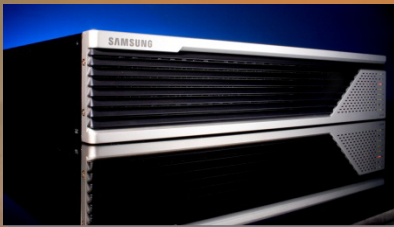


System Services



- **Default User**
 - Show user_accounts
- **Add/Delete Users**
 - Configure#user <options>
 - Configure#no user <user-name>
- **4 Levels of Privilege**
 - Level 4 has highest privilege
 - Level 1 has no configuration privilege
- **User Password Restrictions**
 - User-options password restriction ?
- **User Locking support**
 - User-lock ?

- **Recovering username/password**
 - From boot prompt
- **Show commands**
 - Show users
 - Show user?

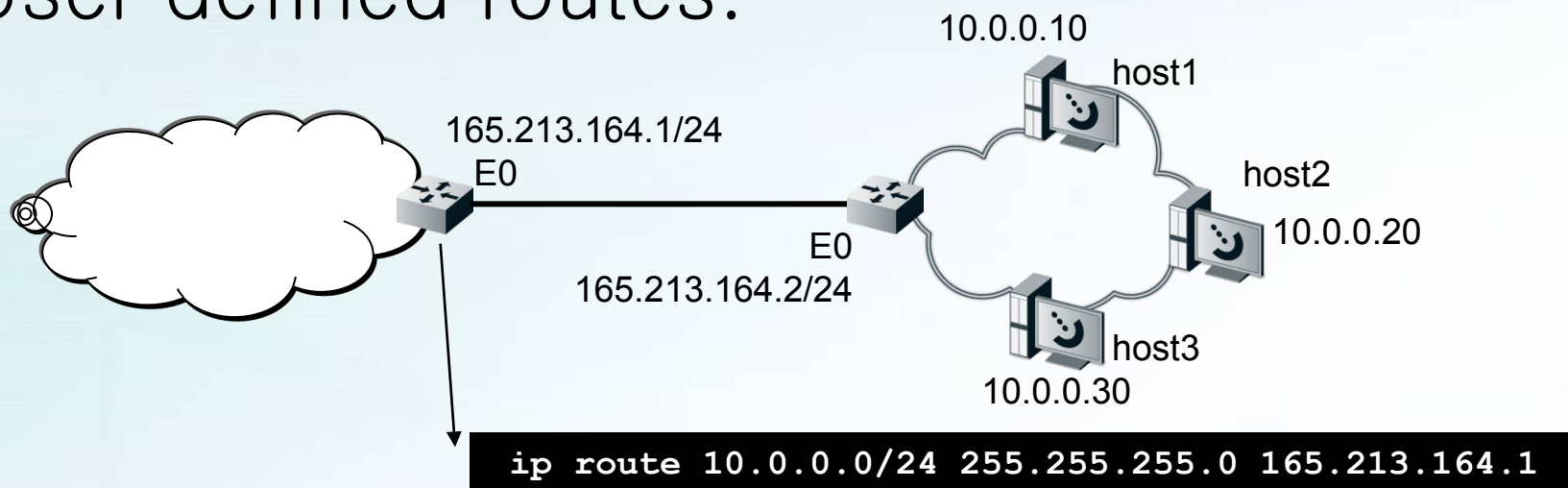
- DHCP
- VLAN
- Static Routing
- DNS/NTP/Time
- Telnet server
- TFTP Server
- FTP Server
- Telnet Server
- SSH/SFTP server
- Show commands

- DHCP Configuration
 - DHCP Server functionality
 - Support for multiple address pools with exclude ranges
 - ICMP checks for verifying availability
 - Sample config:
 - Configure 2 pools for Voice & Data
 - DHCP Relay Agent
 - Acts as a relay agent to an external server
 - Sample config:
 - [relay side] `configure/interface/<intf_name># ip dhcp relay <srv_ip_addr>`
 - [server side] `configure/ip/dhcp# relay <relay_ip_addr> <net_mask>`
- Show commands
 - Display bindings, configurations, statistics etc.
 - `show ip dhcp bindings`
 - `show ip dhcp config`
 - `show ip dhcp statistics`

DHCP Sample Config

```
ip dhcp
  pool voice
    tftpserver [TFTP_SERVER_ADDR]
    network [LAN_VOICE_NET] [LAN_VOICE_MASK]
    default_router [LAN_VOICE_ADDR]
    exclude-range [LAN_VOICE_ADDR] [LAN_VOICE_ADDR]
    commit
  exit pool
  pool data
    network [LAN_DATA_NET] [LAN_DATA_MASK]
    default_router [LAN_DATA_ADDR]
    exclude-range [LAN_DATA_ADDR] [LAN_DATA_ADDR]
    dnsserver import
    commit
  exit pool
enable server
exit dhcp
```

- User defined routes.



