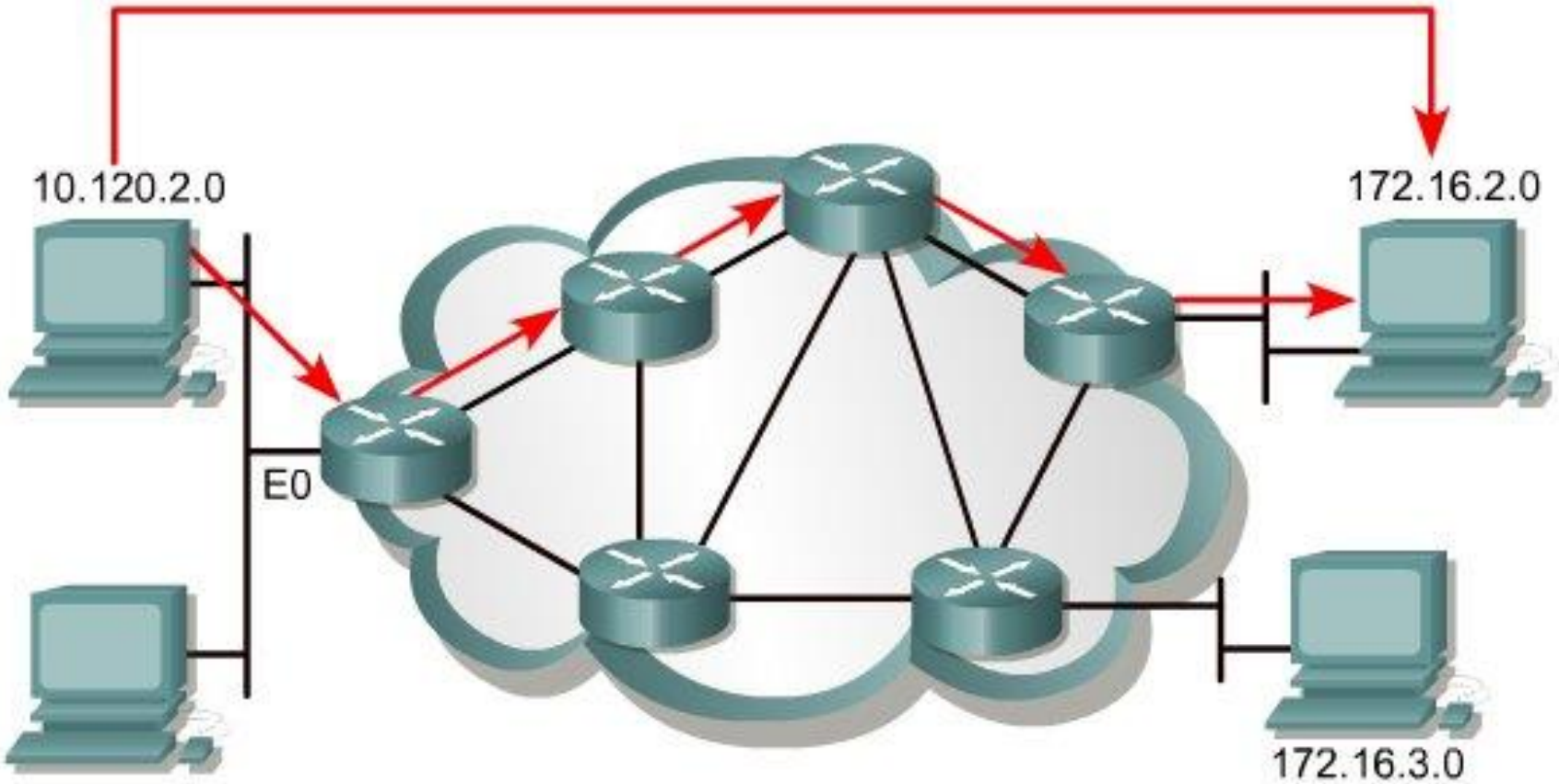
Routing VS Switching

Tabella riepilogativa

Features	Router	Switch
Speed	Slower	Faster
OSI Layer	Layer 3	Layer 2
Addressing used	IP	MAC
Broadcasts	Blocks	Forwards
Security	Higher	Lower

