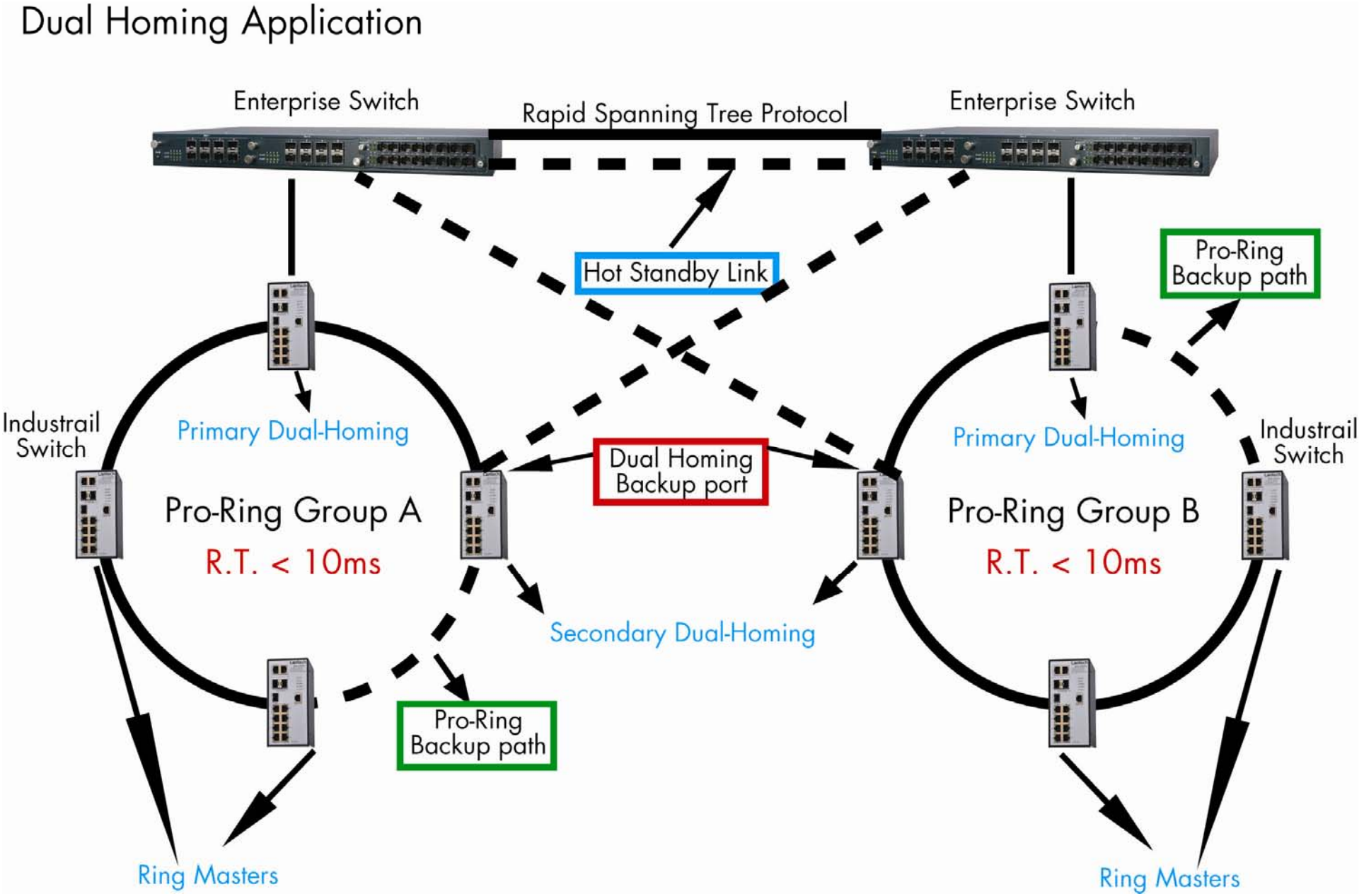
Lantech

Pioneering Industrial and IP Networks

Dual Homing Instruction Guide

Dual Homing Application



Topic: Use 8 “IES-2307C”, 1 “IGS-2206C” and 1 “IES-2216C” to set up Dual Homing.
Step 1: Assign different IP address for each switches.

