

Network Security



Intro.

<https://hermanka.github.io>



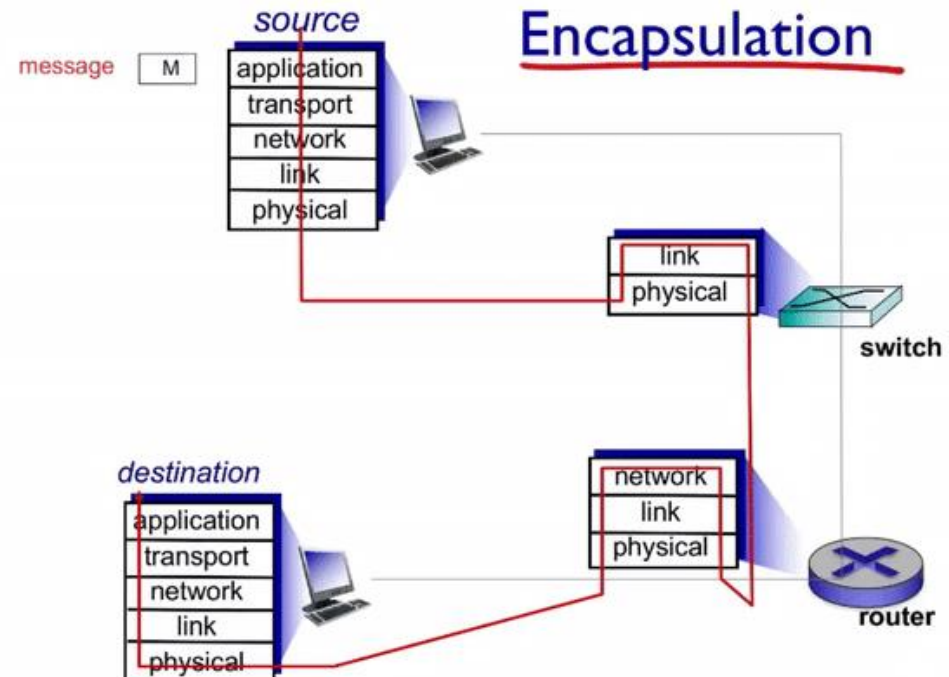
Network Fundamentals

- OSI Layer
- Network devices
- Routing
- Network security
- Programming



OSI (Open System Interconnection) Layers

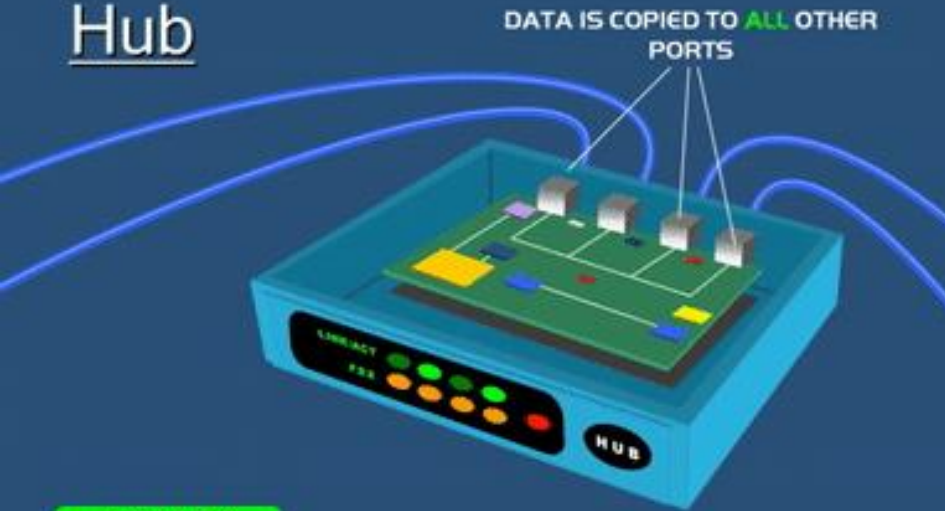
Layer	Function	Example
Application (7)	Services that are used with end user applications	SMTP,
Presentation (6)	Formats the data so that it can be viewed by the user Encrypt and decrypt	JPG, GIF, HTTPS, SSL, TLS
Session (5)	Establishes/ends connections between two hosts	NetBIOS, PPTP
Transport (4)	Responsible for the transport protocol and error handling	TCP, UDP
Network (3)	Reads the IP address from the packet.	Routers, Layer 3 Switches
Data Link (2)	Reads the MAC address from the data packet	Switches
Physical (1)	Send data on to the physical wire.	Hubs, NICS, Cable





