

# Lecture (02)

## Expanding your network - Connecting more Switches

### – introduction to VLANs

CS  
IT

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By:  
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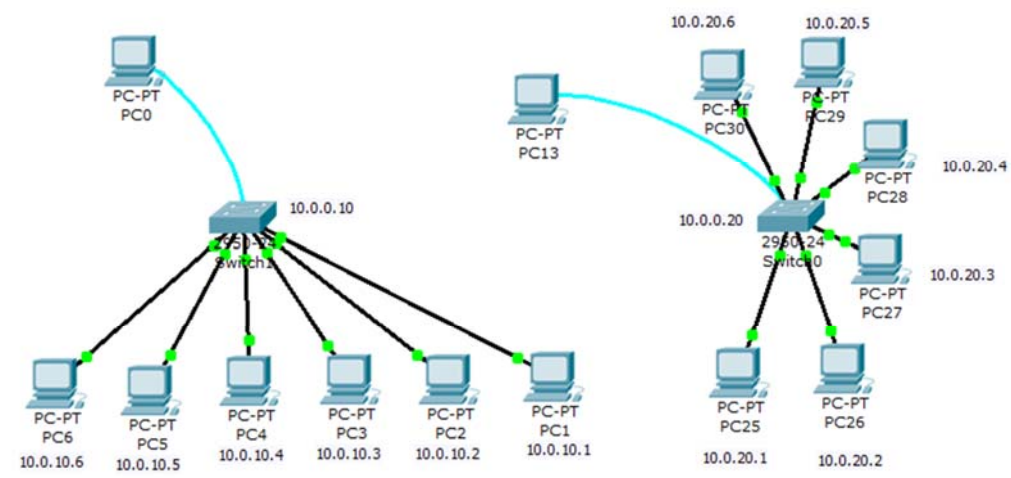
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Networks I

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# 2.1

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## Topology



PC1	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.10.1
	Mask	255.255.0.0

PC2	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.10.2
	Mask	255.255.0.0

PC3	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.10.3
	Mask	255.255.0.0

PC4	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.10.4
	Mask	255.255.0.0

<b>PC5</b>	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.10.5
	Mask	255.255.0.0

<b>PC6</b>	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.10.6
	Mask	255.255.0.0

<b>PC2 5</b>	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.20.1
	Mask	255.255.0.0

<b>PC2 6</b>	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.20.2
	Mask	255.255.0.0

<b>PC2 7</b>	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.20.3
	Mask	255.255.0.0

<b>PC2 8</b>	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.20.4
	Mask	255.255.0.0

<b>PC2 9</b>	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.20.5
	Mask	255.255.0.0

<b>PC3 0</b>	item	Configuration
	Gateway	auto
	DNS	auto
	Port status	On
	Band width	100
	Duplex	Full
	IP	10.0.20.6
	Mask	255.255.0.0

```
[siwtch01]
enabl
config t
hostname SW-FL01-R02
banner motd #Hello & Welcome to
Practical Applications on Networks I -
Lecture 02#
interface vlan 1
ip address 10.0.0.20 255.0.0.0
no shutdown

line vty 0 4
password cisco
login

line console 0
password cisco
login

enable password cisco

enable secret cisco1
```

```
interface range fa0/1-6
speed 100
duplex full
end

copy running-config startup-config
Reload
```

