

# Campus Network Design and Implementation

## Computer Network-1 Course Project

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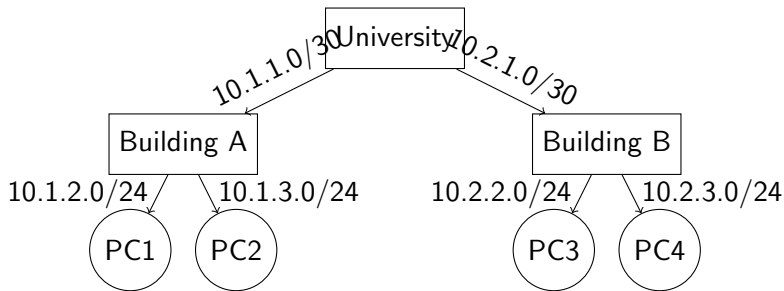
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# Network Diagram



# Network Configuration

- ▶ MikroTik RouterOS is used for routers.
- ▶ Each router uses a unique identity and interface addressing.
- ▶ PCs have static IP addresses and default gateways.
- ▶ Subnetting: 10.1.x.x for Building A, 10.2.x.x for Building B.

# Router Configuration: University Router (R1)

```
1 system identity set name="university"  
2 ip address add address=10.1.1.1/30 interface=ether1  
3 ip address add address=10.2.1.1/30 interface=ether2
```

- ▶ Connects to Building A and B routers.
- ▶ /30 subnets for point-to-point links.

## Router Configuration: Building A Router (R2)

```
1 system identity set name="Building_A"  
2 ip address add address=10.1.1.2/30 interface=ether1  
3 ip address add address=10.1.2.1/24 interface=ether2  
4 ip address add address=10.1.3.1/24 interface=ether3
```

- ▶ ether1: Uplink to University Router
- ▶ ether2: First LAN subnet for PC1
- ▶ ether3: Second LAN subnet for PC2

## Router Configuration: Building B Router (R3)

```
1 system identity set name="Building_B"  
2 ip address add address=10.2.1.2/30 interface=ether1  
3 ip address add address=10.2.2.1/24 interface=ether2  
4 ip address add address=10.2.3.1/24 interface=ether3
```

- ▶ ether1: Uplink to University Router
- ▶ ether2: First LAN subnet for PC3
- ▶ ether3: Second LAN subnet for PC4

# PC Configuration: Building A

```
1 # PC1
2 PC1> ip 10.1.2.2/24 10.1.2.1
3 # PC2
4 PC2> ip 10.1.3.2/24 10.1.3.1
```

- ▶ Each PC has a static IP and gateway.
- ▶ Test: ping 10.1.2.1 or ping 10.1.3.1



# PC Configuration: Building B

```
1 # PC3
2 PC3> ip 10.2.2.2/24 10.2.2.1
3 # PC4
4 PC4> ip 10.2.3.2/24 10.2.3.1
```

- ▶ Each PC has a static IP and gateway.
- ▶ Test: ping 10.2.2.1 or ping 10.2.3.1

# RIP Configuration: University Router

```
1 # Enable RIP on relevant interfaces
2 routing rip interface add interface=ether1 send=v2 receive
   =v2
3 routing rip interface add interface=ether2 send=v2 receive
   =v2
4 # Tell RIP about directly connected subnets
5 routing rip network add network=10.1.1.0/30
6 routing rip network add network=10.2.1.0/30
7 # Set RIP settings
8 routing rip set redistribute-connected=yes
9 routing rip set update-timer=15s
10 routing rip set timeout-timer=30s
11 routing rip set garbage-timer=30s
```

# RIP Configuration: Building A Router

```
1 routing rip interface add interface=ether1 send=v2 receive  
   =v2  
2 routing rip interface add interface=ether2 send=v2 receive  
   =v2  
3 routing rip interface add interface=ether3 send=v2 receive  
   =v2  
4 routing rip network add network=10.1.1.0/30  
5 routing rip network add network=10.1.2.0/24  
6 routing rip network add network=10.1.3.0/24  
7 routing rip set redistribute-connected=yes  
8 routing rip set update-timer=15s  
9 routing rip set timeout-timer=30s  
10 routing rip set garbage-timer=30s
```

# RIP Configuration: Building B Router

```
1 routing rip interface add interface=ether1 send=v2 receive  
   =v2  
2 routing rip interface add interface=ether2 send=v2 receive  
   =v2  
3 routing rip interface add interface=ether3 send=v2 receive  
   =v2  
4 routing rip network add network=10.2.1.0/30  
5 routing rip network add network=10.2.2.0/24  
6 routing rip network add network=10.2.3.0/24  
7 routing rip set redistribute-connected=yes  
8 routing rip set update-timer=15s  
9 routing rip set timeout-timer=30s  
10 routing rip set garbage-timer=30s
```

## RIP Command Explanations

- ▶ `routing rip interface add interface=etherX send=v2 receive=v2`: Enables RIP version 2 on the router's interface. Only interfaces used to connect other routers should run RIP.
- ▶ `routing rip network add network=10.X.X.0/YY`: Informs RIP which directly-connected networks to advertise to neighbors.
- ▶ `routing rip set redistribute-connected=yes`: Ensures directly-connected networks are included in RIP updates.
- ▶ `routing rip set update-timer=15s`: How often RIP sends updates (default = 30s; lower for lab/small network).
- ▶ `routing rip set timeout-timer=30s`: If no update is received in 30s, the route is considered invalid.
- ▶ `routing rip set garbage-timer=30s`: A route is removed 30s after being marked invalid.

# Verification: End-to-End Connectivity with RIP

## Ping from PC3 to PC2 (Building B to Building A):

```
1 PC3> ping 10.1.3.2
2
3 84 bytes from 10.1.3.2 icmp_seq=1 ttl=61 time=1.491 ms
4 84 bytes from 10.1.3.2 icmp_seq=2 ttl=61 time=1.291 ms
5 84 bytes from 10.1.3.2 icmp_seq=3 ttl=61 time=2.439 ms
```

## Ping from PC1 to PC4 (Building A to Building B):

```
1 PC1> ping 10.2.3.2
2
3 84 bytes from 10.2.3.2 icmp_seq=1 ttl=61 time=1.831 ms
4 84 bytes from 10.2.3.2 icmp_seq=2 ttl=61 time=1.235 ms
5 84 bytes from 10.2.3.2 icmp_seq=3 ttl=61 time=2.860 ms
```

*Successful replies indicate full network reachability via dynamic routing.*

# DHCP Configuration

This section will be added later.

# VLAN Configuration

This section will be added later.



# Network Testing

This section will be added later.

# Conclusion

## ▶ **Current Progress:**

- ▶ Network design completed
- ▶ Basic configuration implemented
- ▶ Local and routed connectivity established

## ▶ **Next Steps:**

- ▶ Add DHCP configuration
- ▶ Add VLAN configuration
- ▶ Document and test full connectivity