FACULTY OF INFORMATION TECHNOLOGY
DEPARTMENT OF NETWORKS AND INFORMATION SYSTEMS

CHAPTER 2 – PRACTICE 02

A scenario-based exercise

OBJECTIVES

- Review practice of chapter 1
- Review chapter 2 - practice 1
- Master the concepts of MAC, LAN, VLAN, Trunk
- Get a better understanding of how Cisco 2960 Switches work

CONTENTS

- **Part 1**: Scenario
- **Part 2**: Planning information
- **Part 3**: Implementation steps

The scenario plays out

Details are as follows

- Connect PCs of LAN 1 to VLAN 1 (default) at SW 1 (located at UTC A3)
- Create VLAN 2 (name Guest) to connect devices for LAN 2
- Extend LAN 2 another building (on SW 2 located at UTC A5)
- Two SWs connect to each other via port Fa0/24, access mode
- Connect hosts of LAN 2 to VLAN 2 at SW 2

- Create VLAN 3 (name Research) on two SWs
- Deploy trunk connection via Gi0/1 port of two SWs, allow VLAN3 across this link
- Configure VLAN 3 hosts to exchange information between 2 buildings
- Extend VLAN 1 via Trunk connection
- Deploy more hosts of VLAN 1, VLAN 3 on both SWs

- Rename VLAN 2 from Guest to Outs
- Transfer data on VLAN 2 over the trunk connection, not through the access port
- System re-planning, don't use LAN 3, don't allow VLAN 3 over two SWs
- Review, unused ports are returned to default configuration, delete information about VLAN 3.
- Devices in LAN3 (after planning) use for LAN 1 and 2

Planning information

Address planning table

IP v4/v6 address table

LAN 1 (default)	IPv4 Address	IPv6 Address
Network	97.81.46.0/24	200E:2C0A:F1C6:1231::/64
L1-PC1	97.81.46.2/24	200E:2C0A:F1C6:1231::2/64
L1-PC2	97.81.46.4/24	200E:2C0A:F1C6:1231::4/64
L1-PC3	97.81.46.6/24	200E:2C0A:F1C6:1231::6/64
L1-PC4	97.81.46.8/24	200E:2C0A:F1C6:1231::8/64

LAN 2 (Guest / Outs)	IPv4 Address	IPv6 Address
Network	117.108.45.0/24	2013:B002:1C04:EFA::/64
L2-PC1	117.108.45.11/24	2013:B002:1C04:EFA::11/64
L2-PC2	117.108.45.13/24	2013:B002:1C04:EFA::13/64
L2-PC3	117.108.45.15/24	2013:B002:1C04:EFA::15/64
L2-PC4	117.108.45.17/24	2013:B002:1C04:EFA::17/64

LAN 3 (Research)	IPv4 Address	IPv6 Address
Network	214.8.73.0/24	3ABC:FFFF:6666:5D7F::/64
L3-PC1	214.8.73.23/24	3ABC:FFFF:6666:5D7F::23/64
L3-PC2	214.8.73.24/24	3ABC:FFFF:6666:5D7F::24/64

Replanning	IPv4 Address	IPv6 Address
L3-PC1 → L1-PC5	97.81.46.7/24	200E:2C0A:F1C6:1231::7/64
L3-PC2 → L2-PC5	117.108.45.16/24	2013:B002:1C04:EFA::16/64

Planning information

Connection planning table

Connection table

N0	Name of Device	Type of Device	Interface	To Interface (of device)
01	L1-PC1	PC-PT	Fa0	Fa0/1 (SW-A3)
02	L1-PC2	PC-PT	Fa0	Fa0/2 (SW-A3)
03	L1-PC3	PC-PT	Fa0	Fa0/4 (SW-A5)
04	L1-PC4	PC-PT	Fa0	Fa0/5 (SW-A5)

N0	Name of Device	Type of Device	Interface	To Interface (of device)
05	L2-PC1	PC-PT	Fa0	Fa0/3 (SW-A3)
06	L2-PC2	PC-PT	Fa0	Fa0/4 (SW-A3)
07	L2-PC3	PC-PT	Fa0	Fa0/1 (SW-A5)
08	L2-PC4	PC-PT	Fa0	Fa0/2 (SW-A5)

N0	Name of Device	Type of Device	Interface	To Interface (of device)
09	L3-PC1	PC-PT	Fa0	Fa0/3 (SW-A5)
10	L3-PC2	PC-PT	Fa0	Fa0/5 (SW-A3)

N0	Name of Device	Type of Device	Interface	To Interface (of device)
11	SW-A3	2960-24TT	Fa0/24	Fa0/24 (SW-A5)
12	SW-A3	2960-24TT	Gig0/1	Gig0/1 (SW-A5)

