JARINGAN KOMPUTER LANJUT

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PROGRAM STUDI TEKNIK INFORMATIKA

FAKULTAS ILMU KOMPUTER

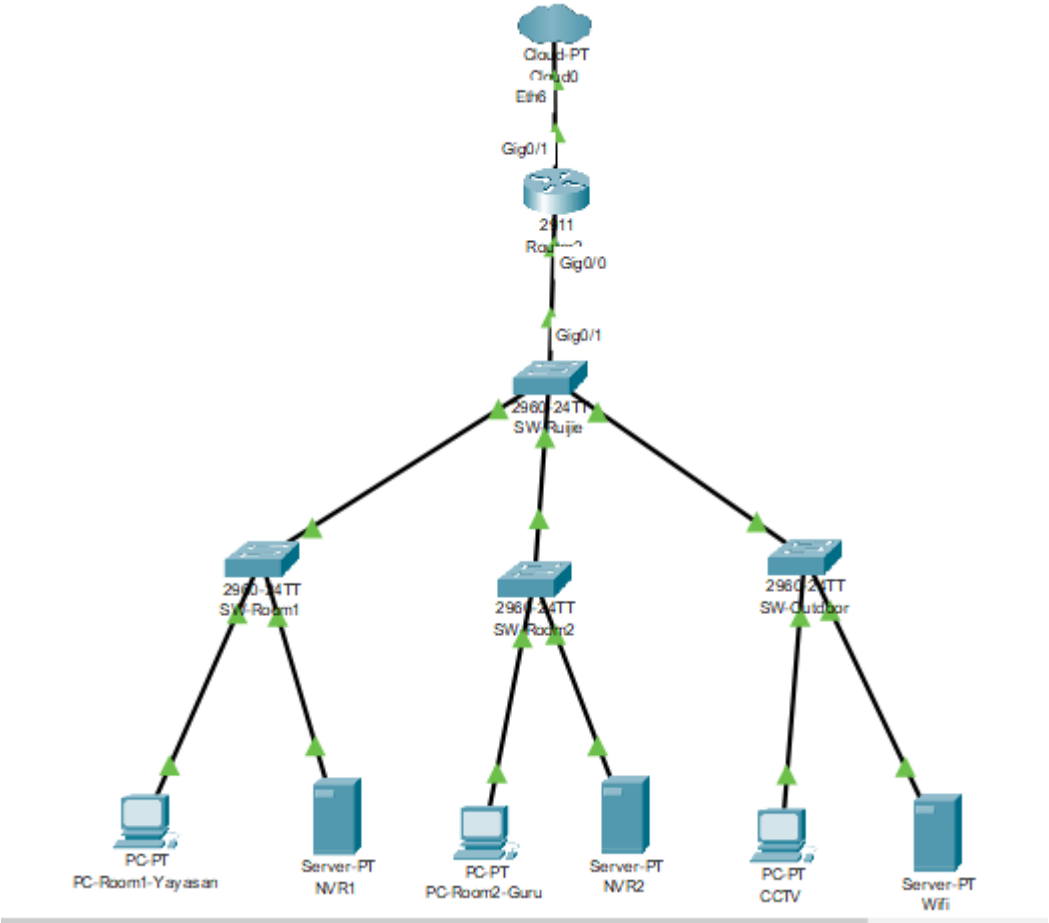
UNIVERSITAS ESA UNGGUL

TANGERANG

2025

1. **Alat dan bahan**
   Software: Cisco Packet Tracer
   Perangkat Simulasi:
   - 1x Router (Router 2911)
   - 1x Switch (Switch 2960 24TT)
   - 3x Switch tambahan untuk setiap VLAN (Switch 2960)
   - 2x PC (Room 1 dan Room 2)
   - 1x IP Camera/Device outdoor
   - 3x Access Point/NVR
   - Straight-Through Cable (garis lurus) → untuk koneksi berbeda jenis device

2. **Desain Topologi**



3. **Langkah – langkah membangun Topologi**
   Tambahkan Perangkat ke workspace
   a. Tambah Router:
      - Klik kategori "Routers" (ikon router)
      - Pilih Router 2911
      - Drag ke workspace (posisi paling atas)
      - Klik router → Physical → matikan power
      - Tambahkan module HWIC-4ESW ke slot kosong (untuk tambahan port)
      - Nyalakan kembali power
   b. Tambah Switch Utama:

- Klik kategori "Switches"
- Pilih Switch 2960-24TT
- Drag ke workspace (di bawah router)

c. Tambah 3 Switch VLAN:
- Tambahkan 3x Switch 2960-24TT
- Susun horizontal di bawah switch utama
- Label dari kiri ke kanan: "SW-Room1", "SW-Room2", "SW-Outdoor"

d. Tambah End Devices:
- 2x PC → End Devices → PC-PT
- 3x Server → End Devices → Server-PT (sebagai NVR dan WiFi AP)
- 1x IP Camera → End Devices → IP Camera (atau gunakan PC sebagai CCTV)

e. Tambah Internet:
- Network Devices → WAN Emulation → Cloud-PT

Hubungkan perangkat dengan kabel

a. Koneksi Router ke Switch Utama:
- Klik ikon kabel (lightning bolt) → pilih Copper Straight-Through
- Klik Router → pilih port GigabitEthernet0/0
- Klik SW-Ruijie → pilih port GigabitEthernet0/1
- Tunggu hingga lampu berubah hijau

b. Koneksi Switch Utama ke Switch VLAN:
- Kabel Straight-Through: SW-Ruijie Gig0/2 → SW-Room1 Gig0/1
- Kabel Straight-Through: SW-Ruijie Fa0/3 → SW-Room2 Gig0/1
- Kabel Straight-Through: SW-Ruijie Fa0/4 → SW-Outdoor Gig0/1

c. Koneksi End Devices ke Switch:
Switch Room1 (VLAN 10 & 40):
- SW-Room1 Fa0/1 → PC Room 1 Fa0
- SW-Room1 Fa0/2 → NVR Room 1 Fa0

Switch Room2 (VLAN 20 & 80):
- SW-Room2 Fa0/1 → PC Room 2 Fa0
- SW-Room2 Fa0/2 → NVR Room 2 Fa0

Switch Outdoor (VLAN 30 & 50):
- SW-Outdoor Fa0/1 → CCTV Fa0
- SW-Outdoor Fa0/2 → WiFi AP Fa0

d. Koneksi Router ke Internet:
- Router Gig0/1 → Cloud/ISP Ethernet0

4. Konfigurasi VLAN

a. Konfigurasi VLAN di router
- Klik Router → Tab CLI
- Masukkan perintah berikut:

```
enable
configure terminal

! Konfigurasi VLAN 10 - Yayasan (Room 1)
interface GigabitEthernet0/0.10
encapsulation dot1Q 10
```

```
ip address 192.168.10.1 255.255.255.0
no shutdown
exit

! Konfigurasi VLAN 20 - Guru (Room 2)
interface GigabitEthernet0/0.20
encapsulation dot1Q 20
ip address 192.168.20.1 255.255.255.0
no shutdown
exit

! Konfigurasi VLAN 30 - CCTV (Outdoor)
interface GigabitEthernet0/0.30
encapsulation dot1Q 30
ip address 192.168.30.1 255.255.255.0
no shutdown
exit

! Konfigurasi VLAN 40 - NVR Room 1
interface GigabitEthernet0/0.40
encapsulation dot1Q 40
ip address 192.168.40.1 255.255.255.0
no shutdown
exit

! Konfigurasi VLAN 50 - WiFi Hotspot
interface GigabitEthernet0/0.50
encapsulation dot1Q 50
ip address 192.168.50.1 255.255.255.0
no shutdown
exit

! Konfigurasi VLAN 80 - NVR Room 2
interface GigabitEthernet0/0.80
encapsulation dot1Q 80
ip address 192.168.80.1 255.255.255.0
no shutdown
exit

! Aktifkan interface fisik utama
interface GigabitEthernet0/0
no shutdown
exit

exit
write memory
```

b. Konfigurasi VLAN di Switch Utama (SW-Ruijie)
Switch utama menghubungkan router dengan semua switch VLAN.
Masuk ke CLi SW-Ruijie:

```
enable
configure terminal

! Buat VLAN
vlan 10
name Yayasan
exit

vlan 20
name Guru
exit

vlan 30
name CCTV
exit

vlan 40
name NVR-Room1
exit

vlan 50
name WiFi-Hotspot
exit

vlan 80
name NVR-Room2
exit

! Port ke Router (TRUNK - lewati semua VLAN)
interface GigabitEthernet0/1
switchport mode trunk
switchport trunk allowed vlan 10,20,30,40,50,80
no shutdown
exit

! Port ke SW-Room1 (TRUNK)
interface GigabitEthernet0/2
switchport mode trunk
switchport trunk allowed vlan 10,40
no shutdown
exit

! Port ke SW-Room2 (TRUNK)
interface FastEthernet0/3
switchport mode trunk
switchport trunk allowed vlan 20,80
```

```
no shutdown
exit

! Port ke SW-Outdoor (TRUNK)
interface FastEthernet0/4
switchport mode trunk
switchport trunk allowed vlan 30,50
no shutdown
exit

exit
write memory
```

