# Cisco Lab - Switch

2013.03.18

# 大綱

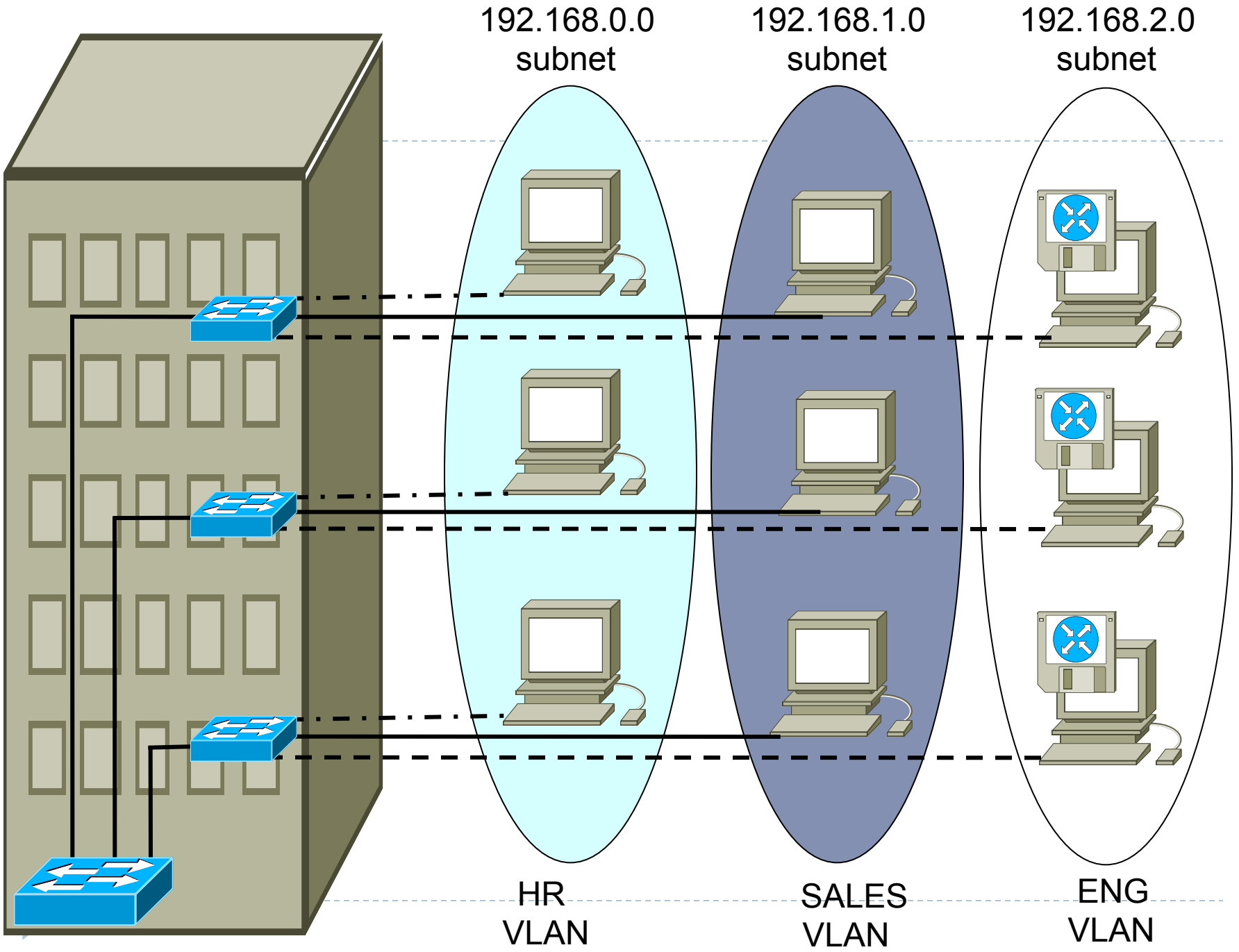
- Multi-LAN
  - VLAN
  - TRUNK
  - VTP
- ACL
- Port Channel
- Routing
  - InterVLAN Routing
  - Static Routing
- Homework