# Show MAC address table information

```

SW-FL01-R02#show mac-address-table
Mac Address Table
-----
Vlan  Mac Address      Type      Ports
-----
SW-FL01-R02#

SW-FL01-R02#ping 10.0.20.6
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.20.6, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 3/4/5 ms

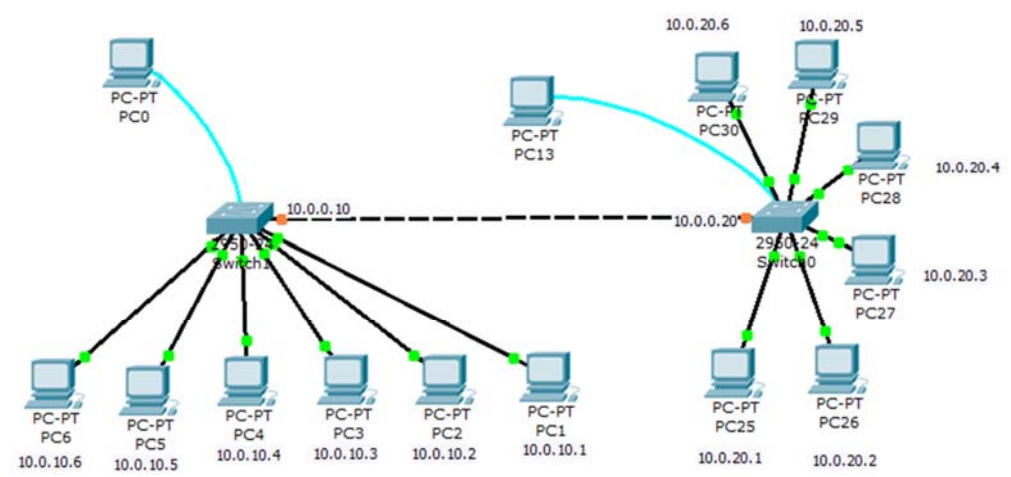
SW-FL01-R02#show mac-address-table
Mac Address Table
-----
Vlan  Mac Address      Type      Ports
-----
1     000c.85cc.889c   DYNAMIC   Fa0/1
1     0030.f2a5.9139   DYNAMIC   Fa0/6
1     0060.5cd3.1823   DYNAMIC   Fa0/5
1     00d0.97eb.0862   DYNAMIC   Fa0/3
1     00d0.ba25.b84a   DYNAMIC   Fa0/2
1     00d0.d3bc.863b   DYNAMIC   Fa0/4
SW-FL01-R02#
    
```

```

show mac address-table
Ping 10.0.20.1
Ping 10.0.20.2
Ping 10.0.20.3
Ping 10.0.20.4
Ping 10.0.20.5
Ping 10.0.20.6
show mac address-table
    
```

# 2.2

# Topology



```

[SW-FL01-R01]
enable
config t
interface fa0/24
speed 100
duplex full
end
copy running-config startup-config
reload

[SW-FL01-R02]
enable
config t
interface fa0/24
speed 100
duplex full
end
copy running-config startup-config
reload
    
```

```

PC25
Physical Config Desktop Software/Services
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.20

Pinging 10.0.0.20 with 32 bytes of data:

Request timed out.
Reply from 10.0.0.20: bytes=32 time=3ms TTL=255
Reply from 10.0.0.20: bytes=32 time=3ms TTL=255
Reply from 10.0.0.20: bytes=32 time=4ms TTL=255

Ping statistics for 10.0.0.20:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 4ms, Average = 3ms

PC>ping 10.0.0.10

Pinging 10.0.0.10 with 32 bytes of data:

Request timed out.
Reply from 10.0.0.10: bytes=32 time=8ms TTL=255
Reply from 10.0.0.10: bytes=32 time=8ms TTL=255
Reply from 10.0.0.10: bytes=32 time=9ms TTL=255

Ping statistics for 10.0.0.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 8ms, Maximum = 9ms, Average = 8ms

```

```

PC>ping 10.0.10.1

Pinging 10.0.10.1 with 32 bytes of data:

Reply from 10.0.10.1: bytes=32 time=24ms TTL=128
Reply from 10.0.10.1: bytes=32 time=12ms TTL=128
Reply from 10.0.10.1: bytes=32 time=14ms TTL=128
Reply from 10.0.10.1: bytes=32 time=12ms TTL=128

Ping statistics for 10.0.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 12ms, Maximum = 24ms, Average = 15ms