Implementation steps

Take steps to do exercises

Details are as follows:

- Step 01: Deploy the devices and connections at UTC A3
- Step 02: Check the connections of the system just built
- Step 03: Connect more PCs on SW-UTC-A3 to the new VLAN 2
- Step 04: Extend connection to UTC A5 building
- Step 05: Deploy more hosts in VLAN 2 at UTC A5
- Step 06: Add the trunk link between the two SWs
- Step 07: Deploy LAN 3's devices at UTC A3, A5
- Step 08: Allow devices of LAN 1 to link over the trunk
- Step 09: Re-planning VLAN 2
- Step 10: Re-planning the system

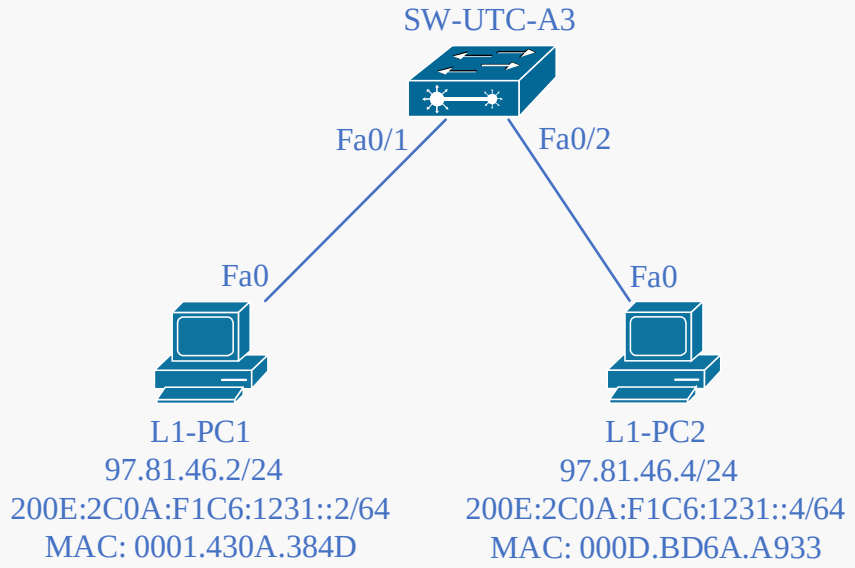
Implementation steps

Step 01 - Deploy the devices and connections at UTC A3

Nodes: L1-PC1, L1-PC2 and SW-UTC-A3

- Create topology for planned devices
- Set the Switch's name and password to access the enable mode
  - ✓ Name is SW-UTC-A3
  - ✓ Password is UTC@123
- Check MAC table of SW-UTC-A3

- Set name, IP v4/v6 address for L1-PC1 and L1-PC2
- Determine the MAC address of L1-PC1, L1-PC2




```
Switch#
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname SW-UTC-A3
SW-UTC-A3(config)#enable secret UTC@123
SW-UTC-A3(config)#end
SW-UTC-A3#wr
%SYS-5-CONFIG_I: Configured from console by console

Building configuration...
[OK]
SW-UTC-A3#
```

```
SW-UTC-A3#
SW-UTC-A3#show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

SW-UTC-A3#
```