# Recall – Packet Routing

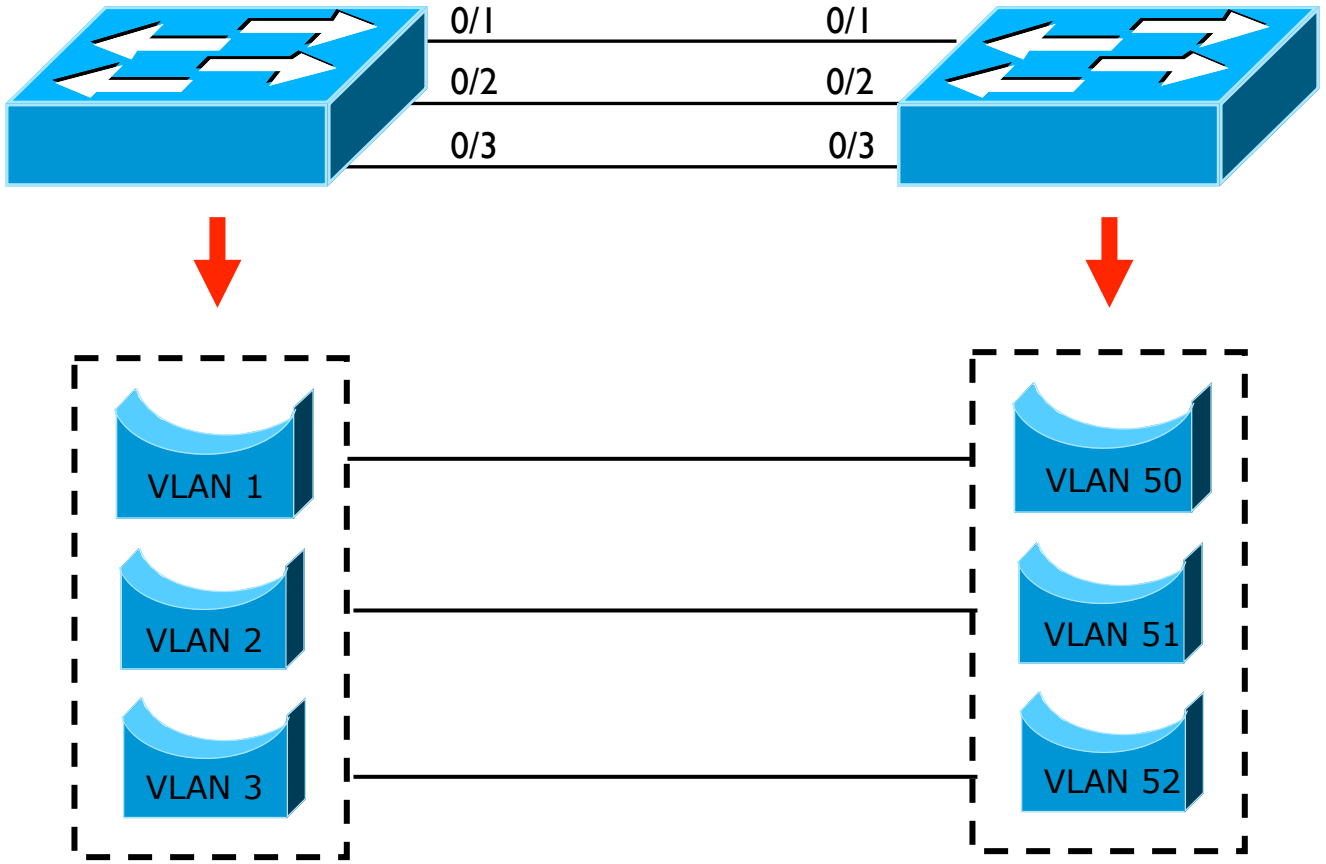
- Inner (V)LAN
  - Destination IP in the same subnet ( according to subnet mask
  - No GW needed
  - First broadcast (ARP) packets in switch
- Inter (V)LAN
  - "Routing"
  - GW (Router / Core Switch / AP etc.) needed
  - GW must have IP on both src and dst subnet
  - Default gateway : Last usable IP in the subnet
- Must check both dir. in duplex transmission !!

# Example

- 140.112.91.1/23 ↔140.112.90.1/24
  - → : inner LAN, broadcast, no gateway needed.
  - ← : inter LAN, need to pass gateway of 140.112.90.1/24 device
- How about VLAN ??
  - Same VLAN, same subnet (inner) : no GW, common.
  - Same VLAN, different subnet (inter) : GW needed, GW must have multiple IP in same VLAN, valid but need careful settings.
  - Different VLAN, same subnet (inner) : not valid, since no GW means no routing among VLAN.
  - Different VLAN, different subnet (inter) : GW needed, common.


192.168.0.0
subnet
192.168.1.0
subnet
192.168.2.0
subnet
HR
VLAN
SALES
VLAN
ENG
VLAN

