

# Router Operations



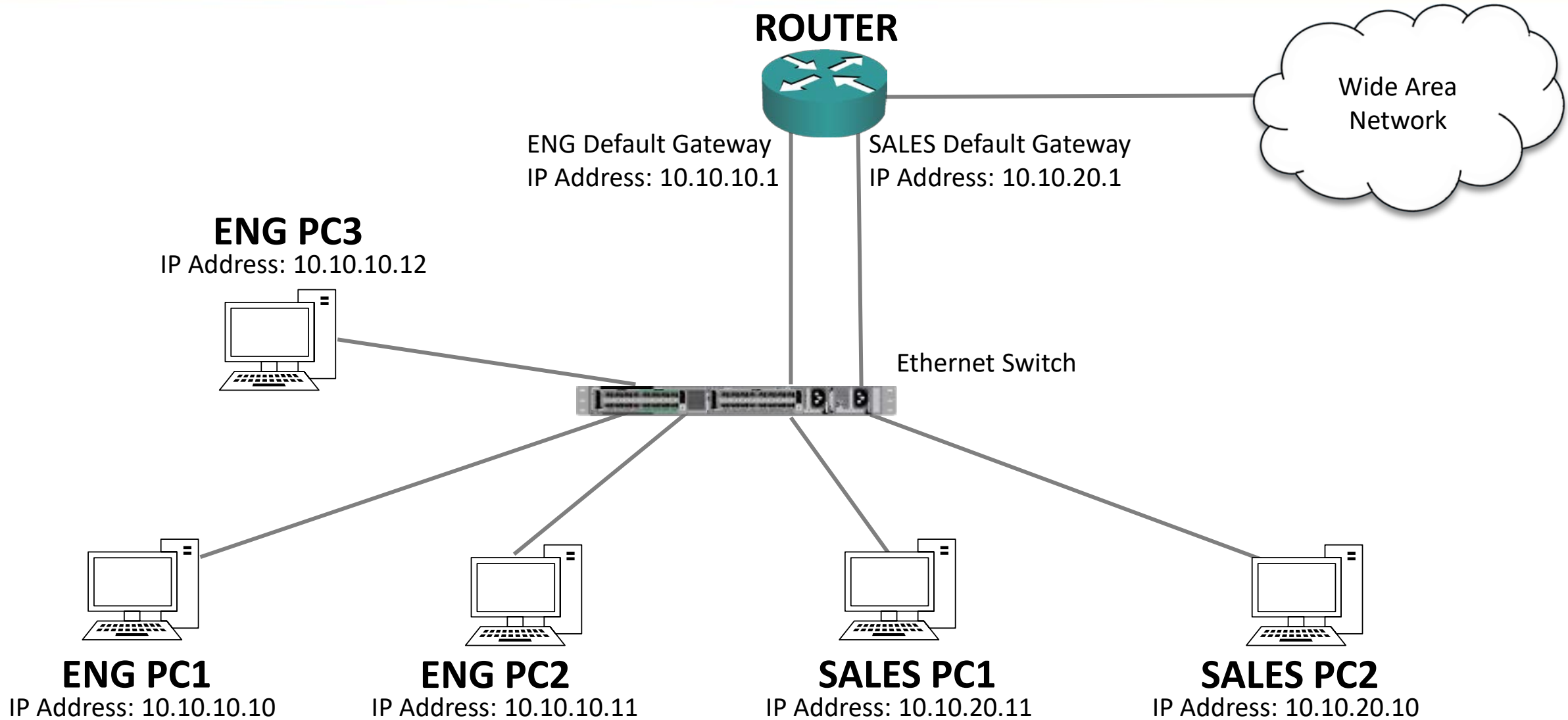
- Routers operate at Layer 3 of the OSI stack
- Hosts in separate IP subnets must send traffic via a router to communicate
- Security rules on routers or firewalls can be used to easily control what traffic is allowed between different IP subnets at Layer 3
- Routers do not forward broadcast traffic by default
- They provide performance and security by splitting networks into smaller domains at Layer 3