IES-2307C IP address setting

IP Address	192.168.16.10	IP Address	192.168.16.20	IP Address	192.168.16.30	IP Address	192.168.16.40
Subnet Mask	255.255.255.0	Subnet Mask	255.255.255.0	Subnet Mask	255.255.255.0	Subnet Mask	255.255.255.0
Gateway	192.168.16.254	Gateway	192.168.16.254	Gateway	192.168.16.254	Gateway	192.168.16.254
DNS1	0.0.0.0	DNS1	0.0.0.0	DNS1	0.0.0.0	DNS1	0.0.0.0
DNS2	0.0.0.0	DNS2	0.0.0.0	DNS2	0.0.0.0	DNS2	0.0.0.0

IP Address	192.168.16.50	IP Address	192.168.16.60	IP Address	192.168.16.70	IP Address	192.168.16.80
Subnet Mask	255.255.255.0	Subnet Mask	255.255.255.0	Subnet Mask	255.255.255.0	Subnet Mask	255.255.255.0
Gateway	192.168.16.254	Gateway	192.168.16.254	Gateway	192.168.16.254	Gateway	192.168.16.254
DNS1	0.0.0.0	DNS1	0.0.0.0	DNS1	0.0.0.0	DNS1	0.0.0.0
DNS2	0.0.0.0	DNS2	0.0.0.0	DNS2	0.0.0.0	DNS2	0.0.0.0

IES-2216C IP address setting

IP Configuration

DHCP Client : Disable

IP Address	192.168.16.100
Subnet Mask	255.255.255.0
Gateway	192.168.16.254
DNS1	0.0.0.0
DNS2	0.0.0.0

Apply Help

IGS-2206C IP address setting

IP Configuration

DHCP Client : Disable

IP Address	192.168.16.200
Subnet Mask	255.255.255.0
Gateway	192.168.16.254
DNS1	0.0.0.0
DNS2	0.0.0.0

Apply Help

Configuring X-Ring

X-Ring provides a faster redundant recovery than Spanning Tree topology. The action is similar to STP or RSTP, but the algorithms not the same.

In the X-Ring topology, every switch should enable X-Ring function and assign two member ports in the ring. Only one switch in the X-Ring group would be set as a backup switch that would be blocked, called backup port, and another port is called working port. Other switches are called working switches and their two member ports are called working ports. When the failure of network connection occurs, the backup port will automatically become a working port to recovery the failure.

The ring master can negotiate and place command to other switches in the X-Ring group. If there are 2 or more switches in master mode, then software will select the switch with lowest MAC address number as the ring master. The X-Ring master ring mode will be enabled by the X-Ring configuration interface. Also, user can identify the switch as the ring master from the R.M. LED panel of the LED panel on the switch.

The system also supports the coupling ring that can connect 2 or more X-Ring group for the redundant backup function and dual homing function that prevent connection lose between X-Ring group and upper level/core switch.

Enable X-Ring: To enable the X-Ring function. Marking the check box to enable the X-Ring function.
Enable Ring Master: Mark the check box for enabling this machine to be a ring master.
1st & 2nd Ring Ports: Pull down the selection menu to assign two ports as the member ports. 1st Ring Port is the working port and 2nd Ring Port is the backup port. When 1st Ring Port fails, the system will automatically upgrade the 2nd Ring Port to be the working port.
Enable Coupling Ring: To enable the coupling ring function. Marking the check box to enable the coupling ring function.
Coupling port: Assign the member port.
Control port: Set the switch as the master switch in the coupling ring.
Enable Dual Homing: Set up one of port on the switch to be the Dual Homing port. In an X-Ring group, maximum Dual Homing port is one. Dual Homing only work when the X-Ring function enable.
And then, click "Apply" to apply the configuration.

[Note]
When the X-Ring function enable, user must disable the RSTP. The X-Ring function and RSTP function cannot exist at the same time. Remember to execute the "Save Configuration" action, otherwise the new configuration will lose when switch power off.

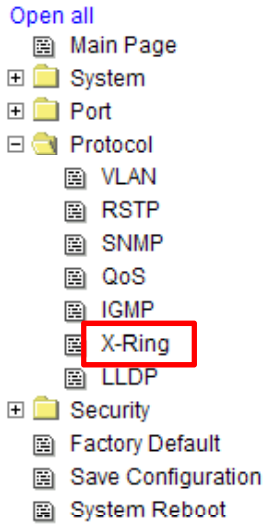
Step 2: Click the X-Ring protocol. Enable Ring.