Network Devices

Hub



HUB TABLE	
PORT	DEVICE
1	DETECTED
2	DETECTED
3	DETECTED
4	DETECTED

Switch

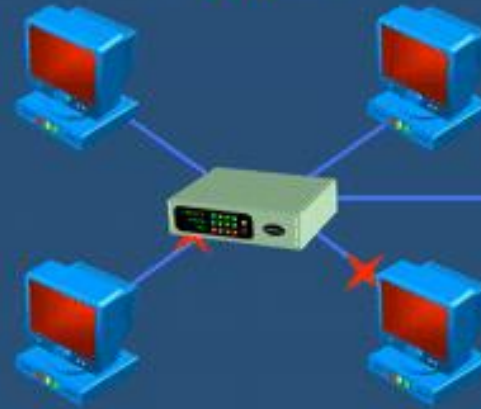


SWITCH TABLE		
PORT	DEVICE	MAC ADDRESS
1	DETECTED	00-04-5A-63-A1-66
2	DETECTED	90-02-7B-C2-CD-67
3	DETECTED	32-07-9A-92-A2-00
4	DETECTED	72-00-FA-63-A9-66

Router

Network Devices

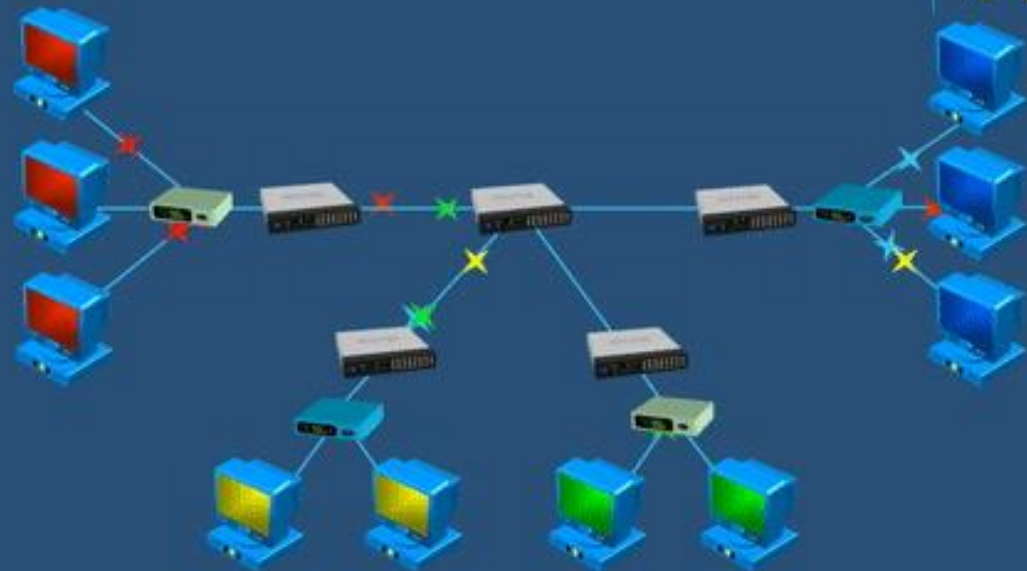
The **RED** network



Data rejected by router.
Sent off to another network.



Router





Don't you remember?



PC-A

192.168.0.1



PC-B

192.168.0.2



PC-C

192.168.2.131

Network Address
192.168.0.0/23



PC-D

192.169.2.3



PC-E

192.168.1.129



PC-F

192.168.1.130



Don't you remember?





Don't you remember?

Tentukan network address,
broadcast address dan range host
address dari suatu host yang
alamatnya ***192.168.91.20/28*** !



Don't you remember?

QUESTION

NETWORK ADDRESS

Netmask /28

11111111 . 11111111 . 11111111 . 11110000

Host Address

192 . 168 . 91 . 20

11000000 . 10101000 . 01011011 . 00010100

Network Address

11000000 . 10101000 . 01011011 . 00010000

192	.	168	.	91	.	16
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ANSWER



Don't you remember?

BROADCAST ADDRESS

Netmask /28

11111111 . 11111111 . 11111111 . 11110000

Host
Address

192 . 168 . 91 . 20

11000000 . 10101000 . 01011011 . 00010100

Broadcast
Address

11000000 . 10101000 . 01011011 . 00011111

192	.	168	.	91	.	31
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Don't you remember?

1ST HOST ADDRESS

Netmask /28

11111111 . 11111111 . 11111111 . 11110000

Host Address

192 . 168 . 91 . 20

11000000 . 10101000 . 01011011 . 00010100

1st Host Address

11000000 . 10101000 . 01011011 . 00010001

192	.	168	.	91	.	17
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Don't you remember?