# Switch Operations

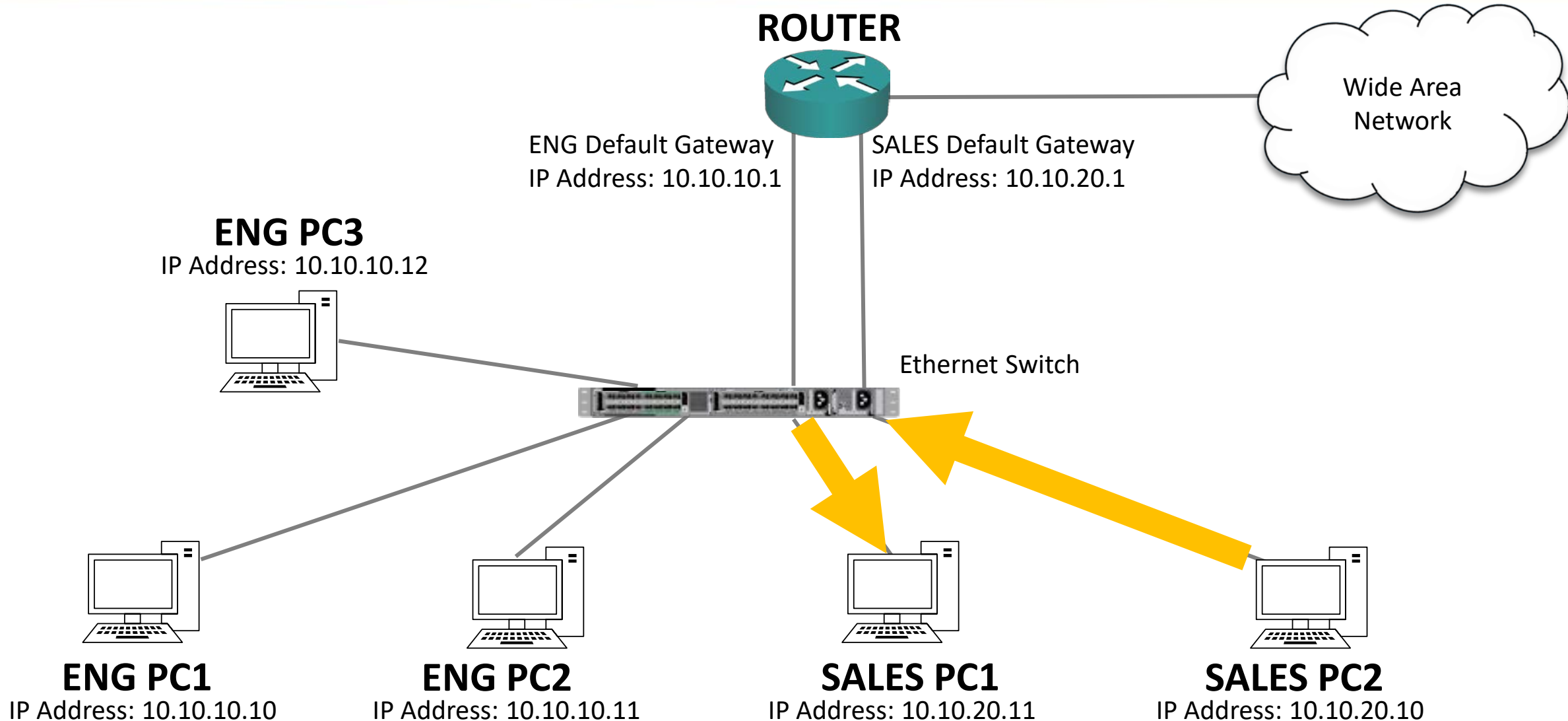


- Switches operate at Layer 2 of the OSI stack
- They **do** forward broadcast traffic by default
- By default a campus switched network is one large broadcast domain
- Switches flood broadcast traffic everywhere, including between different IP subnets
- This raises performance and security concerns

