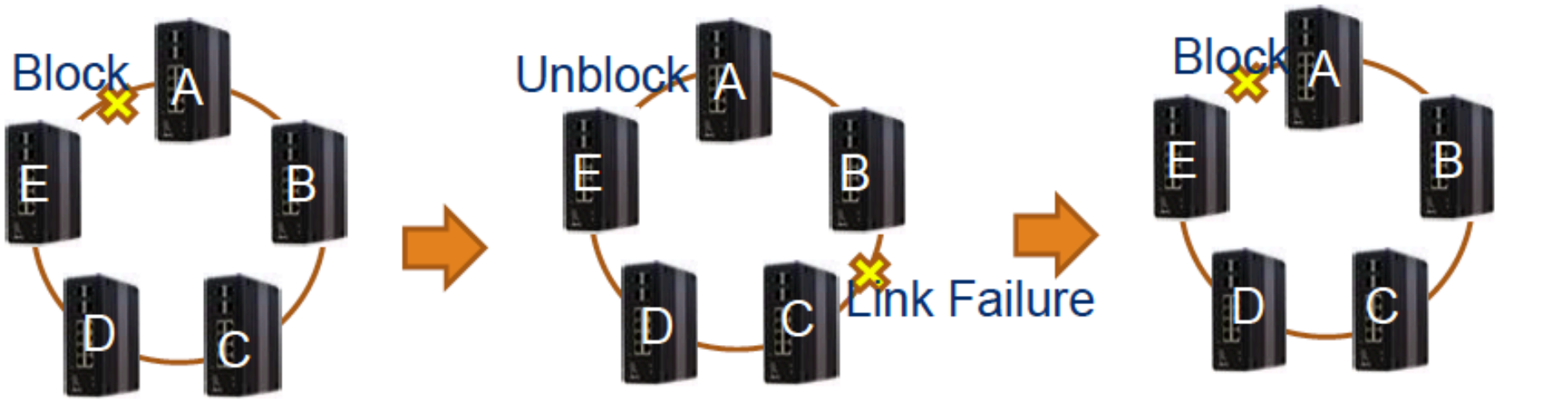
What is Ring Protection



A. Normal condition , block the link between Switches A and E

B. Detect link failure between B and C, unblock the link between A and E

C. Detect link recovery between B and C, block the link between A and E again.

Goal:

Ring protection is introduced to prevent network broken caused by link loss or network device error. It guarantees quick network reconfiguration after the loss of a network link.

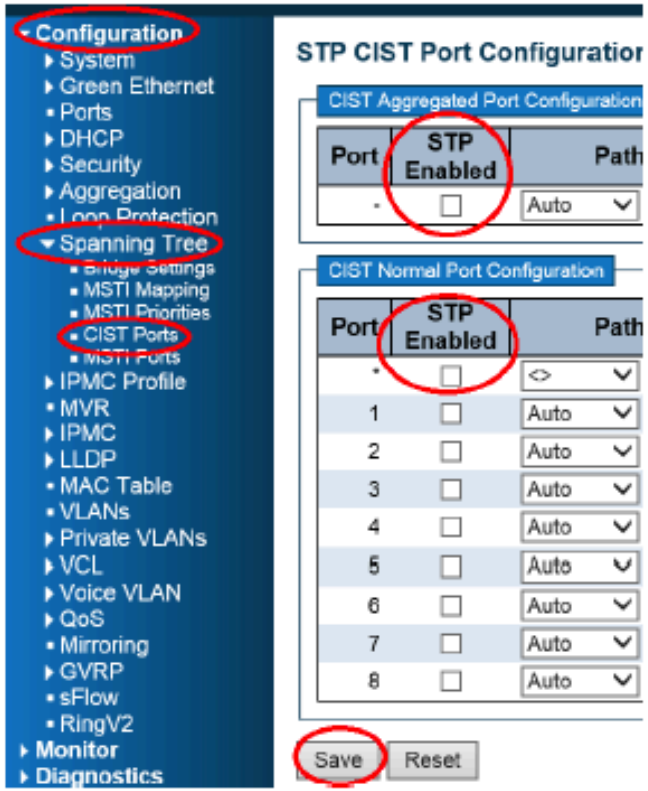
Ring Methods:

1. Single Ring
2. Dual Ring
3. Coupling
4. Dual Homing
5. Chain
6. Balancing Chain

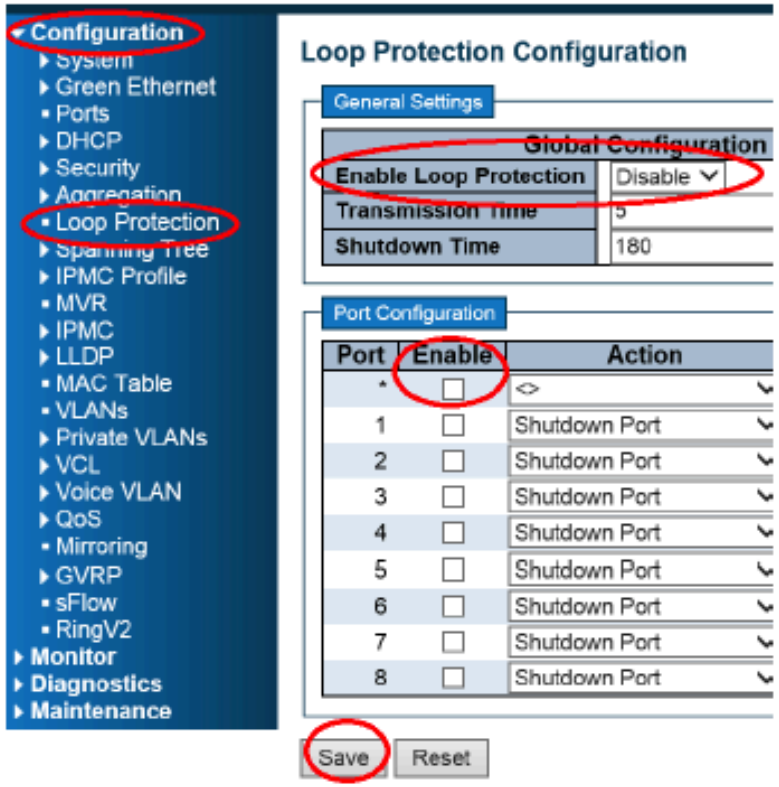
Before configuring the Ring Protection

- Since Ring protection is a media redundancy protocol, it should disable any other anti-loop protections firstly

- Disable Spanning Tree:

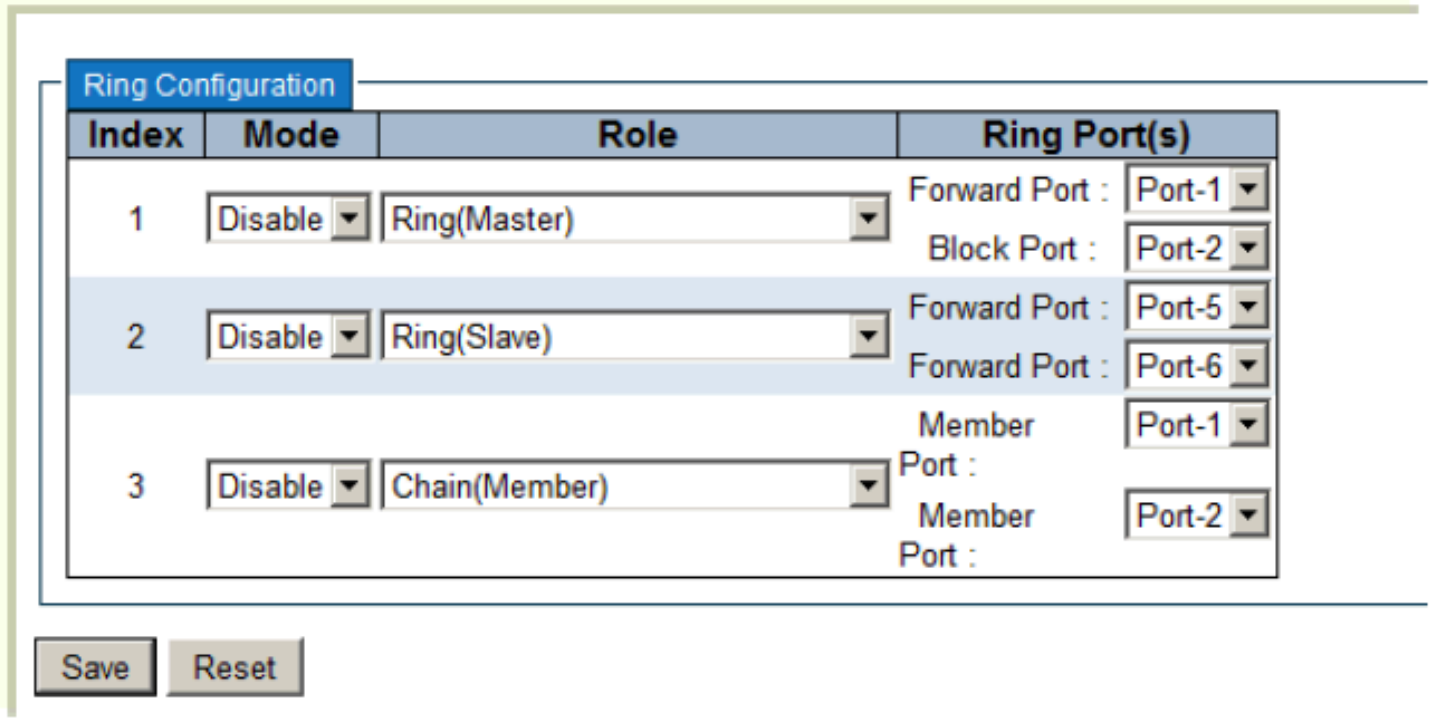


- Disable Loop Protection:



- The redundancy link cannot be connected before configuration ready.

Guideline



Note 1 - Group1 must be enabled before configuring group2 as coupling

Note 2 - When group1 or group2 are enabled, group3 (Chain) can't be configured

Note 3 - When group3 is enabled, group1 and group2 are unable to be configured

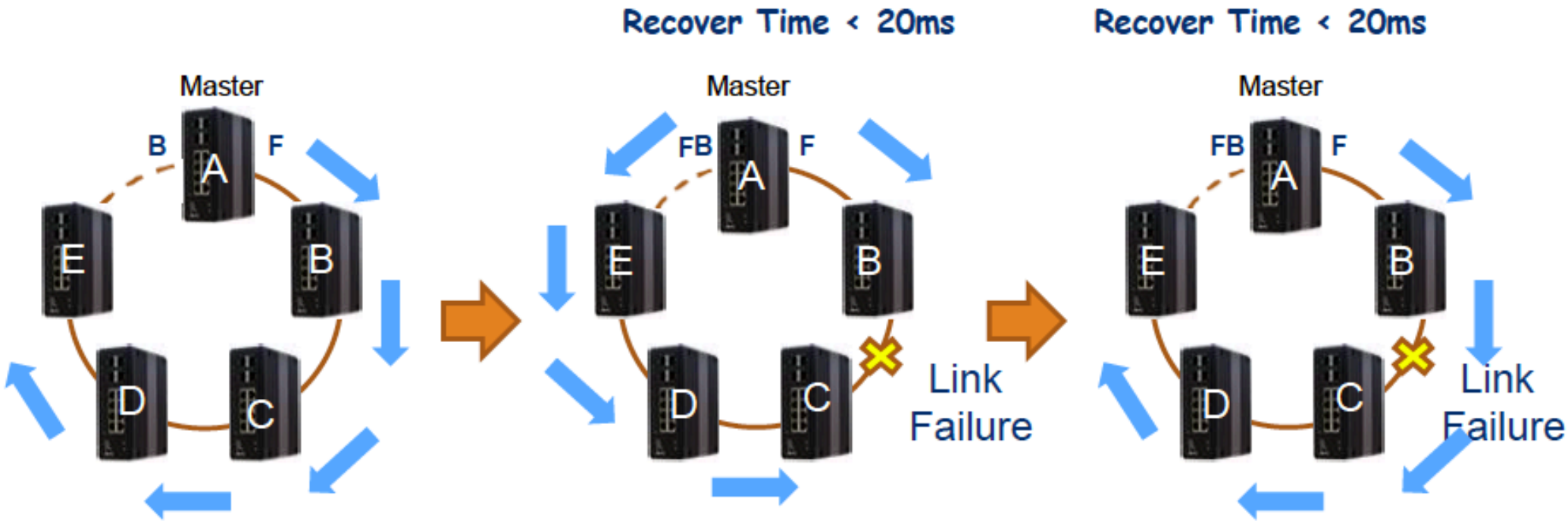
1. Single Ring

- Single Ring is the most common used and easier configuration of ring protection method.
- Ring Port - Each device should select two ports for ring port.
- Ring Role -

  Master: a forwarding port as the main path for traffic
  a blocking port for the protect path

  Slave: two forwarding ports for communication in ring.