c. Konfigurasi SW-Room1
Switch Room1 menangani VLAN 10 (Yayasan) dan VLAN 40 (NVR Room1).
Masuk ke CLI SW-Room1:

```
enable
configure terminal

! Buat VLAN
vlan 10
name Yayasan
exit

vlan 40
name NVR-Room1
exit

! Port ke SW-Ruijie (TRUNK)
interface GigabitEthernet0/1
switchport mode trunk
switchport trunk allowed vlan 10,40
no shutdown
exit

! Port ke PC Room 1 (ACCESS - VLAN 10)
interface FastEthernet0/1
switchport mode access
switchport access vlan 10
no shutdown
exit

! Port ke NVR Room 1 (ACCESS - VLAN 40)
interface FastEthernet0/2
switchport mode access
switchport access vlan 40
no shutdown
exit
```

```
exit
write memory
```

d. Konfigurasi SW-Room2
Switch Room2 menangani VLAN 20 (Guru) dan VLAN 80 (NVR Room2).
Masuk ke CLI SW-Room2:

```
enable
configure terminal

! Buat VLAN
vlan 20
name Guru
exit

vlan 80
name NVR-Room2
exit

! Port ke SW-Ruijie (TRUNK)
interface GigabitEthernet0/1
switchport mode trunk
switchport trunk allowed vlan 20,80
no shutdown
exit

! Port ke PC Room 2 (ACCESS - VLAN 20)
interface FastEthernet0/1
switchport mode access
switchport access vlan 20
no shutdown
exit

! Port ke NVR Room 2 (ACCESS - VLAN 80)
interface FastEthernet0/2
switchport mode access
switchport access vlan 80
no shutdown
exit

exit
write memory
```

e. Konfigurasi SW-Outdoor
Switch Outdoor menangani VLAN 30 (CCTV) dan VLAN 50 (WiFi).
Masuk ke CLI SW-Outdoor:

```
enable
configure terminal
```

```
! Buat VLAN
vlan 30
name CCTV
exit

vlan 50
name WiFi-Hotspot
exit

! Port ke SW-Ruijie (TRUNK)
interface GigabitEthernet0/1
switchport mode trunk
switchport trunk allowed vlan 30,50
no shutdown
exit

! Port ke IP Camera (ACCESS - VLAN 30)
interface FastEthernet0/1
switchport mode access
switchport access vlan 30
no shutdown
exit

! Port ke WiFi AP (ACCESS - VLAN 50)
interface FastEthernet0/2
switchport mode access
switchport access vlan 50
no shutdown
exit

exit
write memory
```

f. Konfigurasi IP di End Devices
   1) PC Room 1 (VLAN 10 - Yayasan):
      - IP Address: 192.168.10.2
      - Subnet Mask: 255.255.255.0
      - Default Gateway: 192.168.10.1
   2) PC Room 2 (VLAN 20 - Guru):
      - IP Address: 192.168.20.2
      - Subnet Mask: 255.255.255.0
      - Default Gateway: 192.168.20.1
   3) IP Camera (VLAN 30 - CCTV):
      - IP Address: 192.168.30.2
      - Subnet Mask: 255.255.255.0
      - Default Gateway: 192.168.30.1
   4) NVR Room 1 (VLAN 40):

- IP Address: 192.168.40.2
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.40.1

5) WiFi AP (VLAN 50):
   - IP Address: 192.168.50.2
   - Subnet Mask: 255.255.255.0
   - Default Gateway: 192.168.50.1
6) NVR Room 2 (VLAN 80):
   - IP Address: 192.168.80.2
   - Subnet Mask: 255.255.255.0
   - Default Gateway: 192.168.80.1