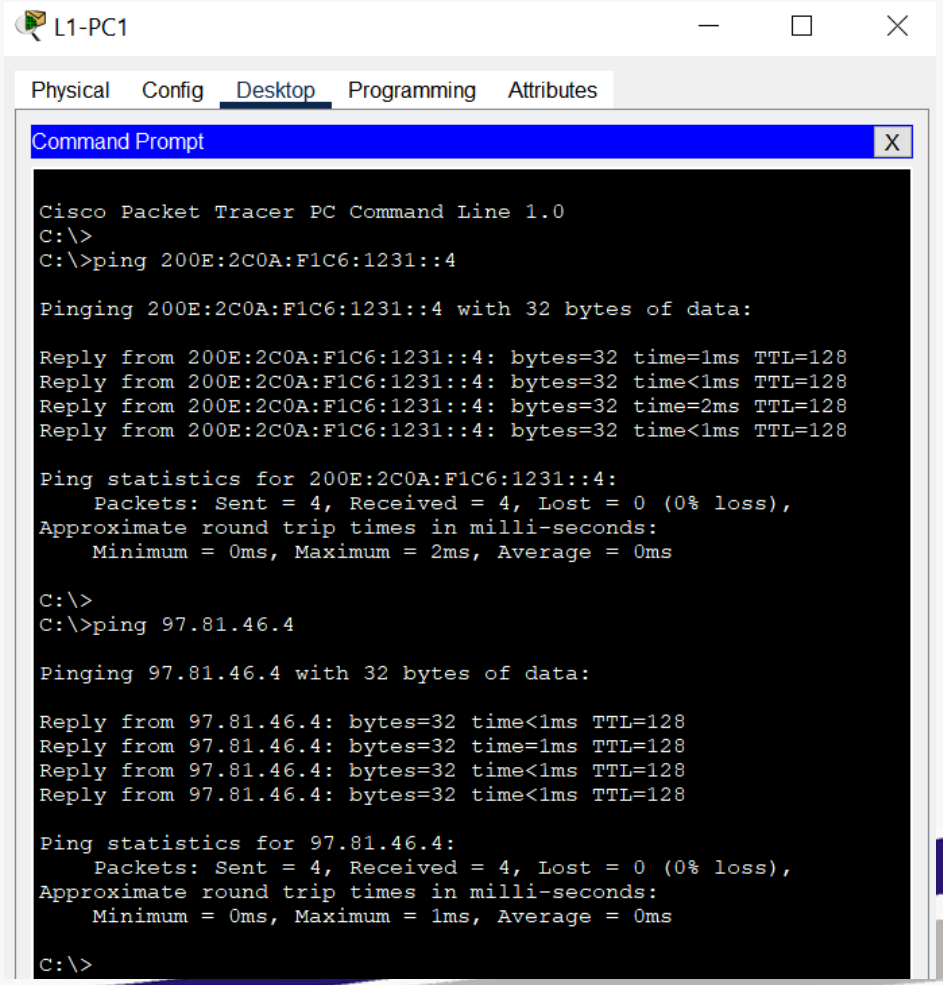
Implementation steps

Step 02 - Check the connections of the system just built

Nodes: L1-PC1, L1-PC2 and SW-UTC-A3

- Use the ping command (v4/v6) to check the connection between the PCs
- See MAC table of SW-UTC-A3

```
SW-UTC-A3#
SW-UTC-A3#show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.430a.384d    DYNAMIC     Fa0/1
   1    000d.bd6a.a933    DYNAMIC     Fa0/2
SW-UTC-A3#
```

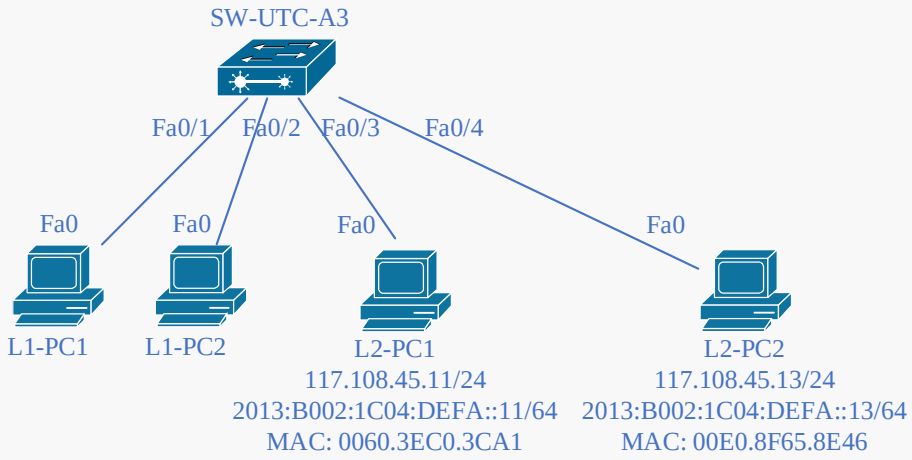


Implementation steps

Step 03 - Connect more PCs on SW-UTC-A3 to the new VLAN 2

Nodes: L2-PC1, L2-PC2 and SW-UTC-A3

- Create VLAN 2, named Guest on SW-UTC-A3
- Connect L2-PC1, L2-PC2 to the planned location
- Set name, IP v4/v6 address for L2-PC1 and L2-PC2
- Assign two PCs to VLAN 2
- Check the connection between two end devices
- Check MAC table of SW-UTC-A3




```
SW-UTC-A3#
SW-UTC-A3#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/5, Fa0/6
                                                Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                Fa0/23, Gig0/1, Gig0/2
2    Guest                            active    Fa0/3, Fa0/4, Fa0/24
1002 fddi-default                     active
```