1. Single Ring Operation



Step1:
Normal State

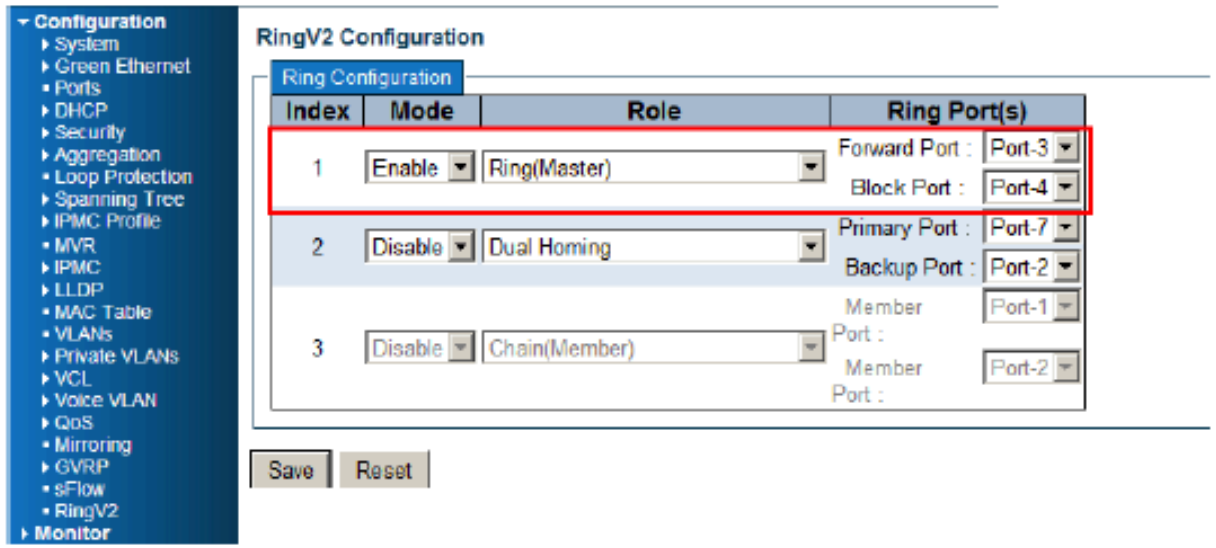
Step2:
Link/device broken

Step3:
Return to Normal State

To Configure Single Ring

Ring Master

1. Go to “Configuration→Ringv2” Web page
2. Enable Group1, and Select Role be “Ring(Master)
3. Select one port link to neighbor devices be “Forward Port”, another is “Block Port”

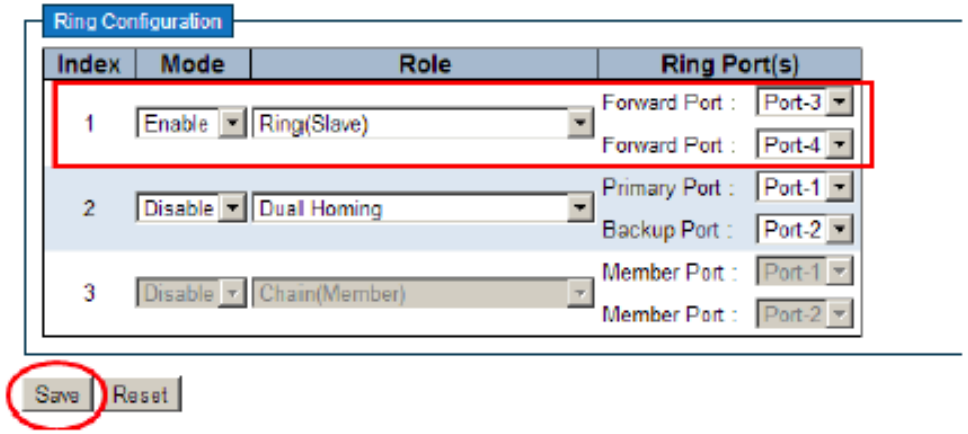


Ring Slave

1.Go to “Configuration→Ringv2” Web page

2.Enable Group1, and Select Role be “Ring(Slave)

3.Select two port link to neighbor devices be “Forward Port”.