# LAN Networks

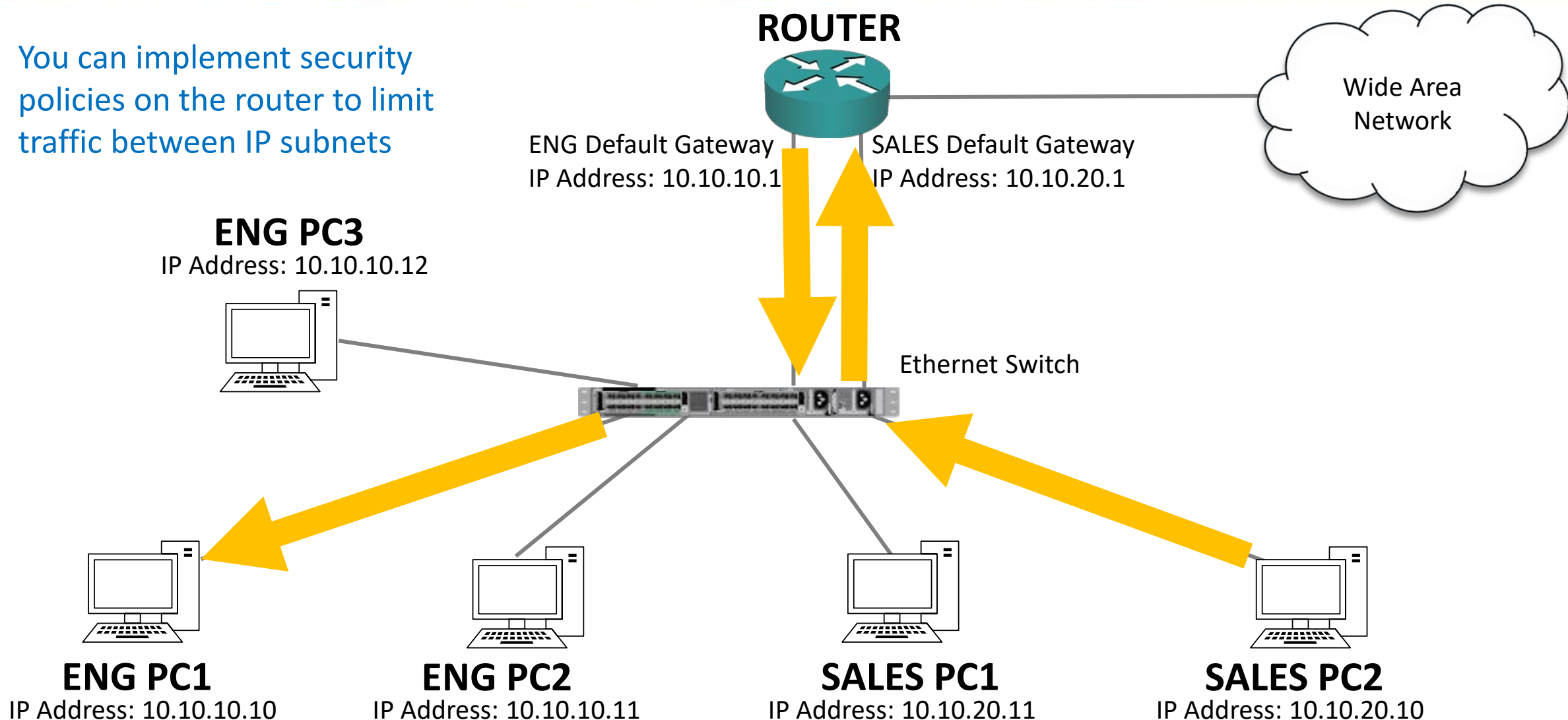


# Unicast Traffic within same IP subnet

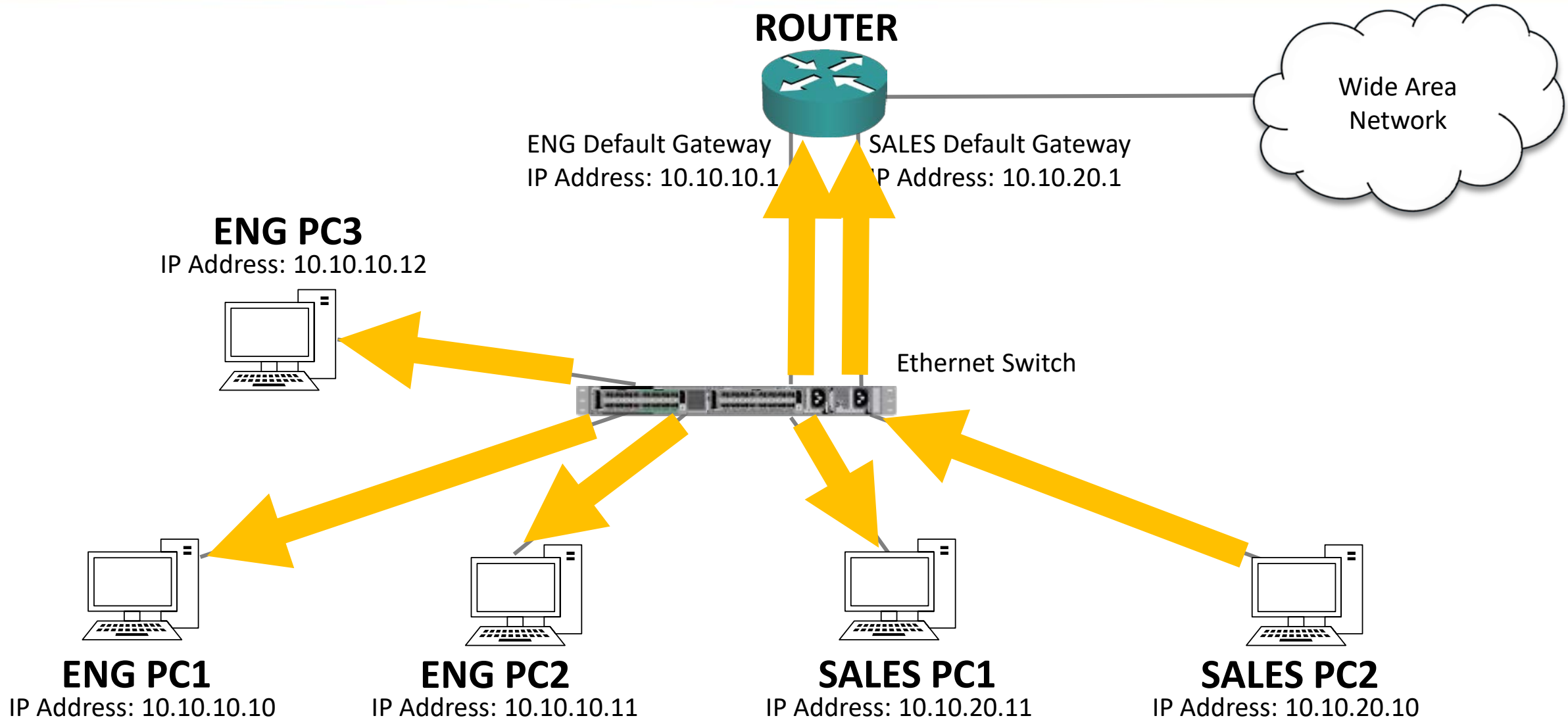


# Unicast Traffic between different IP subnets

You can implement security policies on the router to limit traffic between IP subnets