Step 3: Assign 192.168.16.10 and 192.168.16.40 as Ring Master.

If we enable 2 or more Ring Master in the same Ring, only 1 can be Ring Master.

In this case 192.168.16.40 is master and 192.168.16.10 is backup master.

Step 4: Enable Dual Homing port in switch 192.168.16.20 and 192.168.16.30



☑ Enable Ring			
☑ Enable Ring Master			
1st Ring Port	Port.01		FORWARDING
2nd Ring Port	Port.02		FORWARDING
☐ Enable Couple Ring			
Couple Port	Port.03		LINKDOWN
Control Port	Port.04		LINKDOWN
☐ Enable Dual Homing			
Homing Port	Port.05		LINKDOWN
☐ Enable Dual Ring			
1st Ring Port	Port.01		FORWARDING
2nd Ring Port	Port.02		FORWARDING

192.168.16.10 This switch is Backup Ring Master.

192.168.16.20

☑ Enable Ring			
☐ Enable Ring Master			
1st Ring Port	Port.01		FORWARDING
2nd Ring Port	Port.02		FORWARDING
☐ Enable Couple Ring			
Couple Port	Port.03		LINKDOWN
Control Port	Port.04		LINKDOWN
☑ Enable Dual Homing			
Homing Port	Port.05		FORWARDING
☐ Enable Dual Ring			
1st Ring Port	Port.01		FORWARDING
2nd Ring Port	Port.02		FORWARDING

☑ Enable Ring			
☑ Enable Ring Master			
1st Ring Port	Port.01		FORWARDING
2nd Ring Port	Port.02		BLOCKING
☐ Enable Couple Ring			
Couple Port	Port.03		LINKDOWN
Control Port	Port.04		LINKDOWN
☐ Enable Dual Homing			
Homing Port	Port.05		LINKDOWN
☐ Enable Dual Ring			
1st Ring Port	Port.01		FORWARDING
2nd Ring Port	Port.02		BLOCKING

192.168.16.40 This switch is Ring Master.

192.168.16.30

☑ Enable Ring			
☐ Enable Ring Master			
1st Ring Port	Port.01		FORWARDING
2nd Ring Port	Port.02		FORWARDING
☐ Enable Couple Ring			
Couple Port	Port.03		LINKDOWN
Control Port	Port.04		LINKDOWN
☑ Enable Dual Homing			
Homing Port	Port.05		FORWARDING
☐ Enable Dual Ring			
1st Ring Port	Port.01		FORWARDING
2nd Ring Port	Port.02		FORWARDING

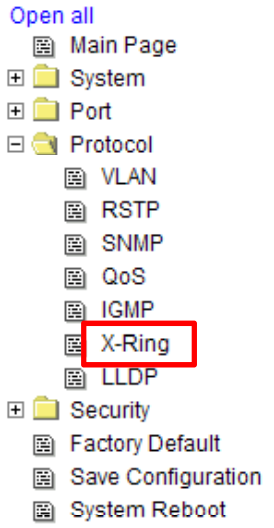
Step 5: Click the X-Ring protocol. Enable Ring.

Step 6: Assign 192.168.16.50 and 192.168.16.80 as Ring Master.

If we enable 2 or more Ring Master in the same Ring, only 1 can be Ring Master.

In this case 192.168.16.50 is master and 192.168.16.80 is backup master.

Step 7: Enable Dual Homing port in switch 192.168.16.60 and 192.168.16.70



☑ Enable Ring		
☑ Enable Ring Master		
1st Ring Port	Port.01	FORWARDING
2nd Ring Port	Port.02	BLOCKING
☐ Enable Couple Ring		
Couple Port	Port.03	LINKDOWN
Control Port	Port.04	LINKDOWN
☐ Enable Dual Homing		
Homing Port	Port.05	LINKDOWN
☐ Enable Dual Ring		
1st Ring Port	Port.01	FORWARDING
2nd Ring Port	Port.02	BLOCKING

192.168.16.50

This switch is Ring Master.