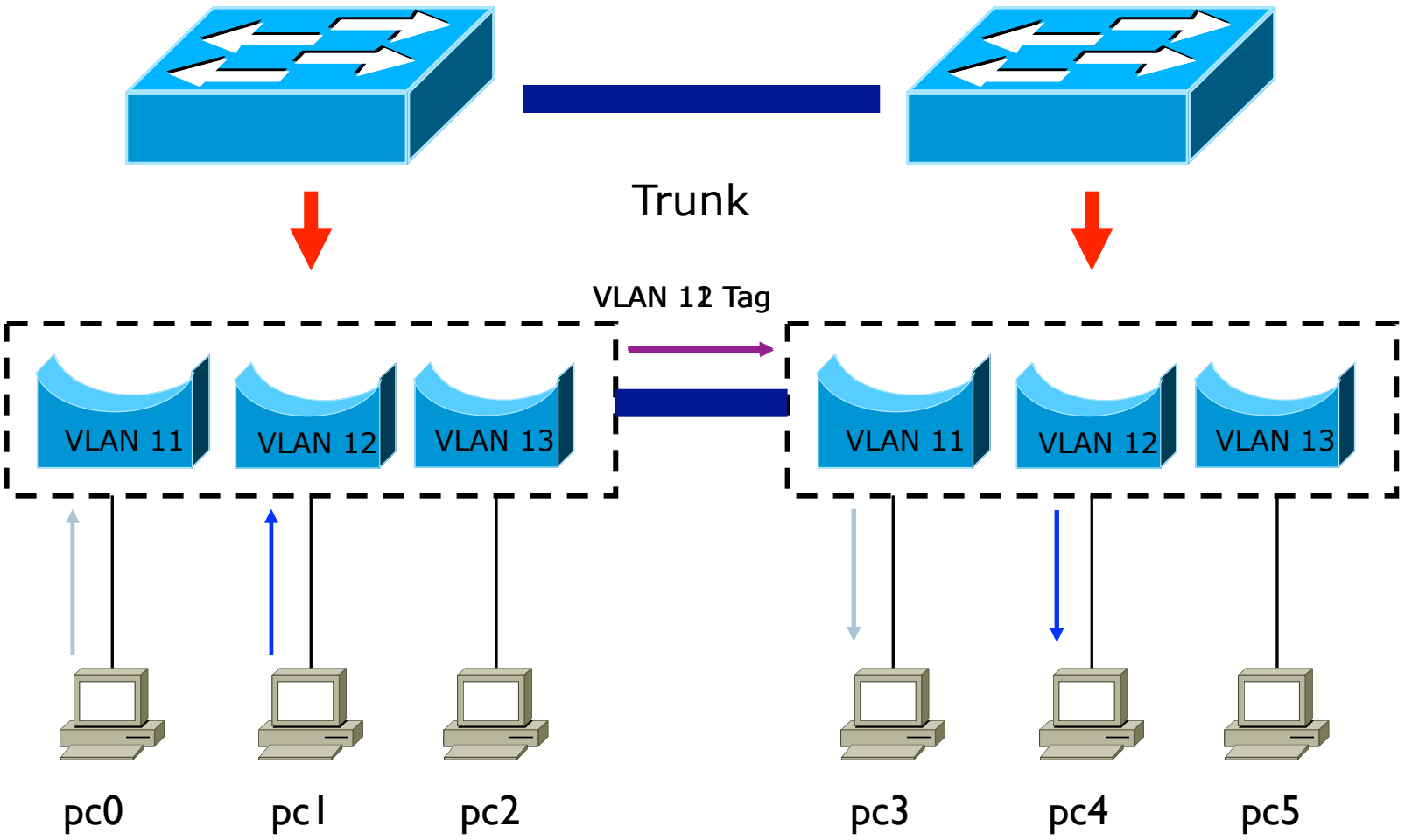
# Multi-LAN - VLAN



# Multi-LAN - VLAN

- Switch(config)#vlan “vlan-id”
  - 建立新vlan
- Switch(config-vlanid)#name “vlan-name”
  - 為所新增的vlan命名
- Switch(config)#interface fastethernet 0/1
  - 進入單一interface設定模式
- Switchport mode access
- Switchport access vlan “vlan-id”

# Multi-LAN - Trunk



# Multi-LAN - Trunk

- switchport trunk encapsulation dot1q (optional, needed on some device)
  - 指定Trunk封裝為dot1q模式
- switchport mode trunk
  - 指定Switch Port為Trunk Port
- switchport trunk allowed vlan “Vlan- ID”
  - 允許特定VLAN ID的流量通過Trunk Port

# Multi-LAN - VTP

- VLAN Trunking Protocol (VTP)
  - Cisco專有協議
  - 負責同步網域中相同VTP Domain Switch的VLAN資訊
  - VTP Mode：Server、Client、Transpartent
  - 利用Switch的Trunking Port作VLAN的同步。

| 所支援的動作 | Server模式 | Client模式 | Transparent模式 |
|---|---|---|---|
| 新增VLAN設定 | ○ | × | ○ |
| 修改VLAN設定 | ○ | × | ○ |
| 刪除VLAN設定 | ○ | × | ○ |
| 發送設定給其他設備做同步 | ○ | × | × |
| 轉發設定給其他設備 | ○ | ○ | ○ |
| 同步其他設備給的VLAN設定 | ○ | ○ | × |
| 儲存到NVRAM中 | ○ | × | ○ |