- Configuration

- syntax : `ip route ipaddress <IP address> netmask <subnet mask> gateway <gateway IP address> metric <n>`

ipaddress	IP address of the static route
netmask	Subnet mask of the static route
gateway	Gateway IP address, interface name, or fr bundlename:pvc# to the destination
metric	Administrative distance of the route The range is 1-255.

- example 1:

- Gateway route:

```
Router/configure# ip route 10.1.200.0 255.255.0.0 10.2.71.5 2
```

- example 2:

- Interface route:

```
Router/configure# ip route 10.1.200.0 255.255.255.0 wan1 2
```

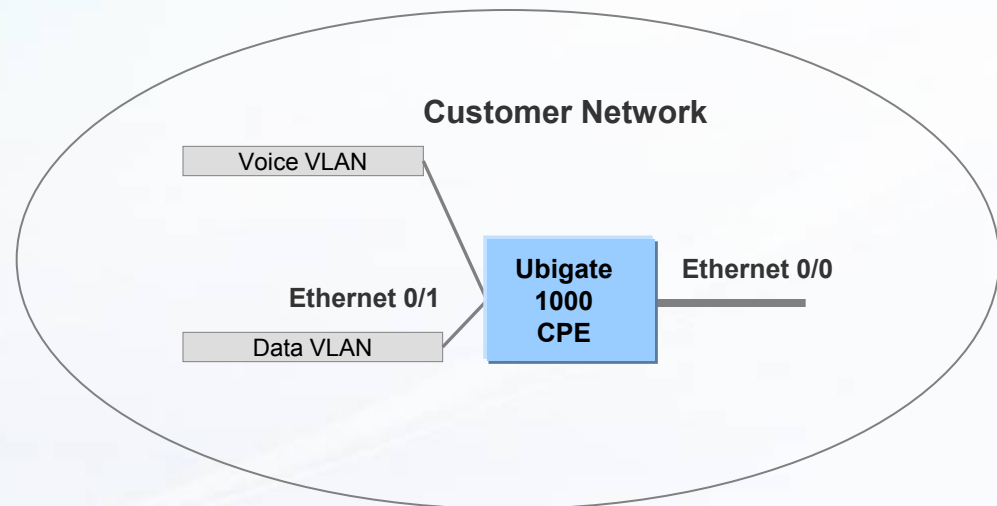
- example 3:

- Frame relay/pvc route:

```
Router/configure# ip route 10.1.200.0 255.255.255.0 wan1:17 2
```


VLAN Feature

- Supports up to 256 VLAN's
- Range of VLAN is 1 from 4000
- Supports L2 switching
- Show commands
 - show bridge
 - show vlan ?



VLAN Sample Config

```
bridge 1 protocol mstp
spanning-tree mst config
exit mst
vlan database
    vlan 2 bridge 1 name Voice
    vlan 3 bridge 1 name Data
exit database
interface ethernet 0/1
    switchport
    bridge-group 1
    switchport mode hybrid
    switchport hybrid vlan 3
    switchport hybrid allowed vlan add 2 egress-tagged
enable
    switchport hybrid allowed vlan add 3 egress-tagged
disable
exit ethernet
```

VLAN Sample Config

```
interface vlan vlan1.3
  ip address 172.16.1.1 255.255.255.0
  qos
  exit qos
exit vlan
interface vlan vlan1.2
  ip address 192.168.1.1 255.255.255.0
  qos
  exit qos
exit vlan
```

- DNS
 - configure# ip pname_server : Primary DNS
 - configure# ip name_server : Secondary DNS
 - configure# ip domain-lookup : enable dns service
 - show ip dns
- NTP
 - configure# sntp server <server_ip>
 - show sntp
- Time
 - show date
 - configure# date
 - configure# time