# Broadcast Traffic

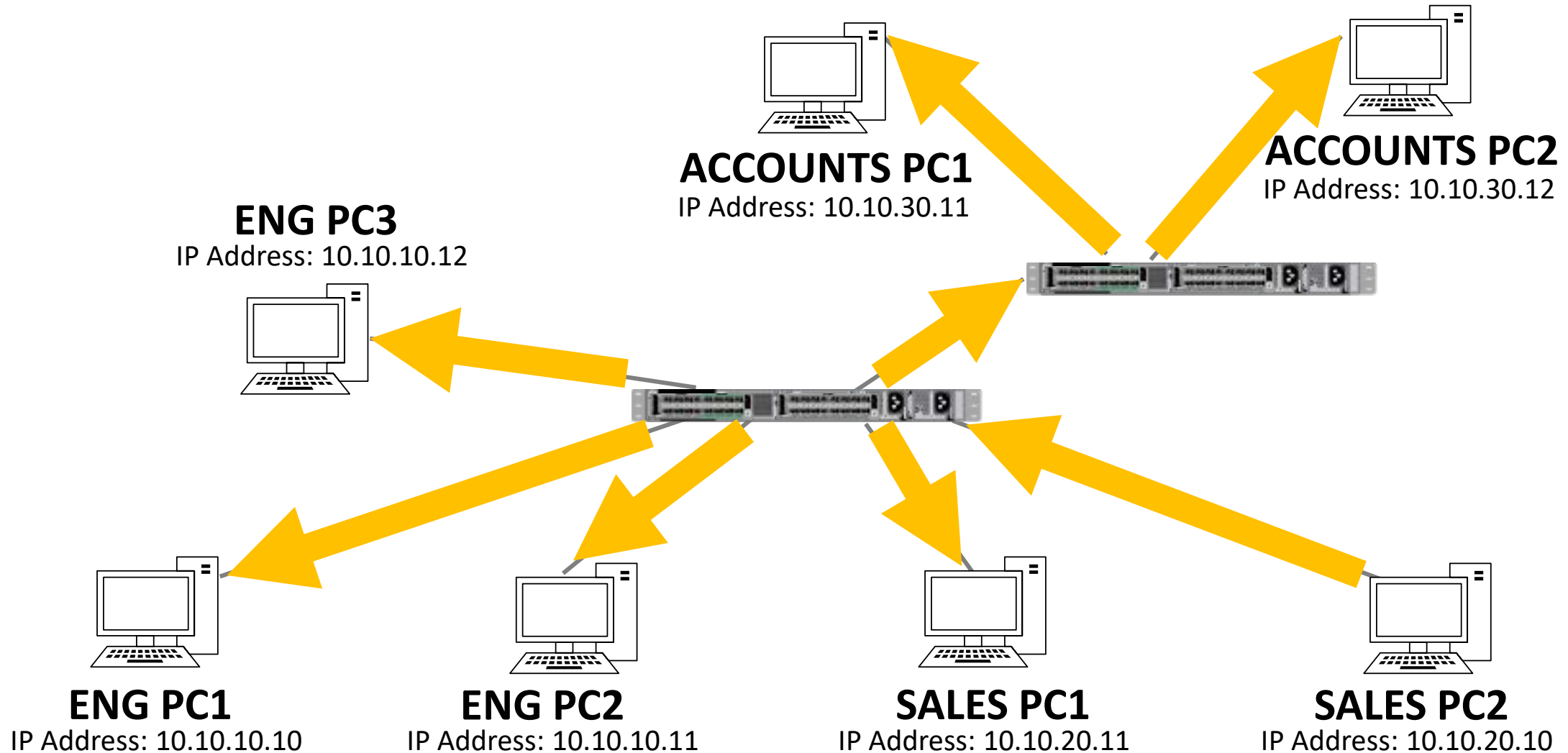


# The Problem



- Switches flood broadcast traffic everywhere, including between different IP subnets
- This affects security because the traffic bypasses router or firewall Layer 3 security policies
- It affects performance because every end host has to process the traffic
- It also affects performance by using bandwidth on links where the traffic is not required