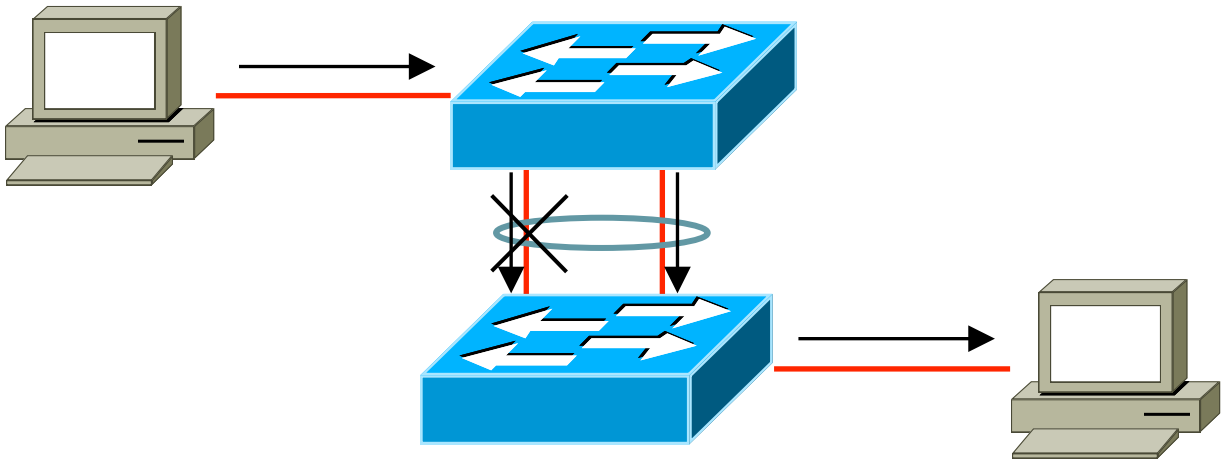
# Multi-LAN - VTP

- Switch(config)#vtp mode server/client/transpartent
  - 設定VTP的模式
- Switch(config)#vtp domain “Domain Name”
  - 設定VTP Domain名稱，Domain相同的才會進行VLAN的同步
- Switch#show vtp status
  - 顯示設備的VTP狀態

# Port Channel

- 利用數個實體介面邏輯上合併為一個
- 增加頻寬
- 分散流量
- 達到備援的目的
- 單一session只在同一實體介面上跑

# Port Channel



# Port Channel

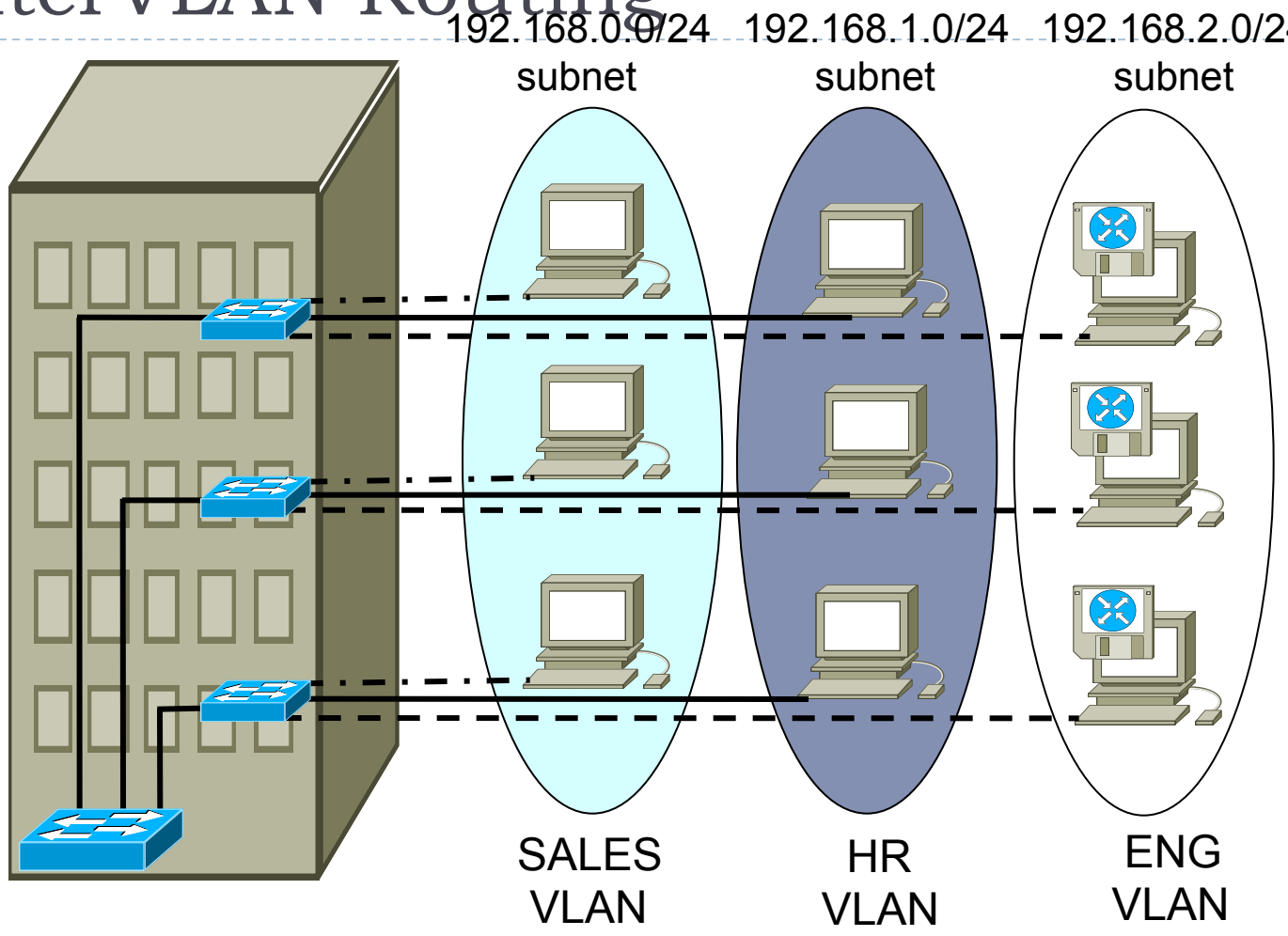
1. Switch(config)#interface range fastethernet 0/1 – 4
   - 指定要作為同一Group的Port
2. Switch(config-if-range)#shutdown
   - 為避免對流量產生影響，建議在建立Port Channel前先將Port關閉
3. Switch(config-if-range)#channel-group "Channel-Group ID" mode active/passive
   - Channel-Group建立起來所使用的ID
   - Active：主動建立Port-Channel
   - Passive：當遠端Switch為Active並要求建立Port-Channel時才會建立