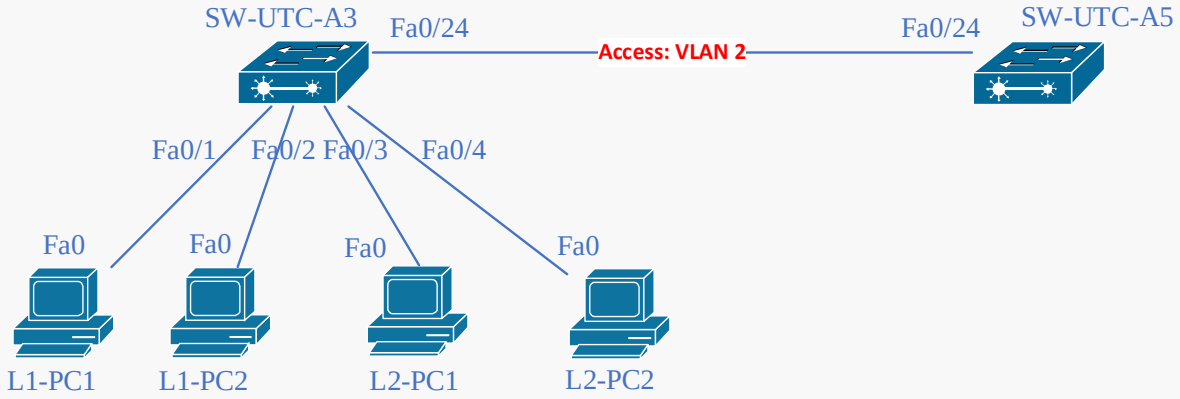
```
SW-UTC-A3#
SW-UTC-A3#show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.430a.384d    DYNAMIC     Fa0/1
   1    000d.bd6a.a933    DYNAMIC     Fa0/2
   2    0060.3ec0.3ca1    DYNAMIC     Fa0/3
   2    00e0.8f65.8e46    DYNAMIC     Fa0/4
SW-UTC-A3#
```

Implementation steps

Step 04 - Extend connection to UTC A5 building

Nodes: L2-PC1, L2-PC2, SW-UTC-A3 and SW-UTC-A5

- Set the name and password to access the enable mode on the new Switch
  - ✓ Name is SW-UTC-A5
  - ✓ Password is UTC@123
- Create VLAN 2 (name: Guest) on SW-UTC-A5
- Assign port Fa0/24 (access mode) on both SWs to VLAN 2
- Connect the cable via two Fa0/24 ports




```
SW-UTC-A3#
SW-UTC-A3#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/5, Fa0/6
                                                Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                Fa0/23, Gig0/1, Gig0/2
2    Guest                            active    Fa0/3, Fa0/4, Fa0/24
```

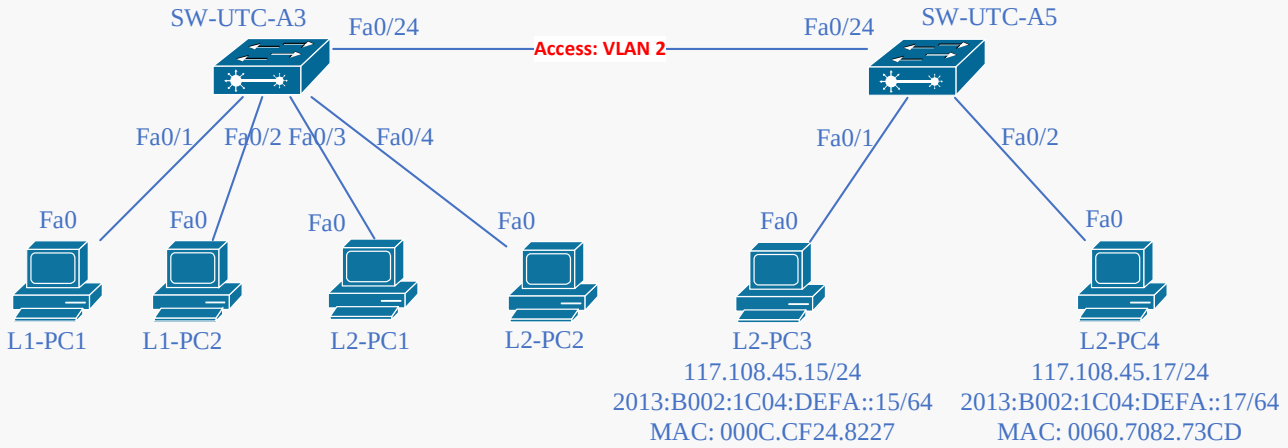
```
SW-UTC-A5#
SW-UTC-A5#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Gig0/1
                                                Gig0/2
2    Guest                            active    Fa0/24
```

Implementation steps

Step 05 - Deploy more hosts in VLAN 2 at UTC A5

Nodes: L2-PC3, L2-PC4 and SW-UTC-A5

- Connect L2-PC3, L2-PC4 to port Fa0/1, Fa0/2 of SW-UTC-A5
- Set access mode, VLAN 2 for the above 2 ports
- Check connection of all devices in VLAN 2
- See MAC table of SW-UTC-A3, SW-UTC-A5