2. Dual Ring

- Use two Single Ring in a single device, and these two single ring works independently.
- Ring Port - The dual ring device should select two ports for each single ring. (total 4 ring ports in this device)
- Ring Role -

  Master: a forwarding port as the main path for traffic
  a blocking port for the protect path

  Slave: two forwarding ports for communication in ring.

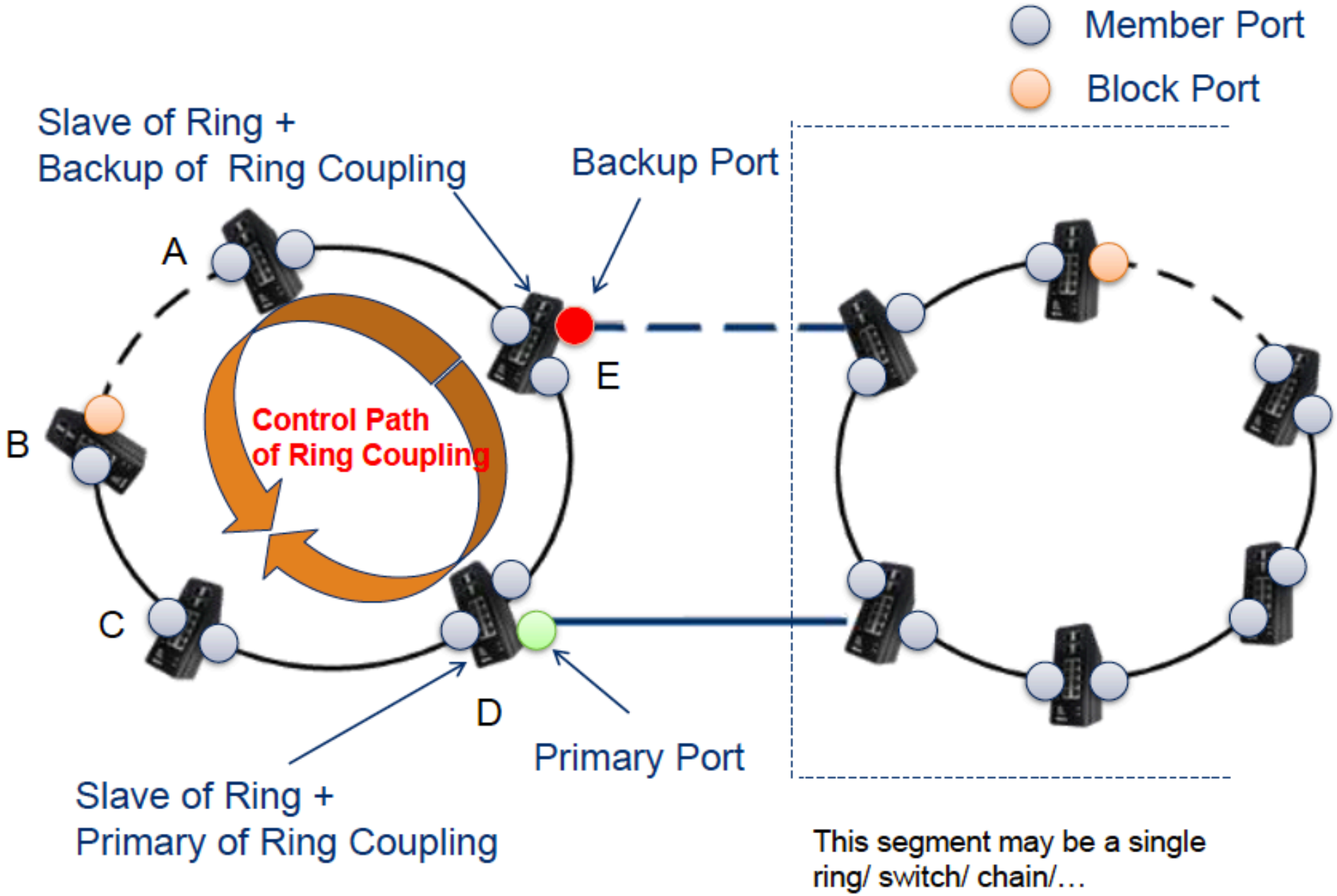
3. Coupling

- Coupling is using 2 link paths connect 1 Ring to another Ring / Switch/ Chain ...etc.
- Coupling mode only can enable in the switch which already configured one Single Ring. (When a switch already have configured Dual Ring, then this switch do not allow to have coupling settings.)
- These 2 links run as redundant path between each other. When 2 link path are in link up status, the Backup of Ring Coupling switch will set it's Backup port to Blocked state.