```

## Show MAC address table information

```

SW-FL01-R02#show mac-address-table
Mac Address Table
-----
Vlan  Mac Address      Type      Ports
----  -
SW-FL01-R02#

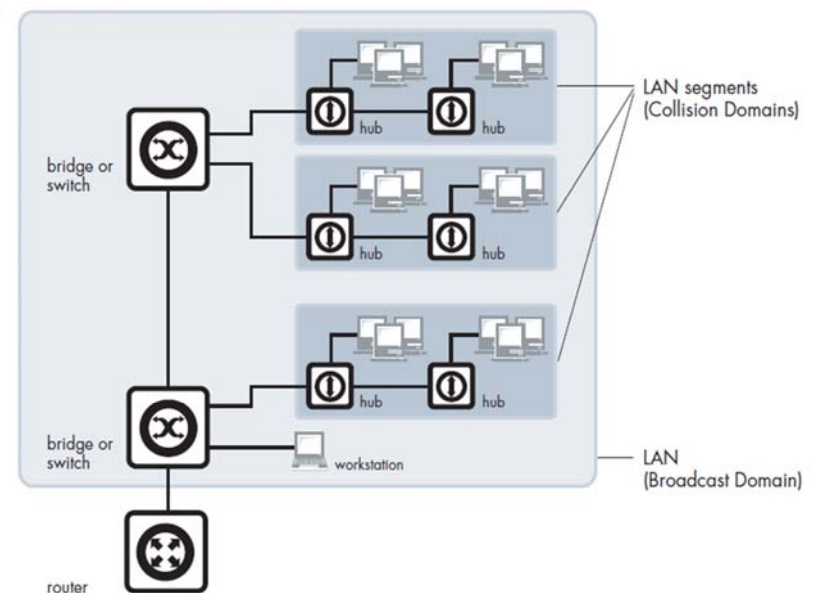
SW-FL01-R02#ping 10.0.20.6
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.20.6, timeout is 2 seconds:
!!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 3/4/5 ms

SW-FL01-R02#show mac-address-table
Mac Address Table
-----
Vlan  Mac Address      Type      Ports
----  -
1     000c.85cc.889c   DYNAMIC   Fa0/1
1     0030.f2a5.9139   DYNAMIC   Fa0/6
1     0060.5cd3.1823   DYNAMIC   Fa0/5
1     00d0.97eb.0362   DYNAMIC   Fa0/3
1     00d0.ba25.b34a   DYNAMIC   Fa0/2
1     00d0.d3bc.863b   DYNAMIC   Fa0/4
SW-FL01-R02#

```

[SW-FL01-R01]  
 show mac address-table  
 Ping 10.0.20.1  
 Ping 10.0.20.2  
 Ping 10.0.20.3  
 Ping 10.0.20.4  
 Ping 10.0.20.5  
 Ping 10.0.20.6  
 show mac address-table

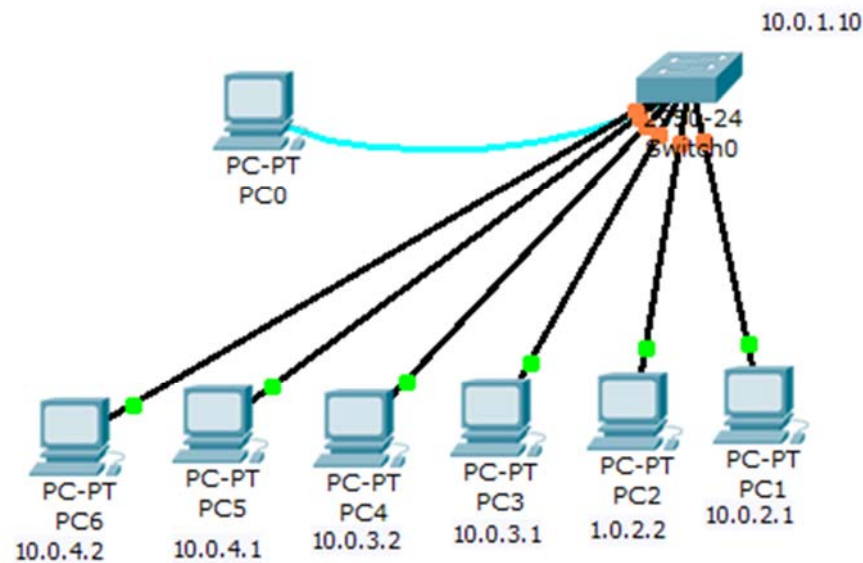
## Domain terminology



- **There are only two simple rules:**
- If a port is a tagged member of a VLAN, then any packets sent out that port by that VLAN must have a tag inserted into the header.
- If a tagged packet arrives in at a port, **and** the port is a tagged member of the VLAN corresponding to the VID in the packet's tag, then the packet is associated with that VLAN.

## 2.3.0

## Topology



PC1	item	Configuration	PC2	item	Configuration
	Gateway	auto		Gateway	auto
	DNS	auto		DNS	auto
	Port status	On		Port status	On
	Band width	auto		Band width	auto
	Duplex	auto		Duplex	auto
	IP	10.0.2.1		IP	10.0.2.2
	Mask	255.255.0.0		Mask	255.255.0.0
PC3	item	Configuration	PC4	item	auto
	Gateway	auto		Gateway	auto
	DNS	auto		DNS	auto
	Port status	On		Port status	On
	Band width	auto		Band width	auto
	Duplex	auto		Duplex	auto
	IP	10.0.3.1		IP	10.0.3.2
	Mask	255.255.0.0		Mask	255.255.0.0