LAST HOST ADDRESS

Netmask /28

11111111 . 11111111 . 11111111 . 11110000

Host Address

192 . 168 . 91 . 20

11000000 . 10101000 . 01011011 . 00010100

Last Host Address

11000000 . 10101000 . 01011011 . 00011110

192 . 168 . 91 . 30



Don't you remember?

Hitunglah jumlah host dari suatu
network yang memiliki
prefix /24 !



Don't you remember?

MENGHITUNG JUMLAH HOST

y = banyaknya **bit-0** di dalam netmask

$$JH = 2^y - 2$$

JH = Jumlah Host per network



Don't you remember?

$$y = 8$$

/24 11111111 . 11111111 . 11111111 . 00000000

$$JH = 2^y - 2 = 2^8 - 2 = 256 - 2$$

254 host



Exercise

- Install a Virtualbox
- Install a guest OS
- Ping Guest to Host IP, and vice versa





Host Only Connection

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 1 . 2

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 1 . 1

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: 192 . 168 . 1 . 2

Alternate DNS server: 192 . 168 . 1 . 1

☐ Validate settings upon exit

Advanced...

OK Cancel

Server IP

Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP address: 192 . 168 . 1 . 3

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 1 . 1

☐ Obtain DNS server address automatically

☒ Use the following DNS server addresses:

Preferred DNS server: 192 . 168 . 1 . 2

Alternate DNS server: 192 . 168 . 1 . 1

☐ Validate settings upon exit

Advanced...

OK Cancel

Client IP

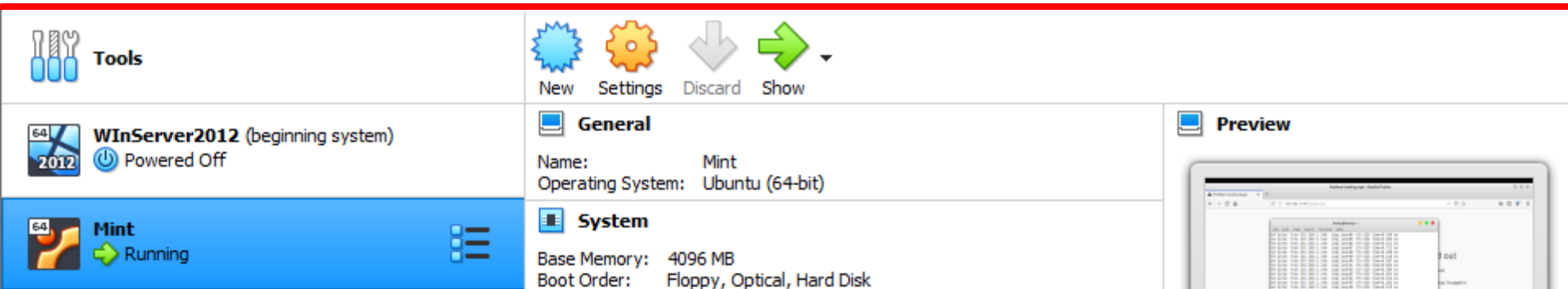
```
C:\Users\herma>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128
```

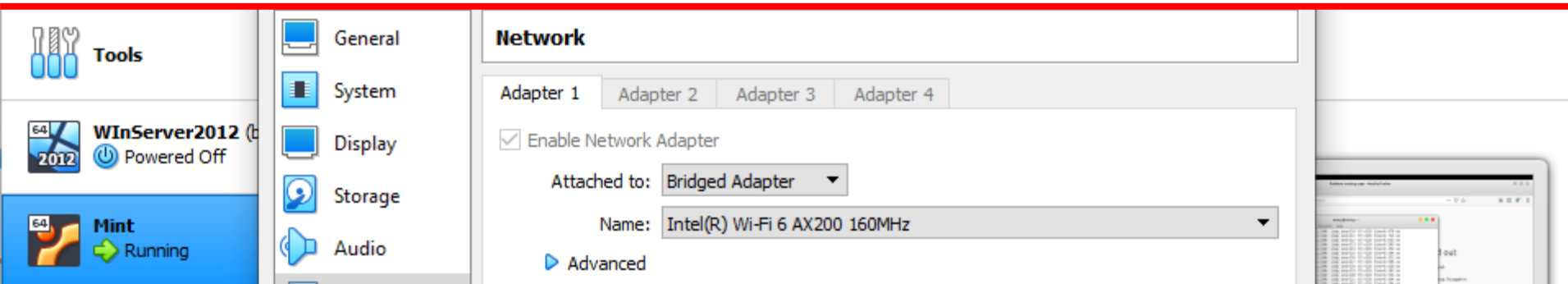


Bridge Connection

Buka Settings/Pengaturan pada VM



Ganti Pilihan “Attached to” menjadi Bridged Adapter



Lakukan ping test dari host dan guest