Note:

- MAC of Fa0/24 port (SW-UTC-A3): 00d0.974c.9918
- MAC of Fa0/24 port (SW-UTC-A5): 0005.5e48.5c18

```
SW-UTC-A3#
SW-UTC-A3#show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   2    0005.5e48.5c18    DYNAMIC     Fa0/24
   2    000c.cf24.8227    DYNAMIC     Fa0/24
   2    0060.3ec0.3ca1    DYNAMIC     Fa0/3
   2    0060.7082.73cd    DYNAMIC     Fa0/24
   2    00e0.8f65.8e46    DYNAMIC     Fa0/4
SW-UTC-A3#
```

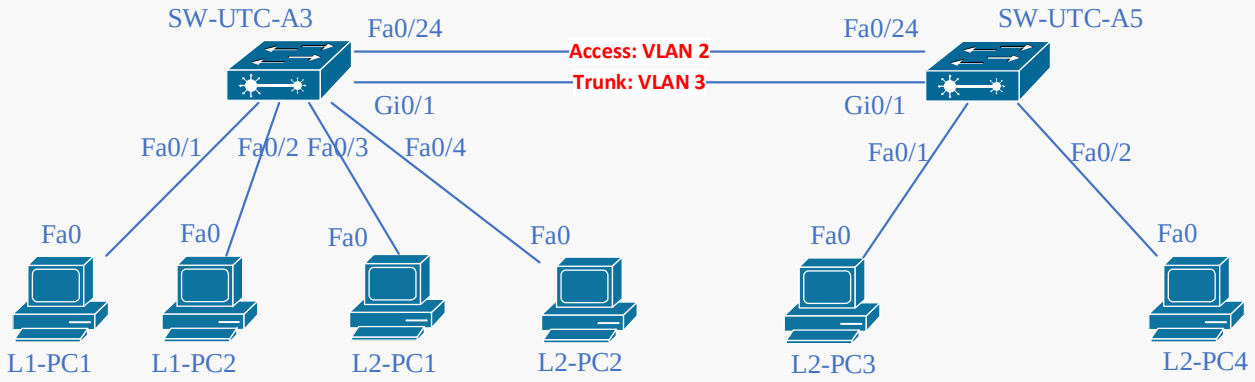
```
SW-UTC-A5#
SW-UTC-A5#show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   2    000c.cf24.8227    DYNAMIC     Fa0/1
   2    0060.3ec0.3ca1    DYNAMIC     Fa0/24
   2    0060.7082.73cd    DYNAMIC     Fa0/2
   2    00d0.974c.9918    DYNAMIC     Fa0/24
   2    00e0.8f65.8e46    DYNAMIC     Fa0/24
SW-UTC-A5#
```

Implementation steps

Step 06 - Add the trunk link between the two SWs

Nodes: SW-UTC-A3 and SW-UTC-A5

- Create new VLAN 3 (name: Research) on two SWs
- Create Trunk link over two Gi0/1 ports on each switch
- Set description for each port: connect to which port – which device
- Only allow VLAN 3 to exchange information over this new cable




```
SW-UTC-A3#
SW-UTC-A3#show vlan

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/1, Fa0/2, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                 Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                 Fa0/23, Gig0/2
2    Guest                             active    Fa0/3, Fa0/4, Fa0/24
3    Research                          active
1002 fddi-default                      active
```

