

Campus Network Design and Implementation

Computer Network-1 Course Project

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Contributors:

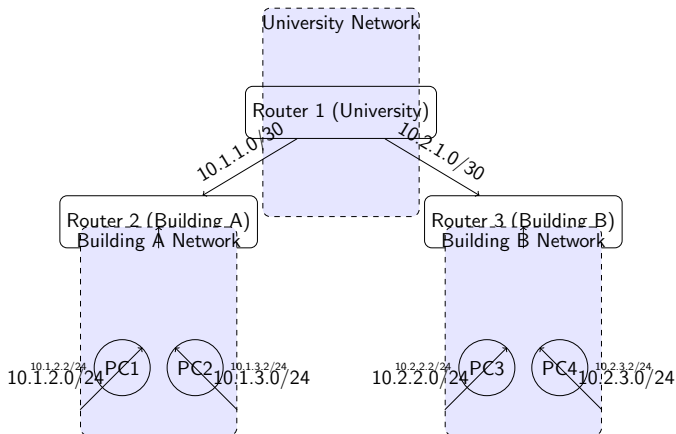
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Network Diagram



Network Configuration

- ▶ The network is configured using MikroTik RouterOS commands
- ▶ Each router has a unique identity and IP addressing scheme
- ▶ PCs are configured with static IP addresses and default gateways
- ▶ The network follows a hierarchical design with:
 - ▶ 10.1.x.x for Building A networks
 - ▶ 10.2.x.x for Building B networks

Router Configuration: University Router (R1)

- 1 `Configure interfaces ip address add address=10.1.1.1/30
interface=ether1 ip address add address=10.2.1.1/30
interface=ether2`

Address	Network	Interface
10.1.1.1/30	10.1.1.0	ether1
10.2.1.1/30	10.2.1.0	ether2

Explanation:

- ▶ The central university router connects to Building A and B routers
- ▶ Point-to-point links use /30 subnets (2 usable addresses)

Router Configuration: Building A Router (R2)

```
2 Configure interfaces ip address add address=10.1.1.2/30  
interface=ether1 ip address add address=10.1.2.1/24  
interface=ether2 ip address add address=10.1.3.1/24  
interface=ether3
```

Address	Network	Interface
10.1.1.2/30	10.1.1.0	ether1
10.1.2.1/24	10.1.2.0	ether2
10.1.3.1/24	10.1.3.0	ether3

Explanation:

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

Router Configuration: Building B Router (R3)

```
3 Configure interfaces ip address add address=10.2.1.2/30  
interface=ether1 ip address add address=10.2.2.1/24  
interface=ether2 ip address add address=10.2.3.1/24  
interface=ether3
```

Address	Network	Interface
10.2.1.2/30	10.2.1.0	ether1
10.2.2.1/24	10.2.2.0	ether2
10.2.3.1/24	10.2.3.0	ether3

Explanation:

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

PC Configuration: Building A

- 4 Test connectivity PC1> ping 10.1.2.1 84 bytes from 10.1.2.1
icmp_seq = 1ttl = 64time = 0.245ms84bytesfrom10.1.2.1icmp_seq = 2ttl =
64time = 0.303ms...
- 5 PC2 Configuration PC2> ip 10.1.3.2/24 10.1.3.1 Checking for
duplicate address... PC2 : 10.1.3.2 255.255.255.0 gateway
10.1.3.1
- 6 Test connectivity PC2> ping 10.1.3.1 84 bytes from 10.1.3.1
icmp_seq = 1ttl = 64time = 0.222ms...

Explanation:

- ▶ Each PC is configured with a static IP and gateway
- ▶ Basic connectivity test confirms links are active

PC Configuration: Building B

- 7 Test connectivity PC3> ping 10.2.2.1 84 bytes from 10.2.2.1
icmp_seq = 1ttl = 64time = 0.187ms...
- 8 PC4 Configuration PC4> ip 10.2.3.2/24 10.2.3.1 Checking for
duplicate address... PC4 : 10.2.3.2 255.255.255.0 gateway
10.2.3.1
- 9 Test connectivity PC4> ping 10.2.3.1 84 bytes from 10.2.3.1
icmp_seq = 1ttl = 64time = 0.211ms84bytesfrom10.2.3.1icmp_seq = 2ttl =
64time = 0.510ms84bytesfrom10.2.3.1icmp_seq = 3ttl = 64time = 0.625ms

Explanation:

- ▶ PC3 and PC4 are configured in their respective subnets
- ▶ Ping tests confirm connectivity to their respective gateways
- ▶ All PCs are properly configured with the correct IP settings

Static/Dynamic Routing

DHCP Configuration

VLAN Configuration

Network Testing

Conclusion

▶ **Current Progress:**

- ▶ Network design has been completed
- ▶ Basic configuration implemented
- ▶ Local connectivity established

▶ **Next Steps:**

- ▶ Configure routing between subnets
- ▶ Set up DHCP for automatic IP assignment
- ▶ Configure VLANs for network segmentation
- ▶ Test full network connectivity