192.168.16.60

☑ Enable Ring		
☐ Enable Ring Master		
1st Ring Port	Port.01	FORWARDING
2nd Ring Port	Port.02	FORWARDING
☐ Enable Couple Ring		
Couple Port	Port.03	LINKDOWN
Control Port	Port.04	LINKDOWN
☑ Enable Dual Homing		
Homing Port	Port.05	FORWARDING
☐ Enable Dual Ring		
1st Ring Port	Port.01	FORWARDING
2nd Ring Port	Port.02	FORWARDING

☑ Enable Ring		
☑ Enable Ring Master		
1st Ring Port	Port.01	FORWARDING
2nd Ring Port	Port.02	FORWARDING
☐ Enable Couple Ring		
Couple Port	Port.03	LINKDOWN
Control Port	Port.04	LINKDOWN
☐ Enable Dual Homing		
Homing Port	Port.05	LINKDOWN
☐ Enable Dual Ring		
1st Ring Port	Port.01	FORWARDING
2nd Ring Port	Port.02	FORWARDING

192.168.16.80

This switch is Backup Ring Master.

192.168.16.70

☑ Enable Ring		
☐ Enable Ring Master		
1st Ring Port	Port.01	FORWARDING
2nd Ring Port	Port.02	FORWARDING
☐ Enable Couple Ring		
Couple Port	Port.03	LINKDOWN
Control Port	Port.04	LINKDOWN
☑ Enable Dual Homing		
Homing Port	Port.05	FORWARDING
☐ Enable Dual Ring		
1st Ring Port	Port.01	FORWARDING
2nd Ring Port	Port.02	FORWARDING

Spanning Tree Management

The Rapid Spanning Tree Protocol (RSTP) is an evolution of the Spanning Tree Protocol and provides for faster spanning tree convergence after a topology change. The system also supports STP and the system will auto detect the connected device that is running STP or RSTP protocol.

RSTP System Configuration

1.User can view spanning tree information about the Root Bridge
2.User can modify RSTP state. After modification, click "Apply" button

RSTP mode: user must enable or disable RSTP function before configure the related parameters
Priority (0-61440): a value used to identify the root bridge. The bridge with the lowest value has the highest priority and is selected as the root. If the value changes, user must reboot the switch. The value must be multiple of 4096 according to the protocol standard rule
Max Age (6-40): the number of seconds a bridge waits without receiving Spanning-tree Protocol configuration messages before attempting a reconfiguration. Enter a value between 6 through 40
Hello Time (1-10): the time that controls switch sends out the BPDU packet to check RSTP current status. Enter a value between 1 through 10
Forward Delay Time (4-30): the number of seconds a port waits before changing from its Rapid Spanning-Tree Protocol learning and listening states to the forwarding state. Enter a value between 4 through 30
[NOTE]
1. Must follow the rule to configure the MAX Age, Hello Time, and Forward Delay Time 2 x (Forward Delay Time value ¡V1) > = Max Age value >= 2 x (Hello Time value +1)
2. Remember to execute the "Save Configuration" action, otherwise the new configuration will lose when switch power off

RSTP Per Port Configuration

You can configure path cost and priority of every port.
1.Select the port in Port column.
2.Path Cost: The cost of the path to the other bridge from this transmitting bridge at the specified port. Enter a number 1 through 200000000.
3.Priority: Decide which port should be blocked by priority in LAN. Enter a number 0 through 240. The value of priority must be the multiple of 16.
4.Admin P2P: Some of the rapid state transactions that are possible within RSTP are dependent upon whether the port concerned can only be connected to exactly one other bridge (i.e. it is served by a point-to-point LAN segment), or can be connected to two or more bridges (i.e. it is served by a shared medium LAN segment). This function allows the P2P status of the link to be manipulated administratively. true is P2P enabling. false is P2P disabling.
5.Admin Edge: The port directly connected to end stations cannot create bridging loop in the network. To configure the port as an edge port, set the port to "true" status.
6.Non Stp: The port includes the STP mathematic calculation. true is not including STP mathematic calculation. false is including the STP mathematic calculation.
7.Click "Apply“.