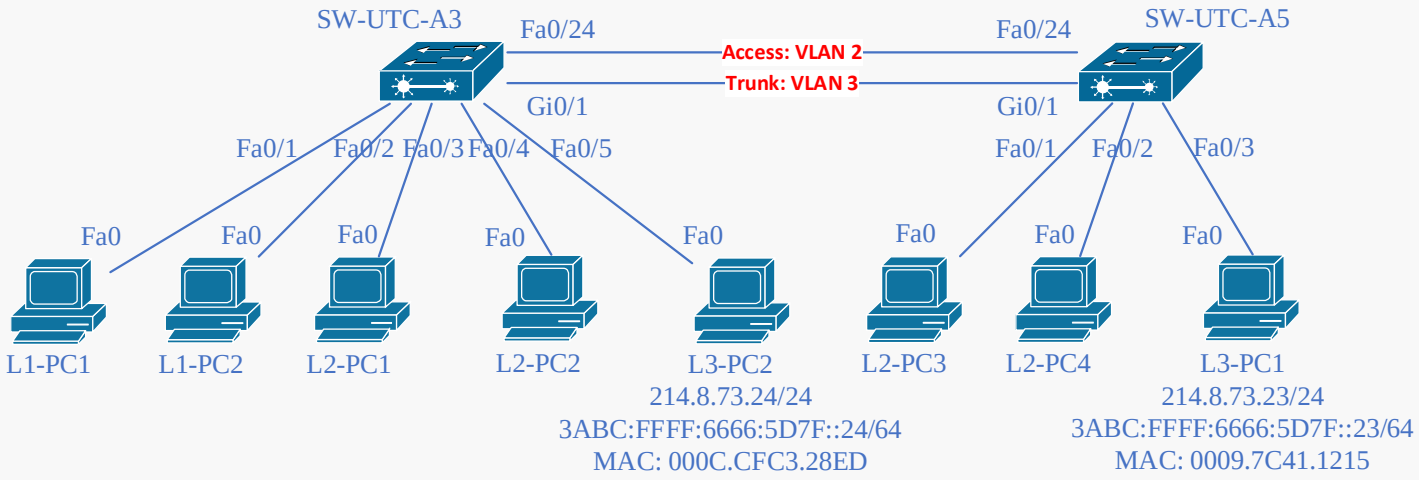
```
SW-UTC-A5#
SW-UTC-A5#show vlan

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/3, Fa0/4, Fa0/5, Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9, Fa0/10
                                                 Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                 Fa0/23, Gig0/2
2    Guest                             active    Fa0/1, Fa0/2, Fa0/24
3    Research                          active
1002 fddi-default                      active
```

Implementation steps

Step 07 - Deploy LAN 3's devices at UTC A3, A5

Nodes: L3-PC1, L3-PC2, SW-UTC-A3 and SW-UTC-A5

- Connect to VLAN 3: (L3-PC1 on SW-UTC-A5) and (L3-PC2 on SW-UTC-A3)
- Check the connection between 2 PCs above
- View information on MAC table of both SWs




```
SW-UTC-A3#
SW-UTC-A3#show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0005.5e48.5c19    DYNAMIC     Gig0/1
   2    0005.5e48.5c18    DYNAMIC     Fa0/24
   3    0009.7c41.1215    DYNAMIC     Gig0/1
   3    000c.cfc3.28ed    DYNAMIC     Fa0/5
SW-UTC-A3#
```

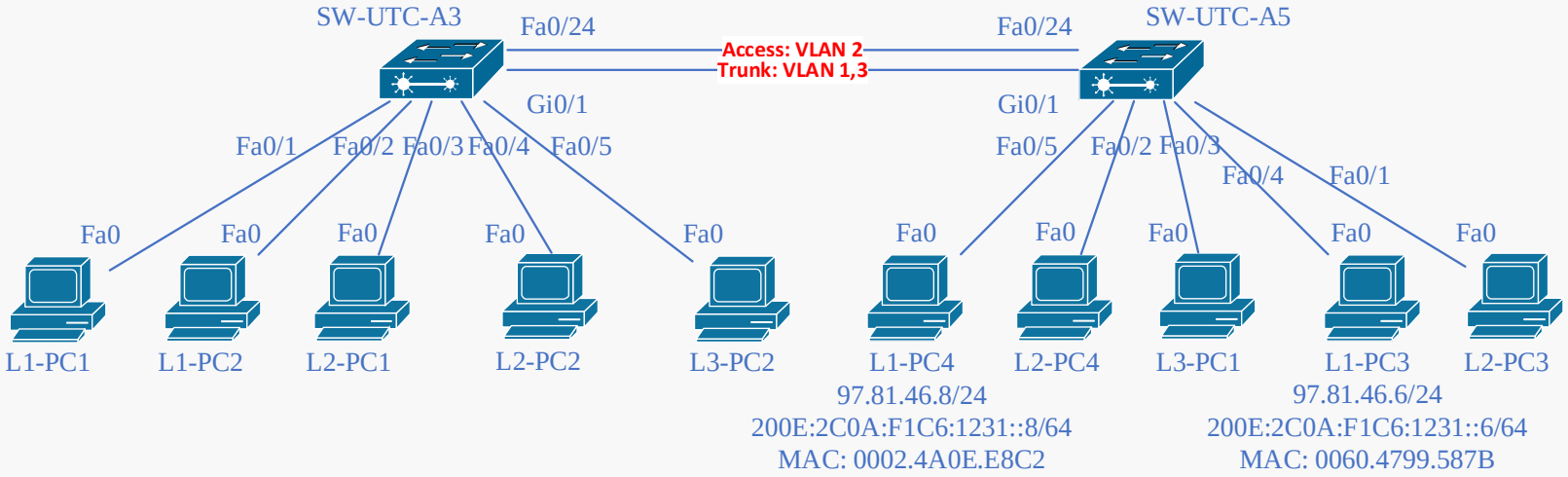
```
SW-UTC-A5#
SW-UTC-A5#show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    00d0.974c.9919    DYNAMIC     Gig0/1
   2    00d0.974c.9918    DYNAMIC     Fa0/24
   3    0009.7c41.1215    DYNAMIC     Fa0/3
   3    000c.cfc3.28ed    DYNAMIC     Gig0/1
   3    00d0.974c.9919    DYNAMIC     Gig0/1
SW-UTC-A5#
```