PC5	item	Configuration	PC6	item	Configuration
	Gateway	auto		Gateway	auto
	DNS	auto		DNS	auto
	Port status	On		Port status	On
	Band width	auto		Band width	auto
	Duplex	auto		Duplex	auto
	IP	10.0.4.1		IP	10.0.4.2
	Mask	255.255.0.0		Mask	255.255.0.0

```

enabl
config t
hostname FL00-R01-SW01
banner motd #Hello & Welcome to
Practical Applications on Networks I -
Lecture 02#

line vty 0 4
password cisco
login

line console 0
password cisco
login

enable password cisco

enable secret cisco1

interface vlan 1
ip address 10.0.1.10 255.255.0.0
no shutdown

interface range fa0/1-6
speed auto
duplex auto
end

copy running-config startup-config

```

```

FL00-R01-SW01#show ip interface brief
Interface          IP-Address      OK? Method Status  Protocol

FastEthernet0/1    unassigned      YES manual up       up
FastEthernet0/2    unassigned      YES manual up       up
FastEthernet0/3    unassigned      YES manual up       up
FastEthernet0/4    unassigned      YES manual up       up
FastEthernet0/5    unassigned      YES manual up       up
FastEthernet0/6    unassigned      YES manual up       up
FastEthernet0/7    unassigned      YES manual down     down
FastEthernet0/8    unassigned      YES manual down     down
FastEthernet0/9    unassigned      YES manual down     down
FastEthernet0/10   unassigned      YES manual down     down
FastEthernet0/22   unassigned      YES manual down     down
FastEthernet0/23   unassigned      YES manual down     down
FastEthernet0/24   unassigned      YES manual down     down

Vlan1
10.0.1.10          YES manual up       up
FL00-R01-SW01#

```

```

FL00-R01-SW01#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, Fa0/24

1002 fddi-default          act/unsup
1003 token-ring-default    act/unsup
1004 fddinet-default        act/unsup
1005 trnet-default         act/unsup

VLAN Type  SAID      MTU    Parent RingNo BridgeNo Stp    BrdgMode Trans1 Trans2
-----
1    enet    100001    1500   -     -     -     -     -     0     0
1002 fddi    101002    1500   -     -     -     -     -     0     0
1003 tr     101003    1500   -     -     -     -     -     0     0
1004 fdnet  101004    1500   -     -     -     ieee  -     0     0
1005 trnet  101005    1500   -     -     -     ibm   -     0     0

Remote SPAN VLANs
-----

Primary Secondary Type          Ports
-----
FL00-R01-SW01#

```

```
PC>ping 10.0.1.10

Pinging 10.0.1.10 with 32 bytes of data:

Request timed out.
Reply from 10.0.1.10: bytes=32 time=5ms TTL=255
Reply from 10.0.1.10: bytes=32 time=3ms TTL=255
Reply from 10.0.1.10: bytes=32 time=3ms TTL=255

Ping statistics for 10.0.1.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 5ms, Average = 3ms
```

```
PC>ping 10.0.2.1

Pinging 10.0.2.1 with 32 bytes of data:

Reply from 10.0.2.1: bytes=32 time=1ms TTL=128
Reply from 10.0.2.1: bytes=32 time=0ms TTL=128

Ping statistics for 10.0.2.1:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
PC>ping 10.0.3.1

Pinging 10.0.3.1 with 32 bytes of data:

Reply from 10.0.3.1: bytes=32 time=17ms TTL=128
Reply from 10.0.3.1: bytes=32 time=8ms TTL=128

Ping statistics for 10.0.3.1:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 8ms, Maximum = 17ms, Average = 12ms

Control-C
^C
PC>ping 10.0.4.1

Pinging 10.0.4.1 with 32 bytes of data:

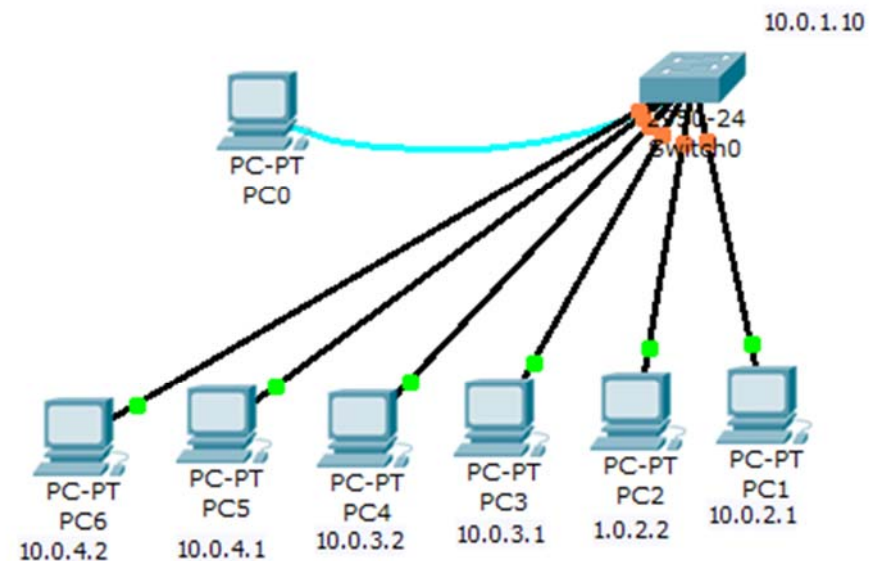
Reply from 10.0.4.1: bytes=32 time=15ms TTL=128
Reply from 10.0.4.1: bytes=32 time=7ms TTL=128

Ping statistics for 10.0.4.1:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 7ms, Maximum = 15ms, Average = 11ms

Control-C
```