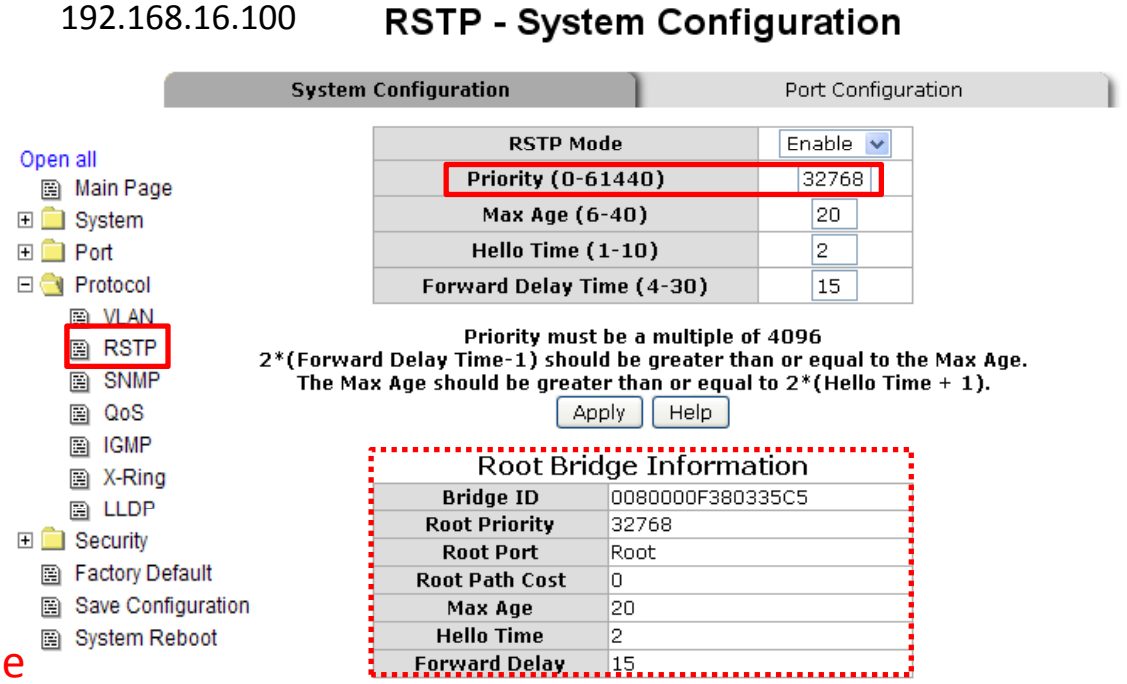
Step 8: Click RSTP protocol.
Enable RSTP Mode.

Step 9: Set different priority value to 192.168.16.100 and 192.168.16.200.

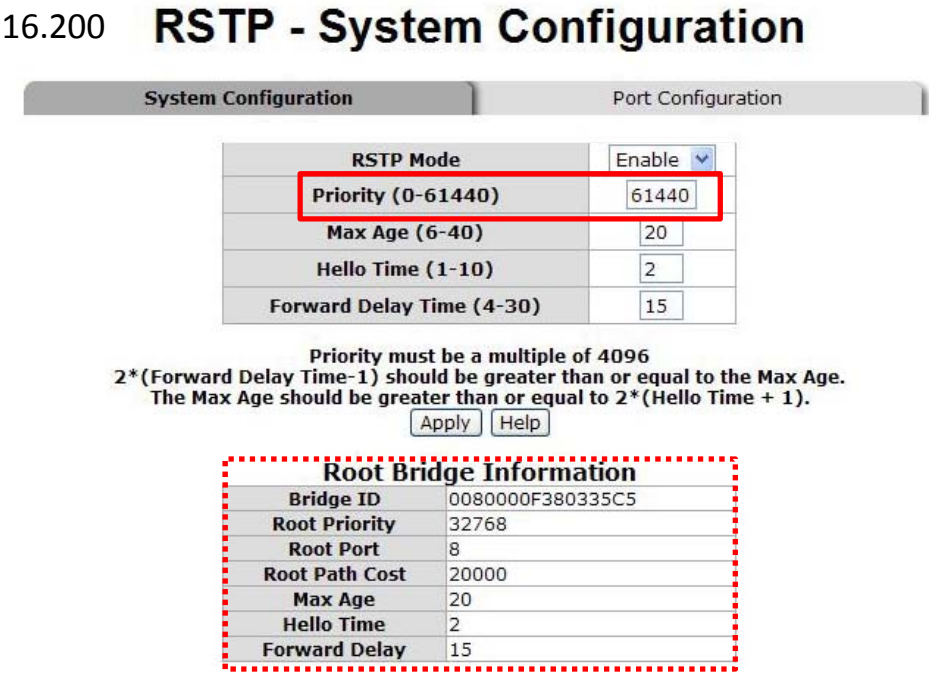
Note: If your connection and settings are correct. You can see Root Bridge Information as dotted line area.