Implementation steps

Step 08 - Allow devices of LAN 1 to link over the trunk

Nodes: L1-PC3, L1-PC4 and SW-UTC-A5

- Allow VLAN 1 to be passed over the trunk cable
- Add 2 PCs LAN 1 (L1-PC3, L1-PC4) to use at A5
- Check connection of hosts in VLAN 1
- See on MAC table of both SWs




```
SW-UTC-A3#
SW-UTC-A3#show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.430a.384d    DYNAMIC     Fa0/1
   1    0002.4a0e.e8c2    DYNAMIC     Gig0/1
   1    0005.5e48.5c19    DYNAMIC     Gig0/1
   1    000d.bd6a.a933    DYNAMIC     Fa0/2
   1    0060.4799.587b    DYNAMIC     Gig0/1
SW-UTC-A3#
```

```
SW-UTC-A5#
SW-UTC-A5#show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.430a.384d    DYNAMIC     Gig0/1
   1    0002.4a0e.e8c2    DYNAMIC     Fa0/5
   1    000d.bd6a.a933    DYNAMIC     Gig0/1
   1    0060.4799.587b    DYNAMIC     Fa0/4
   1    00d0.974c.9919    DYNAMIC     Gig0/1
SW-UTC-A5#
```

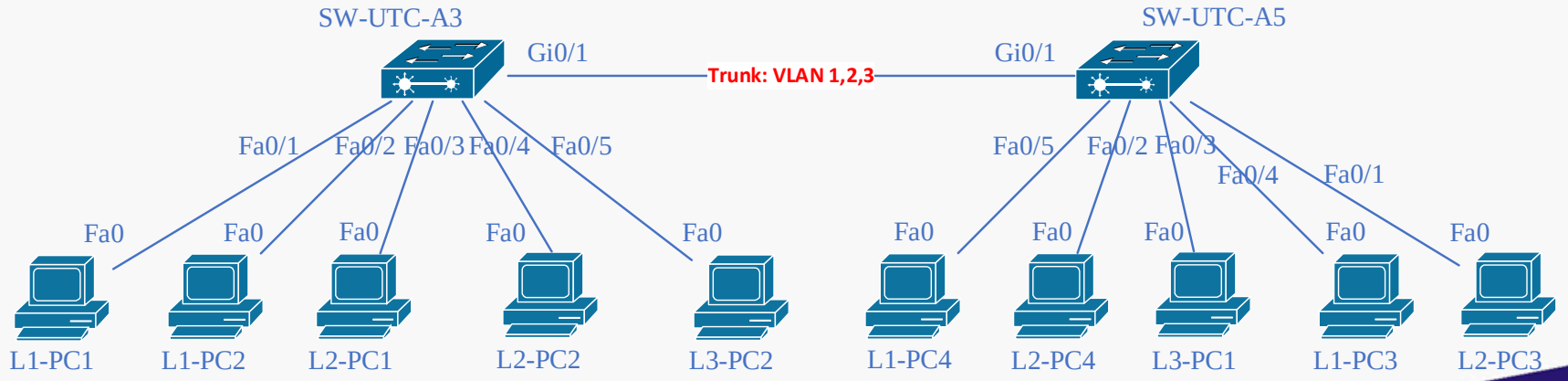
Implementation steps

Step 09 - Re-planning VLAN 2

Nodes: SW-UTC-A3 and SW-UTC-A5

- Rename VLAN 2 (from Guest to Outs) on both SWs
- Allows VLAN 2 data to be exchanged over trunking
- Turn off the Fa0/24 ports and remove the access cable between the tw
- Check the connection of devices in LAN 2
- Show information on MAC table of both SWs

```
SW-UTC-A3#
SW-UTC-A3#show vlan

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/1, Fa0/2, Fa0/6, Fa0/7
                                                 Fa0/8, Fa0/9, Fa0/10, Fa0/11
                                                 Fa0/12, Fa0/13, Fa0/14, Fa0/15
                                                 Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                 Fa0/20, Fa0/21, Fa0/22, Fa0/23
                                                 Gig0/2
2    Outs                              active    Fa0/3, Fa0/4, Fa0/24
3    Research                          active    Fa0/5
1002 fddi-default                      active
```