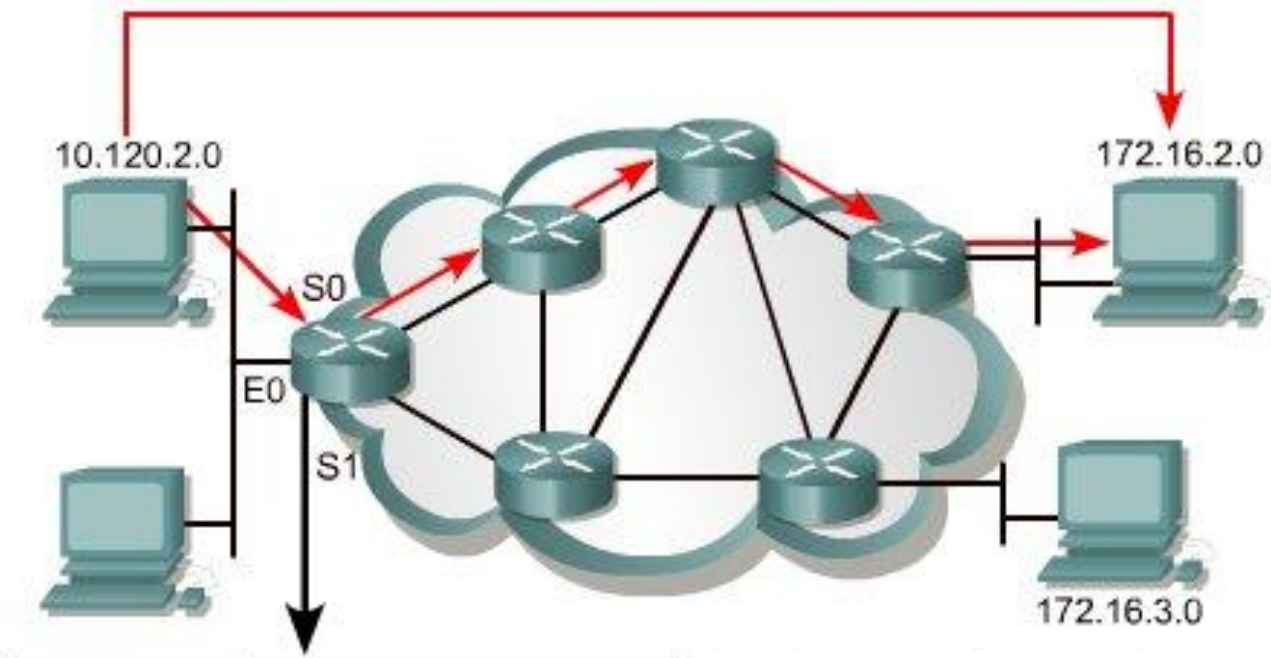
Routed VS Routing Protocol

Routed Protocol



Routed VS Routing Protocol

Routing Protocol



Network Protocol	Destination Network	Exit Interface
Connected	10.120.2.0	E0
RIP	172.16.2.0	S0
IGRP	172.16.3.0	S1

I Protocolli di Routing sono usati tra i Router per determinare e mantenere il Percorso nelle tabelle di routing

Dopo che il percorso è determinato, il Router può instradare i Protocolli di tipo routed

Routing Protocol
Algoritmi di Routing e metriche

Protocol	Metric	Maximum number of routers	Origins
RIP	Hop count	15	Xerox
IGRP	• Bandwidth • Load • Delay • Reliability	255	Cisco

Subnetting

Class A	Network	Host		
Octet	1	2	3	4

Class B	Network		Host	
Octet	1	2	3	4

Class C	Network			Host
Octet	1	2	3	4

Class D	Host			
Octet	1	2	3	4

Subnetting rete di classe C

Class C network address 192.168.10.0
11000000.10101000.00001010.00000000 N . N . N . H
11000000.10101000.00001010.00000000 N . N . N . sN H In this example three bits have been assigned to designate the subnet.

Subnetting rete di classe B

Class B network address 147.10.0.0
10010011.00001010.00000000.00000000 N . N . H . H
10010011.00001010.00000000.00000000 N . N . sN H. H In this example five bits have been assigned to designate the subnet.

Subnetting rete di classe A

Class A network address 28.0.0.0
00011100.00000000.00000000.00000000 N . H . H . H
00011100.00000000.00000000.00000000 N . sN . sN H . H In this example twelve bits have been assigned to designate the subnet.

Subnetting

Bits borrowed	1	2	3	4	5	6	7	8
Value	128	64	32	16	8	4	2	1

Slash format	/25	/26	/27	/28	/29	/30	N/A	N/A
Mask	128	192	224	240	248	252	254	255
Bits borrowed	1	2	3	4	5	6	7	8
Value	128	64	32	16	8	4	2	1

Subnetting

Tabella riepilogativa

Slash format	/25	/26	/27	/28	/29	/30	N/A	N/A
Mask	128	192	224	240	248	252	254	255
Bits borrowed	1	2	3	4	5	6	7	8
Value	128	64	32	16	8	4	2	1
Total Subnets		4	8	16	32	64		
Usable Subnets		2	6	14	30	62		
Total Hosts		64	32	16	8	4		
Usable Hosts		62	30	14	6	2		

Subnetting

Esempio di subnetting

Subnetwork #	Subnetwork ID	Host Range	Broadcast ID
0	192.168.10.0	.1--.30	192.168.10.31
1	192.168.10.32	.33--.62	192.168.10.63
2	192.168.10.64	.65--.94	192.168.10.95
3	192.168.10.96	.97--.126	192.168.10.127
4	192.168.10.128	.129--.158	192.168.10.159
5	192.168.10.160	.161--.190	192.168.10.191
6	192.168.10.192	.193--.222	192.168.10.223
7	192.168.10.224	.225--.254	192.168.10.255

Subnetting

Calcolo dell'IP di rete in una subnet

Packet address	201.10.11.65	11001001.00001010.00001011.01000001
AND		
Mask	255.255.255.224	11111111.11111111.11111111.11100000
Subnetwork ID	201.10.11.64	11001001.00001010.00001011.01000000