- TFTP server
 - `configure# tftp_server` : to enable tftp server
 - `show tftp_server_info`
- FTP server
 - `configure# ftp_server` : to enable ftp server
 - `configure# ftp_user <ftp_user>` : to create a ftp user & password
 - `show ftp`
- Telnet Server
 - Enabled as default
 - `configure# telnet_server`
 - `configure# telnet_timeout <timeout>` : if zero, unlimited timeout
 - `show telnet_server`
- SSH Server
 - `configure/ssh_keygen# generate <dsa | rsa>`
 - `configure/ssh_server# sftp`
 - `configure/ssh_server# enable`

- Event Logging
 - Show system logging commandLog
 - Show system logging
- Syslog Support
- Configuration options
- Show commands

- Audit Logging
 - Configure#system logging audit-log
- Support for syslog
 - Configure#system logging syslog ?
- Support for Buffered Logging
 - Configure#system logging buffered
- Support for email
 - Configure#system logging email ?
- Show Commands
 - Show system logging commandLog
 - Show system logging buffered
 - Show system logging ?
- Alarms:
 - show event alarm_list
 - show event current_alarm
 - show event event_history

- Events/Alarms
 - Configure# event event_history
 - Configure# event change_severity
- Show commands
 - show event alarm_list
 - show event current_alarm
 - show event event_history

- Debug Command Subtree
 - System Reset Info
 - System crash info
 - Watchdog
- Debug_Engineering
- Show commands

- Commonly Used commands
 - `configure# console_timeout 300` : To prevent config lock outs etc
 - Show `reboot_source`
 - Show system cpu, uptime, logging
 - debug command tree
 - `debug_eng` for engineering debugging.

- Additional Tools
 - Voice Quality Monitoring
 - Voice Network Management Station
 - UNM (Ubigate Node Manager)

- This command verifies connectivity between a Router system and other network hosts
- `ping ip_address [sipaddress <ipaddress>] [pingcnt <n>] [pktsize <n>] [timeout <n>][fillpattern <n>] [sweepmin<n>] [sweepmax <n>] [tos <n>] [dfbit <on | off>] [options <none | verbose | validate>]`
- ex)
Router# **ping 10.10.0.5**
Router# **ping router2.test.com pktsize 150**

no keepalive

- It needs to check the connectivity of a specific interface port whose link is not up.
 - supported interfaces : Ethernet/Vlan



- ex)

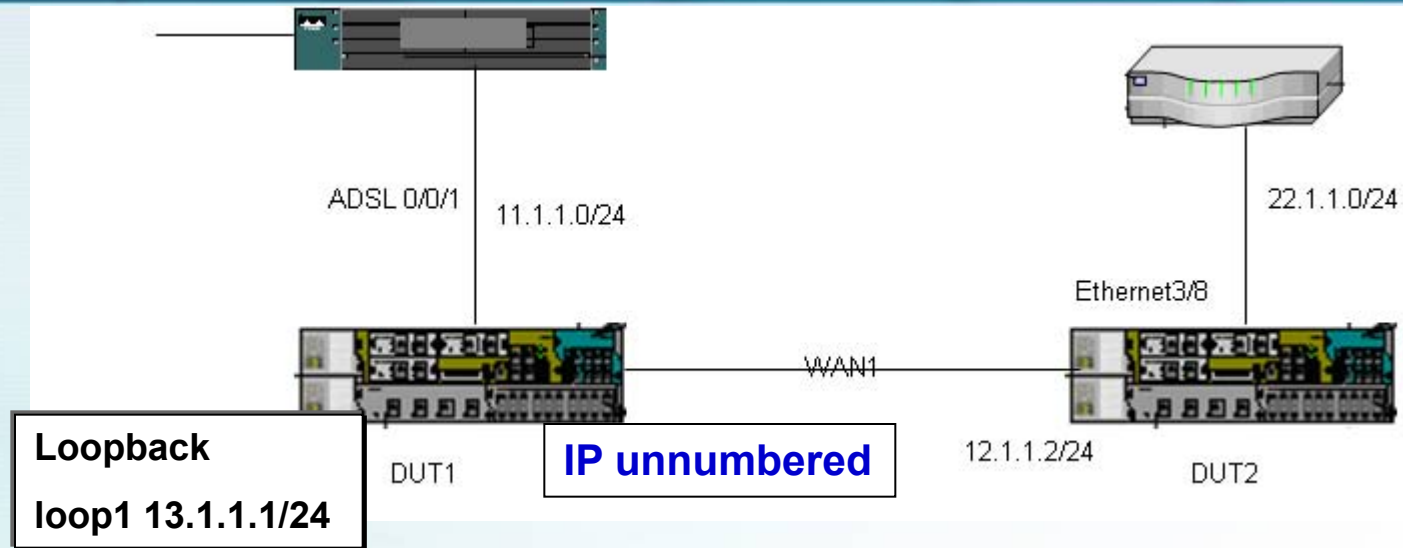
Router/configure/interface/ethernet (0/0)# no keepalive