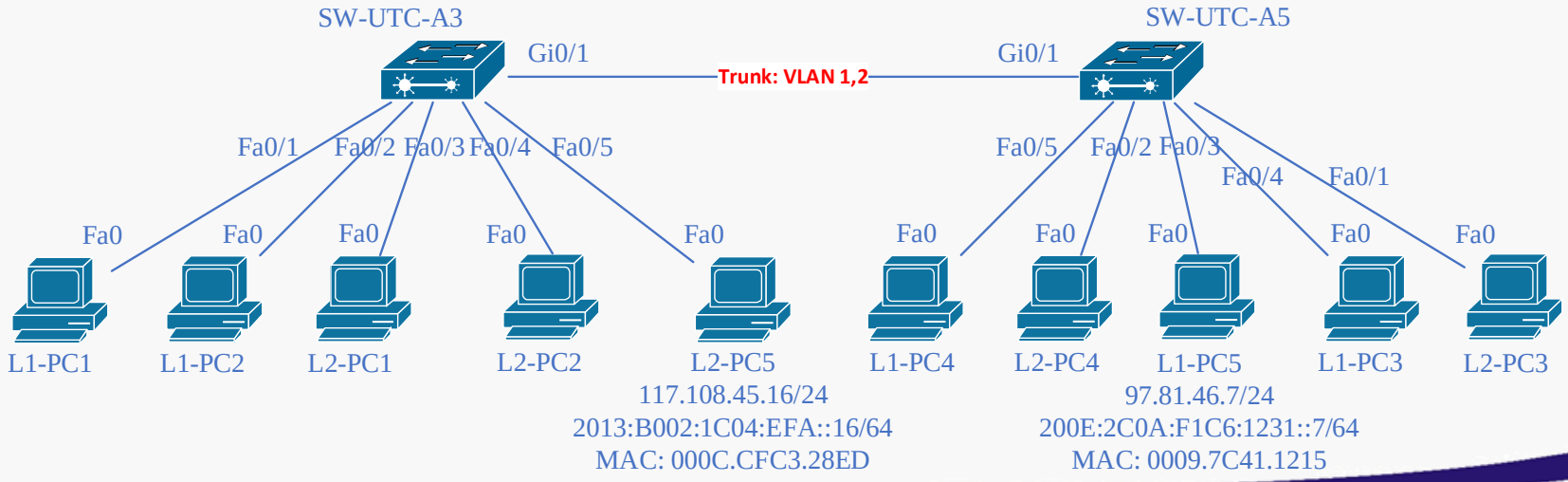


Implementation steps

Step 10 - Re-planning the system

Nodes: L1-PC5, L2-PC5, SW-UTC-A3 and SW-UTC-A5

- Do not use LAN 3, do not allow VLAN 3 over trunk link
- Change LAN 3 hosts to device of VLAN 1, VLAN 2 (planned)
- Review configuration, set unused ports (Fa0/24 on both SWs) to default
- Check connection of new devices in LAN 1 and 2
- Show MAC table of both SWs




```
SW-UTC-A3#
SW-UTC-A3#show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.430a.384d    DYNAMIC     Fa0/1
   1    0002.4a0e.e8c2    DYNAMIC     Gig0/1
   1    0005.5e48.5c19    DYNAMIC     Gig0/1
   1    0009.7c41.1215    DYNAMIC     Gig0/1
   1    000d.bd6a.a933    DYNAMIC     Fa0/2
   1    0060.4799.587b    DYNAMIC     Gig0/1
   2    000c.cf24.8227    DYNAMIC     Gig0/1
   2    000c.cfc3.28ed    DYNAMIC     Fa0/5
   2    0060.3ec0.3ca1    DYNAMIC     Fa0/3
   2    0060.7082.73cd    DYNAMIC     Gig0/1
   2    00e0.8f65.8e46    DYNAMIC     Fa0/4
```

```
SW-UTC-A5#
SW-UTC-A5#show mac address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.430a.384d    DYNAMIC     Gig0/1
   1    0002.4a0e.e8c2    DYNAMIC     Fa0/5
   1    0009.7c41.1215    DYNAMIC     Fa0/3
   1    0060.4799.587b    DYNAMIC     Fa0/4
   1    00d0.974c.9919    DYNAMIC     Gig0/1
   2    000c.cf24.8227    DYNAMIC     Fa0/1
   2    000c.cfc3.28ed    DYNAMIC     Gig0/1
   2    0060.3ec0.3ca1    DYNAMIC     Gig0/1
   2    0060.7082.73cd    DYNAMIC     Fa0/2
   2    00d0.974c.9919    DYNAMIC     Gig0/1
   2    00e0.8f65.8e46    DYNAMIC     Gig0/1
SW-UTC-A5#
```

Questions and Answers