RSTP will chose the lower priority value as root. So 192.168.16.100 is the RSTP Root.

192.168.16.100



192.168.16.200



RSTP Port Status:

192.168.16.100 **RSTP - Port Configuration**

System Configuration | **Port Configuration**

It is show the RSTP connection status by each port.

Port	Path Cost (1-200000000)	Priority (0-240)	Admin P2P	Admin Edge	Admin Non Stp
Port.01 Port.02 Port.03 Port.04 Port.05	20000(	128	Auto	true	false

priority must be a multiple of 16

Apply | Help

Port.02 ->192.168.16.20
Port.06 ->192.168.16.60
Port.13 ->192.168.16.200
Port.15 ->192.168.16.200

192.168.16.20

192.168.16.60

192.168.16.200

RSTP Port Status

Port	Path Cost	Port Priority	Oper P2P	Oper Edge	Stp Neighbor	State	Role
Port.01	200000	128	True	True	False	Disabled	Disabled
Port.02	200000	128	True	False	False	Forwarding	Designated
Port.03	200000	128	True	True	False	Disabled	Disabled
Port.04	200000	128	True	True	False	Disabled	Disabled
Port.05	200000	128	True	True	False	Disabled	Disabled
Port.06	200000	128	True	False	False	Forwarding	Designated
Port.07	200000	128	True	True	False	Disabled	Disabled
Port.08	200000	128	True	True	False	Disabled	Disabled
Port.09	200000	128	True	True	False	Disabled	Disabled
Port.10	200000	128	True	True	False	Disabled	Disabled
Port.11	200000	128	True	True	False	Disabled	Disabled
Port.12	200000	128	True	True	False	Disabled	Disabled
Port.13	200000	128	True	False	False	Forwarding	Designated
Port.14	200000	128	True	True	False	Disabled	Disabled
Port.15	200000	128	True	False	False	Forwarding	Designated
Port.16	200000	128	True	True	False	Disabled	Disabled
Port.17	20000	128	True	True	False	Disabled	Disabled
Port.18	20000	128	True	True	False	Disabled	Disabled

RSTP Port Status:

192.168.16.200 **RSTP - Port Configuration**

System Configuration | **Port Configuration**

It is show the RSTP connection status by each port.

Port	Path Cost (1-200000000)	Priority (0-240)	Admin P2P	Admin Edge	Admin Non Stp
Port.01 Port.02 Port.03 Port.04 Port.05	20000(	128	Auto	true	false

priority must be a multiple of 16

Apply | Help

Port.03 ->192.168.16.30
Port.06 ->192.168.16.70
Port.07 ->192.168.16.100
Port.08 ->192.168.16.100