Router#show ip interface brief

ethernet0/0	ETHERNET (802.3)	90.90.19.40/16	Up
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- An IP unnumbered interface is an interface which does not have its own IP address but borrows an IP address of another interface on the router.
 - Source interfaces
: PPPoE/IPoA/Ethernet/Loopback
 - allowable interfaces as IP unnumbered interface
: PPP/PPPoA/PPPoFR/Tunnel

Unnumbered Interface



- Example

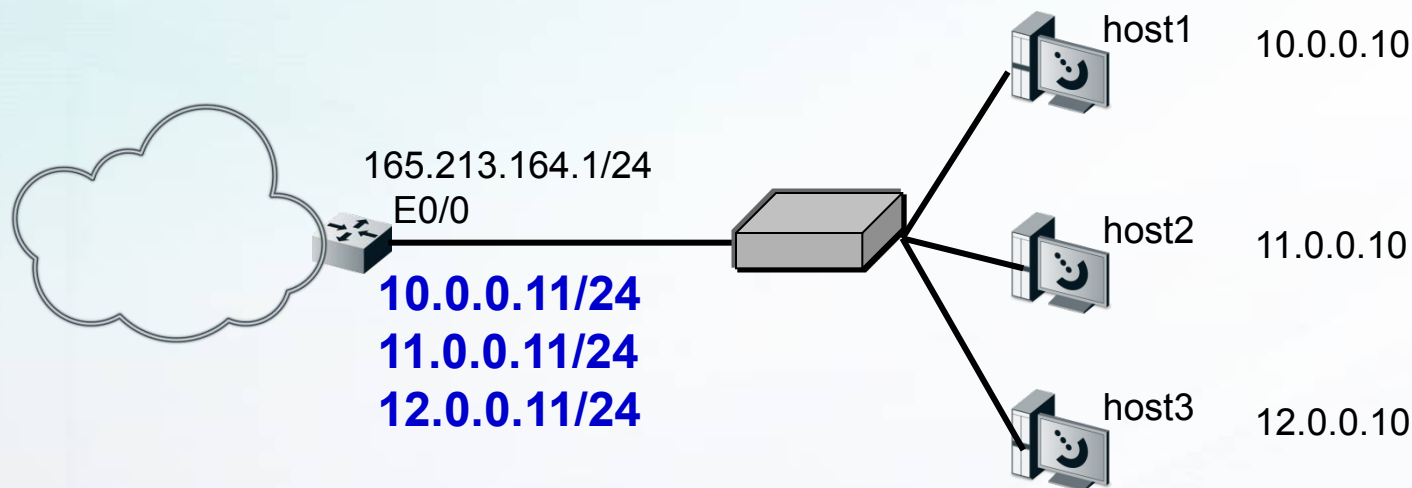
DUT1/configure/ interface/bundle WAN1#ip unnumbered loop1

DUT1# show ip interface brief

Interface	Type	IP-Address/Mask	Status
WAN1	PT2PT (UNNUMBERED)	13.1.1.1	Up
loop1	S/W LOOPBACK	13.1.1.1/24	Up

Secondary IP

- Secondary IP addresses are the way to extend networks without readdressing of interfaces.
 - Following interfaces : Ethernet/VLAN



```
Router/configure/interface/ethernet (0/0)# ip address 10.0.0.11/24 secondary
```

```
Router/configure/interface/ethernet (0/0)# ip address 11.0.0.11/24 secondary
```

```
Router/configure/interface/ethernet (0/0)# ip address 12.0.0.11/24 secondary
```

Thank You