- Show etherchannel summary
  - 查看Port-Channel狀態
- 對Port Channel進行設定
  - Switch(config)#interface port-channel "Channel-Group ID"

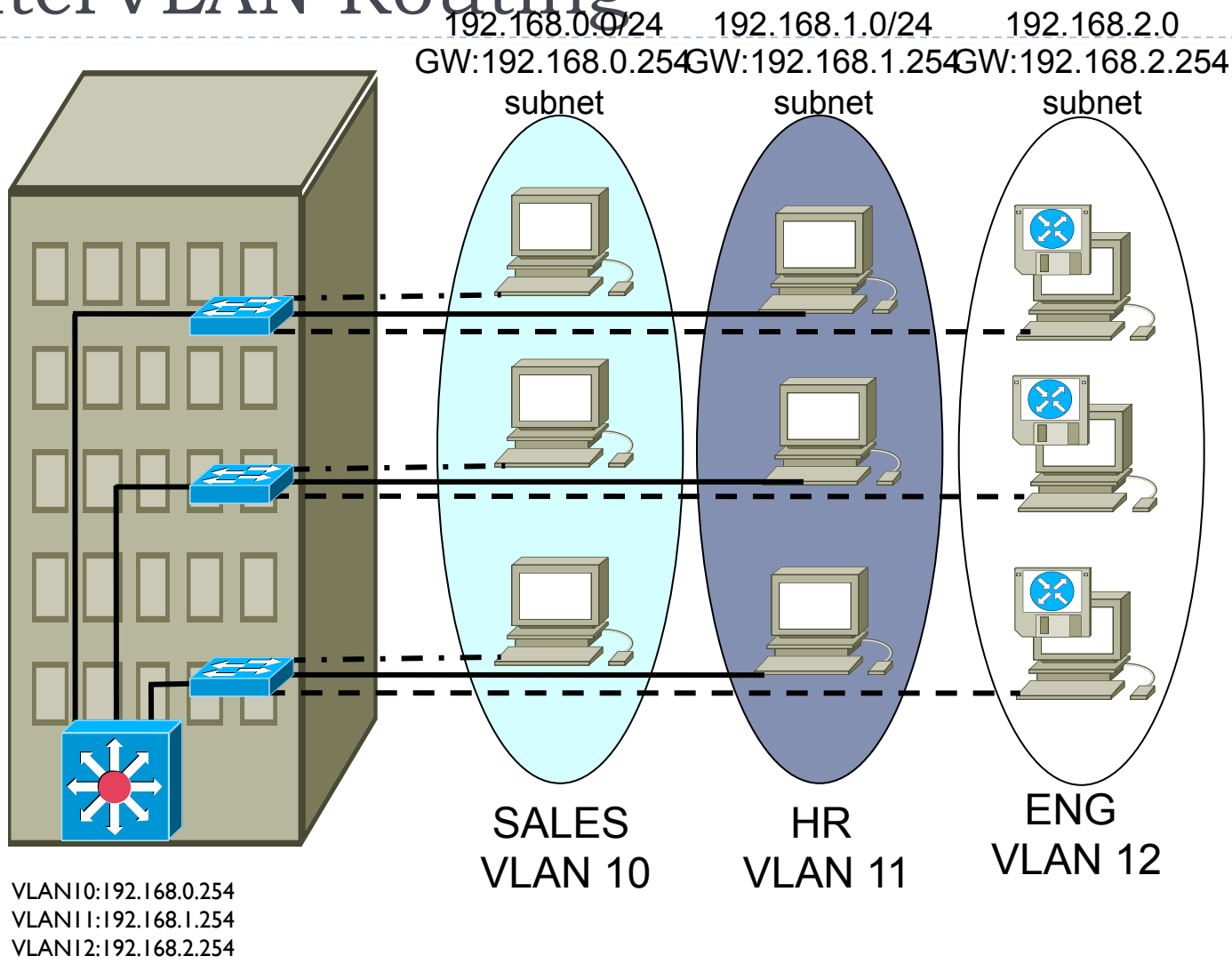
# ACL

1. Switch(config)#ip access-list extended/standard “Policy ID or Policy Name”
   - Extended：會檢查封包來源、目的IP以及所使用之Layer4協定及路由協定等等資訊。
   - Standard：僅檢查封包的目的地IP資訊。
2. Switch(config-ext-nacl)#permit/deny tcp/udp “Source Address” “Wildcard Bits” “Dest Address” “Wildcard Bits” eq “Port Number”
3. Switch(config)#interface fastethernet “Port ID”
4. Switch(config-if)#no switchport
5. Switch(config-if)#ip access-group “Policy Name or Policy ID” in/out