5. Verifikasi Konfigurasi

a) Di Router:

show ip interface brief

```
Router>show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES unset  up                    up
GigabitEthernet0/0.10  192.168.10.1    YES manual up                    up
GigabitEthernet0/0.20  192.168.20.1    YES manual up                    up
GigabitEthernet0/0.30  192.168.30.1    YES manual up                    up
GigabitEthernet0/0.40  192.168.40.1    YES manual up                    up
GigabitEthernet0/0.50  192.168.50.1    YES manual up                    up
GigabitEthernet0/0.80  192.168.80.1    YES manual up                    up
GigabitEthernet0/1     unassigned      YES unset  up                    up
GigabitEthernet0/2     unassigned      YES unset  administratively down down
FastEthernet0/0/0      unassigned      YES unset  up                    down
FastEthernet0/0/1      unassigned      YES unset  up                    down
FastEthernet0/0/2      unassigned      YES unset  up                    down
FastEthernet0/0/3      unassigned      YES unset  up                    down
Vlan1                  unassigned      YES unset  administratively down down
Router>
```

show vlan-switch

```
Router>show vlan-switch

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/0/0, Fa0/0/1, Fa0/0/2, Fa0/0/3
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
1005 trnet 101005     1500  -      -      -        ibm  -        0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Transl Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs
------------------------------------------------------------------------------

 --More--
```

b) Di Switch:

show vlan brief

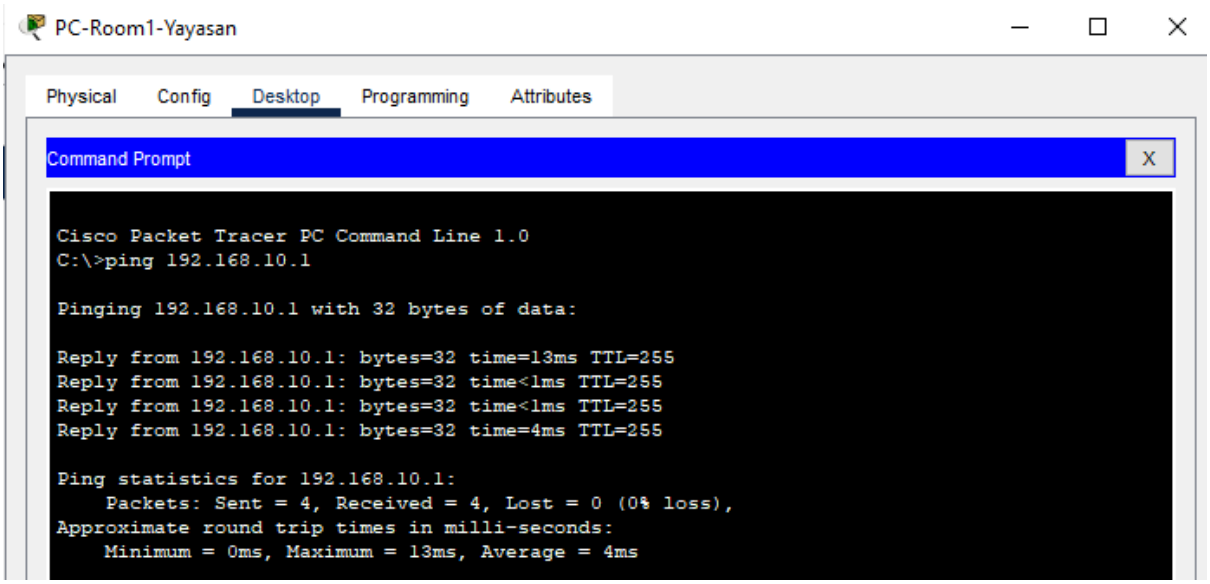
```
Switch>show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/1, Fa0/2, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                 Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                 Fa0/23, Fa0/24
10   Yayasan                           active
20   Guru                              active
30   CCTV                              active
40   NVR-Room1                         active
50   Wifi-Hotspot                      active
80   NVR-Room2                         active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
```

show interface trunk

```
Switch>show interface trunk
Port        Mode         Encapsulation  Status        Native vlan
Fa0/3       on           802.1q         trunking      1
Fa0/4       on           802.1q         trunking      1
Gig0/1      on           802.1q         trunking      1
Gig0/2      on           802.1q         trunking      1

Port        Vlans allowed on trunk
Fa0/3       20,80
Fa0/4       30,50
Gig0/1      10,20,30,40,50,80
Gig0/2      10,40

Port        Vlans allowed and active in management domain
Fa0/3       20,80
Fa0/4       30,50
Gig0/1      10,20,30,40,50,80
Gig0/2      10,40

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/3       20,80
Fa0/4       30,50
Gig0/1      10,20,30,40,50,80
 --More--
```

c) Test Koneksi

- Dari PC Room 1, ping ke gateway: ping 192.168.10.1



- Dari PC Room 1, ping ke CCTV dan NVR-Room1: ping 192.168.30.2, ping 192.168.40.2