RSTP Port Status

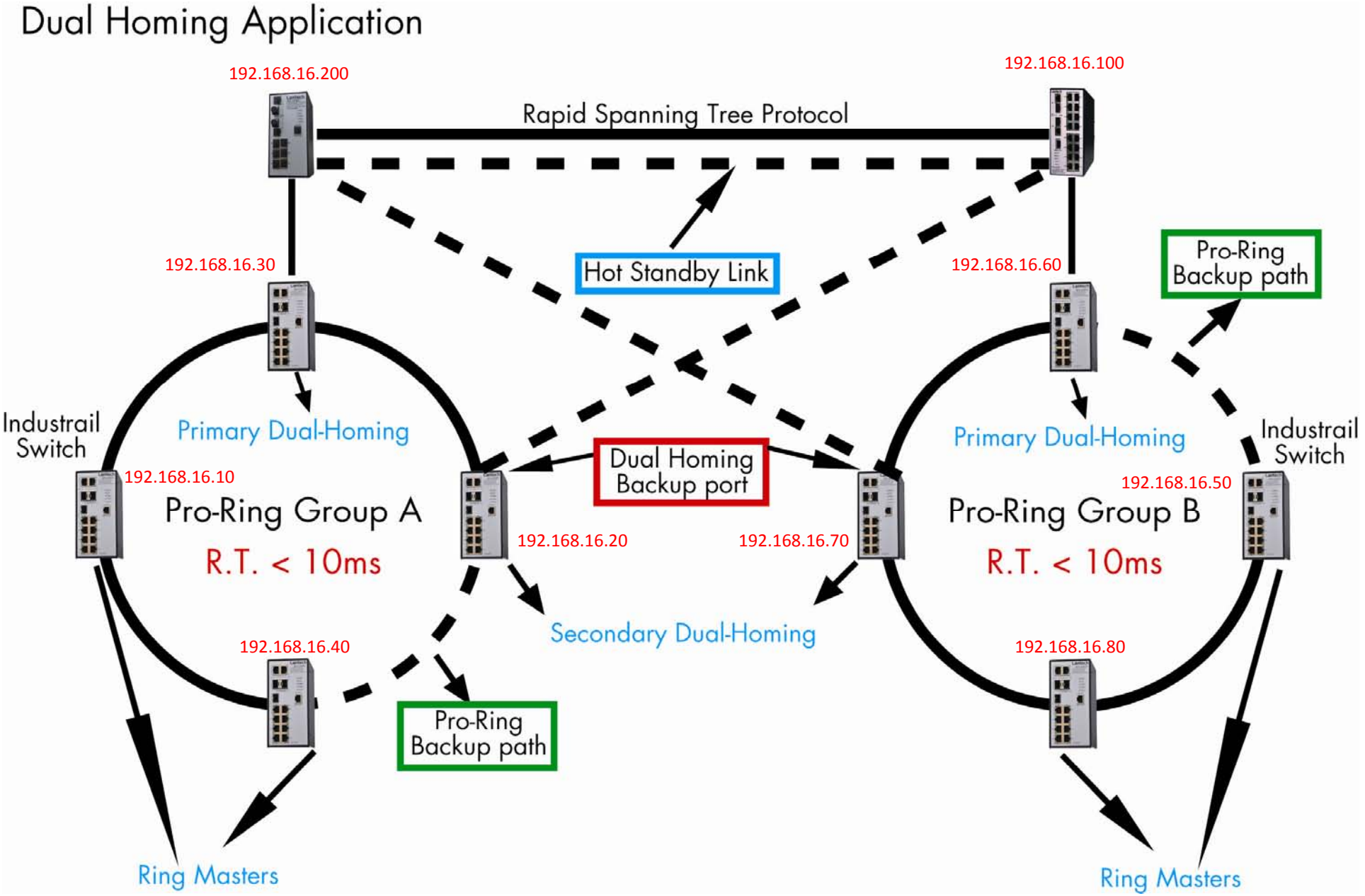
Port	Path Cost	Port Priority	Oper P2P	Oper Edge	Stp Neighbor	State	Role
Port.01	20000	128	True	True	False	Disabled	Disabled
Port.02	20000	128	True	True	False	Disabled	Disabled
Port.03	20000	128	True	False	False	Forwarding	Root
Port.04	20000	128	True	True	False	Disabled	Disabled
Port.05	20000	128	True	True	False	Disabled	Disabled
Port.06	20000	128	True	False	False	Discarding	Alternated
Port.07	20000	128	True	False	False	Discarding	Alternated
Port.08	20000	128	True	False	False	Discarding	Alternated