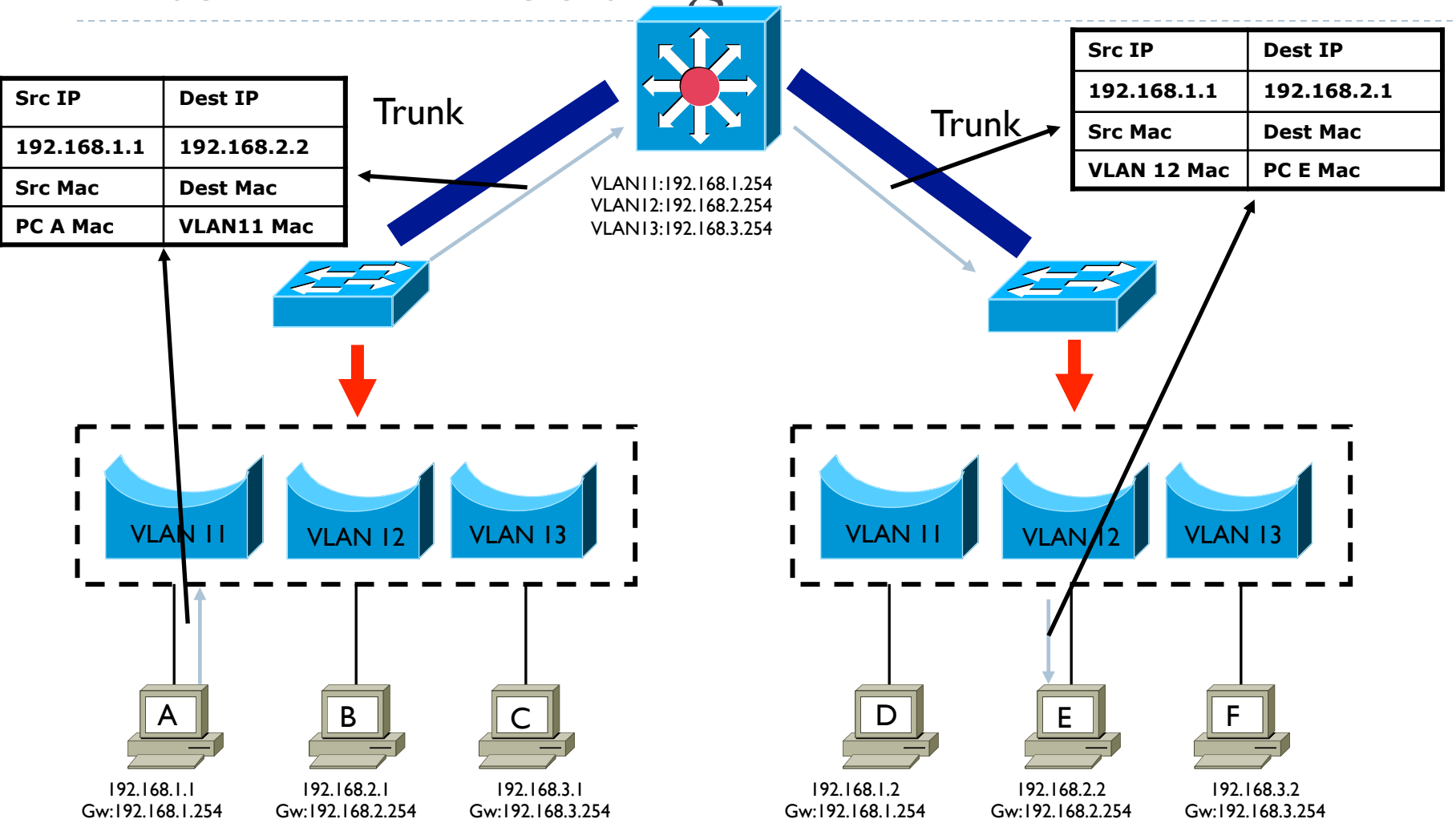
# InterVLAN Routing



# InterVLAN Routing



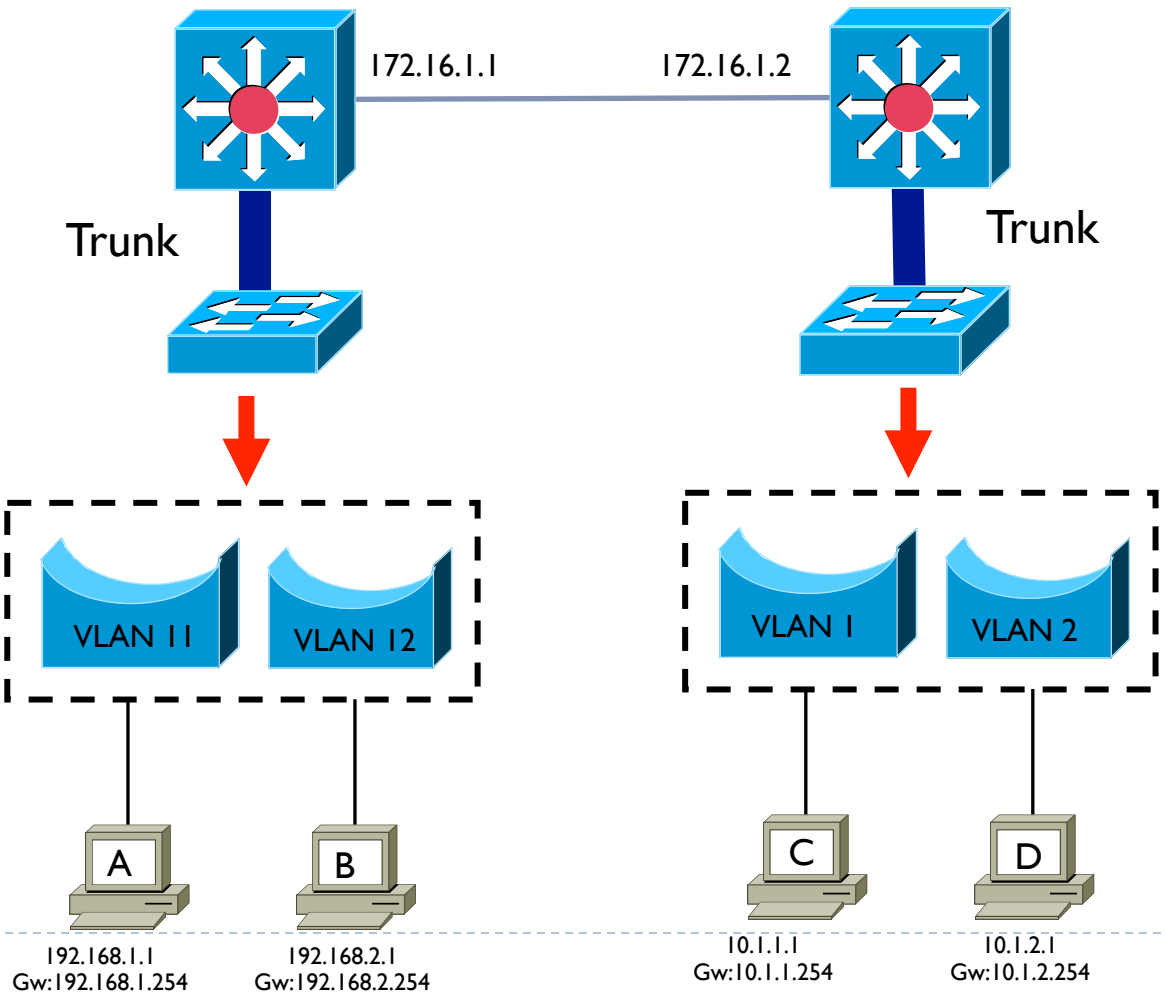
# InterVLAN Routing



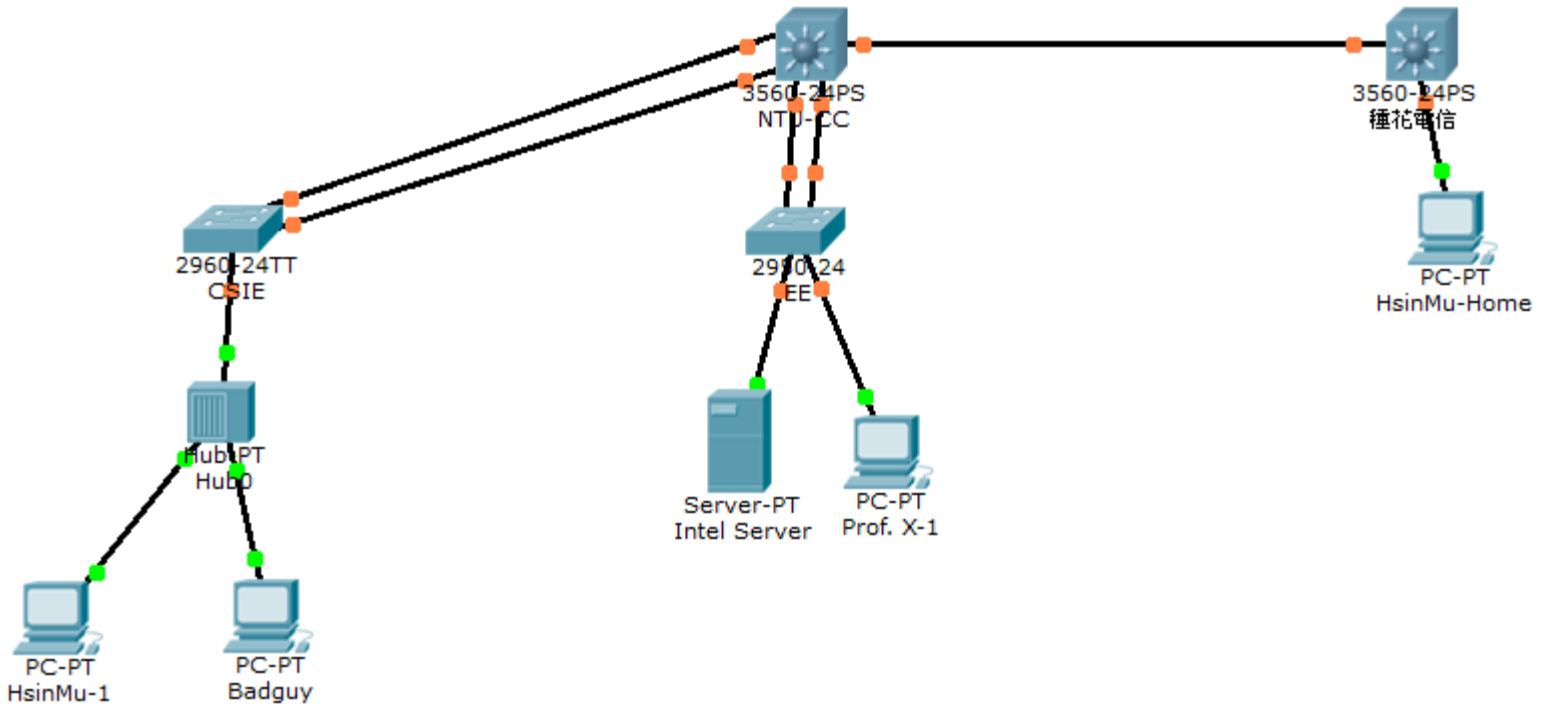
# Static Routing

ip route 10.1.1.0 255.255.255.0 gw 172.16.1.2
ip route 10.1.2.0 255.255.255.0 gw 172.16.1.2

ip route 192.168.1.0 255.255.255.0 gw 172.16.1.2
ip route 192.168.2.0 255.255.255.0 gw 172.16.1.2



# Homework


3560-24PS
NTU-CC
3560-24PS
種花電信
2960-24TT
CSIE
2960-24
EE
PC-PT
HsinMu-Home
Hub-PT
Hub0
Server-PT
Intel Server
PC-PT
Prof. X-1
PC-PT
HsinMu-1
PC-PT
Badguy

# Homework

- VLAN
- - Vlan 91
  - - Name: NASA-Project
  - - HsinMu-1, ptt.cc, BadGuy, and Intel Server under this Vlan
- - Vlan 100
  - - Name: X-Project
  - - Prof. X-1 under this Vlan
- VTP
- - vtp domain : NTU
  - - Server mode :NTU-CC
  - - Client mode :CSIE and EE

# Homework

- ACL
- - Deny icmp request from BadGuy in appropriate device
- Connectify test:
- - HsinMu-1 can ping Intel Server ( Inner-Vlan ), Prof. X-1 and HsinMu-Home (Inter-Vlan).
- (Hint : netmask of some PCs and NTU-CC need to be configured in order to do this.)
- (Hint : type 'ip routing' in NTU-CC(config)# to enable routing.)
- - BadGuy cannot ping HsinMu-Home