# Broadcast Traffic





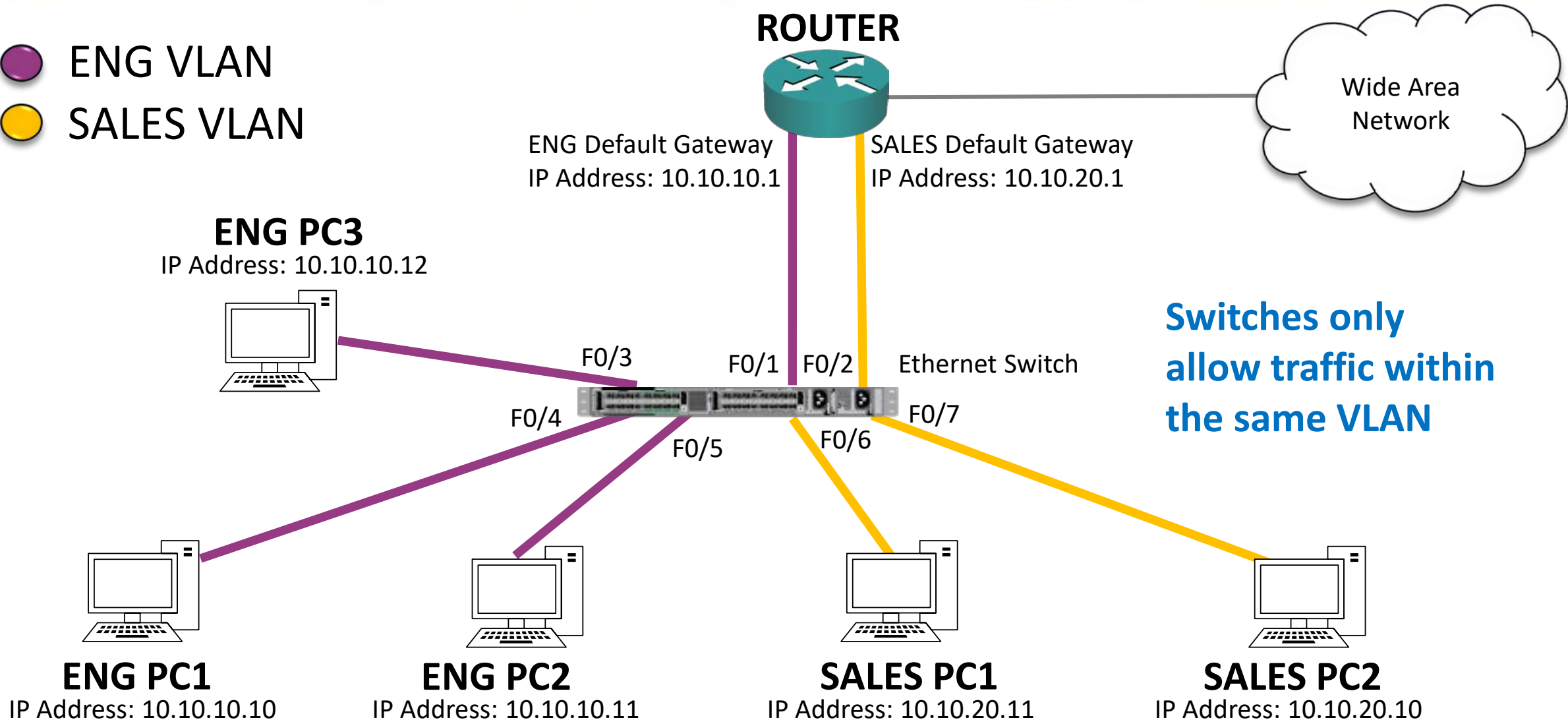
# VLAN Virtual Local Area Networks



- We can increase performance and security in the LAN by implementing VLANs on our switches
- VLANs segment the LAN into separate broadcast domains at Layer 2
- There is typically a one-to-one relationship between an IP subnet and a VLAN