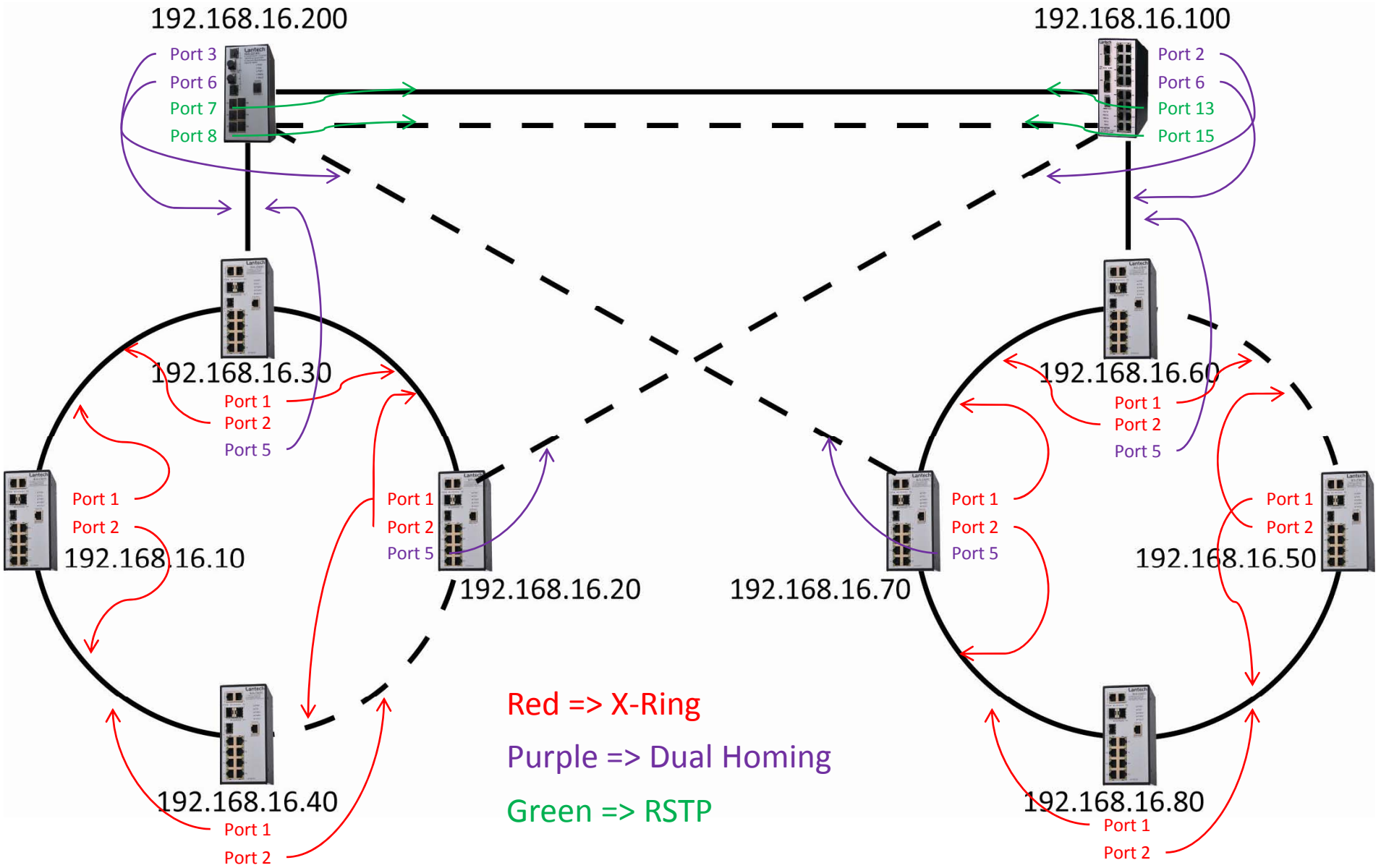
192.168.16.30

192.168.16.70

192.168.16.100

RSTP Backup Path


Dual Homing Application
192.168.16.200
192.168.16.100
Rapid Spanning Tree Protocol
192.168.16.30
Hot Standby Link
192.168.16.60
Pro-Ring
Backup path
Industrail
Switch
Primary Dual-Homing
Dual Homing
Backup port
Primary Dual-Homing
Industrail
Switch
192.168.16.10
192.168.16.50
Pro-Ring Group A
R.T. < 10ms
192.168.16.20
192.168.16.70
Pro-Ring Group B
R.T. < 10ms
Secondary Dual-Homing
192.168.16.40
192.168.16.80
Pro-Ring
Backup path
Ring Masters
Ring Masters


192.168.16.200
Port 3
Port 6
Port 7
Port 8
192.168.16.100
Port 2
Port 6
Port 13
Port 15
192.168.16.30
Port 1
Port 2
Port 5
192.168.16.60
Port 1
Port 2
Port 5
Port 1
Port 2
192.168.16.10
Port 1
Port 2
Port 5
192.168.16.20
Port 1
Port 2
Port 5
192.168.16.70
Port 1
Port 2
192.168.16.50
192.168.16.40
Port 1
Port 2
192.168.16.80
Port 1
Port 2
Red => X-Ring
Purple => Dual Homing
Green => RSTP

Ring Tool Recovery time test method:

1. We send the test packet from NIC #1 to NIC #2.
2. Because of the X-Ring topology we can see the data flow.
3. When the X-Ring topology change the data flow will be change too.
4. Ring tool will capture the test packet when NIC #2 not only receive data.
5. It will calculate test packet the interval in ms.