## 2.3

## Topology



```

enble
config t
vlan 2
name Finance

vlan 3
name HR

vlan 4
name Administration

interface fa0/1
switchport mode access
switchport access vlan 2

interface fa0/2
switchport mode access
switchport access vlan 2

interface fa0/3
switchport mode access
switchport access vlan 3

interface fa0/4
switchport mode access
switchport access vlan 3

interface fa0/5
switchport mode access
switchport access vlan 4

interface fa0/6
switchport mode access
switchport access vlan 4

end

copy running-config startup-config

```

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```

FL00-R01-SW01#show vlan

VLAN Name                Status    Ports
-----
1    default                active    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, Fa0/24
2    Finance                active    Fa0/1, Fa0/2
3    HR                    active    Fa0/3, Fa0/4
4    Administration        active    Fa0/5, Fa0/6
10   Management             active
1002 fddi-default          act/unsup
1003 token-ring-default   act/unsup
1004 fddinet-default      act/unsup
1005 trnet-default        act/unsup

VLAN Type  SAID      MTU   Parent  RingNo BridgeNo Stp    BrdgMode Trans1 Trans2
-----
1    enet  100001   1500  -       -       -       -       -       0       0
2    enet  100002   1500  -       -       -       -       -       0       0
3    enet  100003   1500  -       -       -       -       -       0       0
4    enet  100004   1500  -       -       -       -       -       0       0
10   enet  100010   1500  -       -       -       -       -       0       0
1002 fddi  101002   1500  -       -       -       -       -       0       0
1003 tr   101003   1500  -       -       -       -       -       0       0
1004 fdnet 101004   1500  -       -       -       -       ieee -   0       0
1005 trnet 101005   1500  -       -       -       -       ibm  -   0       0

Remote SPAN VLANs
-----

Primary Secondary Type          Ports
-----

```

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```

FL00-R01-SW01#show ip interface brief

Interface      IP-Address      OK? Method Status      Protocol

FastEthernet0/1  unassigned      YES manual up           up
FastEthernet0/2  unassigned      YES manual up           up
FastEthernet0/3  unassigned      YES manual up           up
FastEthernet0/4  unassigned      YES manual up           up
FastEthernet0/5  unassigned      YES manual up           up
FastEthernet0/6  unassigned      YES manual up           up
FastEthernet0/7  unassigned      YES manual down         down
FastEthernet0/8  unassigned      YES manual down         down
FastEthernet0/9  unassigned      YES manual down         down
FastEthernet0/22 unassigned      YES manual down         down
FastEthernet0/23 unassigned      YES manual down         down
FastEthernet0/24 unassigned      YES manual down         down
Vlan1           10.0.1.10       YES manual up             down
FL00-R01-SW01#

```

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```

PC>ping 10.0.2.2

Pinging 10.0.2.2 with 32 bytes of data:

Reply from 10.0.2.2: bytes=32 time=18ms TTL=128
Reply from 10.0.2.2: bytes=32 time=8ms TTL=128

Ping statistics for 10.0.2.2:
    Packets: Sent = 2, Received = 2, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 8ms, Maximum = 18ms, Average = 13ms

Control-C
^C
PC>ping 10.0.3.1

Pinging 10.0.3.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.0.3.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>ping 10.0.4.1

Pinging 10.0.4.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.


Ping statistics for 10.0.4.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

PC>

```

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**Thanks,..**  
**See you next week (ISA),...**

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