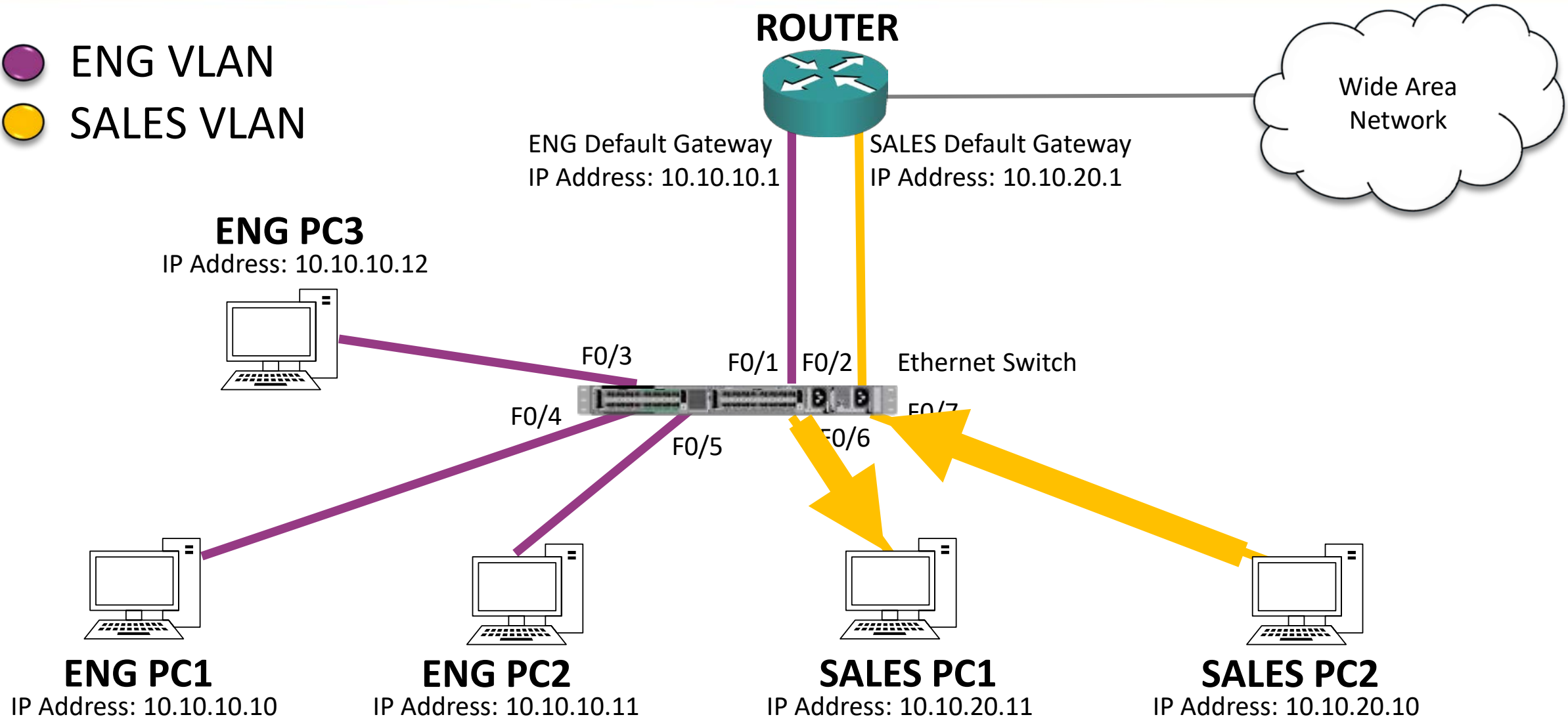
# VLAN Virtual Local Area Networks

- ENG VLAN
- SALES VLAN



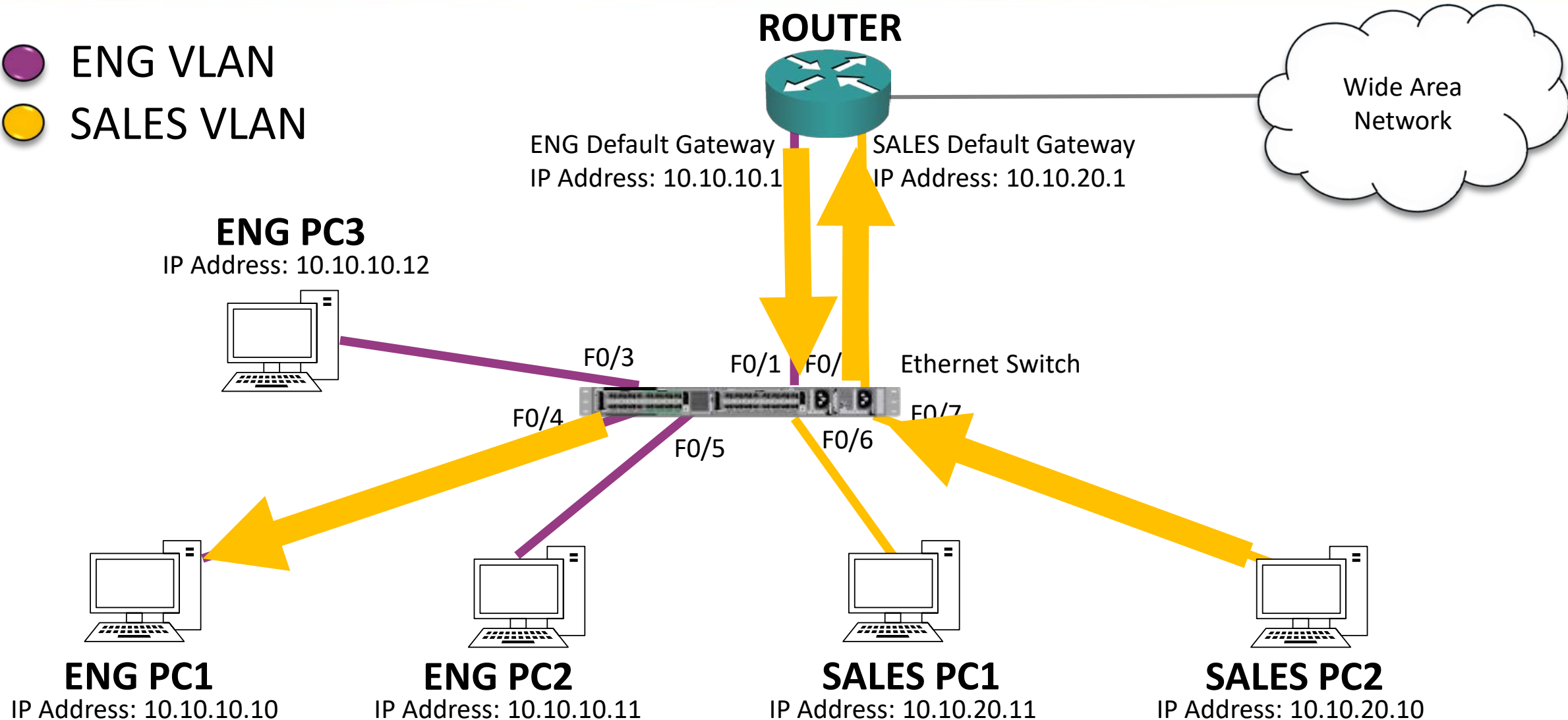
# Unicast Traffic within same IP subnet

- ENG VLAN
- SALES VLAN



# Unicast Traffic between different IP subnets

- ENG VLAN
- SALES VLAN



# Broadcast Traffic

- ENG VLAN
- SALES VLAN