- Ring Port -

  Primary: in the primary of ring coupling

  Backup: in the backup of ring coupling

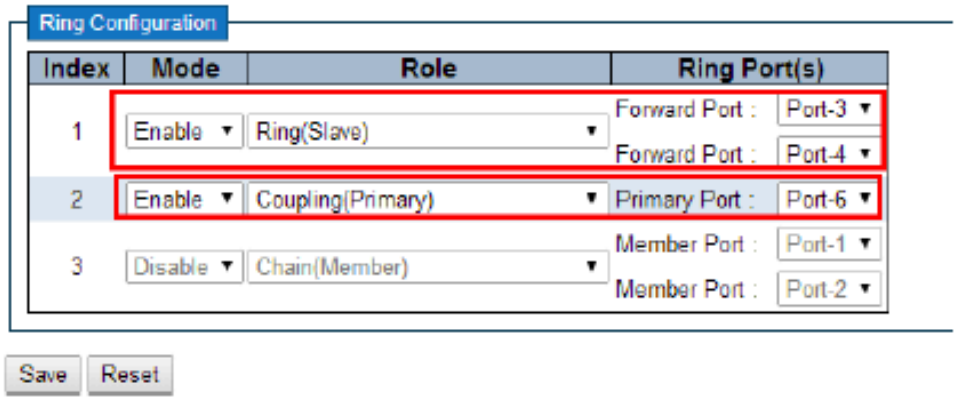
3. Coupling cont.



To configure Ring Coupling

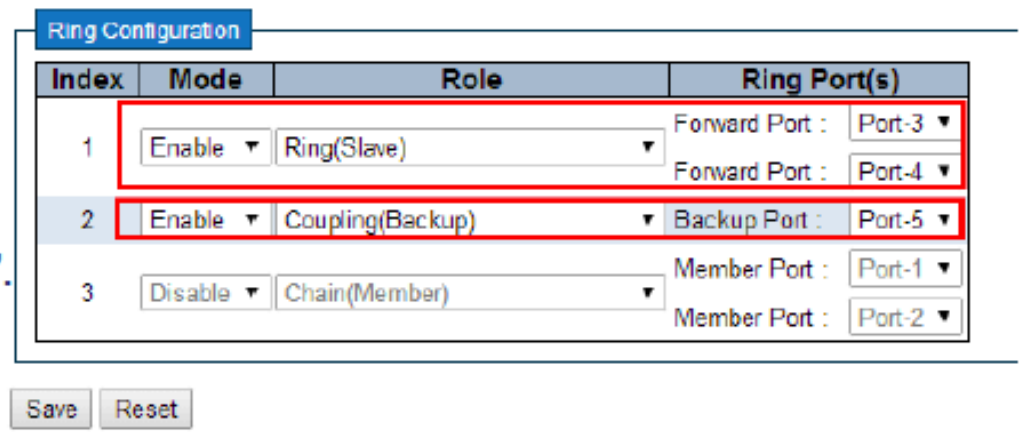
1.Go to “Configuration→Ringv2” Web page
2.Enable Group1, and Select Role be “Ring(Slave)
3.Select two port link to neighbor devices be “Forward Port”.
4.Enable Group2, and Select Role be “Coupling(Primary)”
5.Select one port link to above ring be “Primary Port”.

Coupling Primary



1.Go to “Configuration→Ringv2” Web page
2.Enable Group1, and Select Role be “Ring(Slave)
3.Select two port link to neighbor devices be “Forward Port”.
4.Enable Group2, and Select Role be “Coupling(Backup)”
5.Select one port link to above ring be “Backup Port”.

Coupling Backup

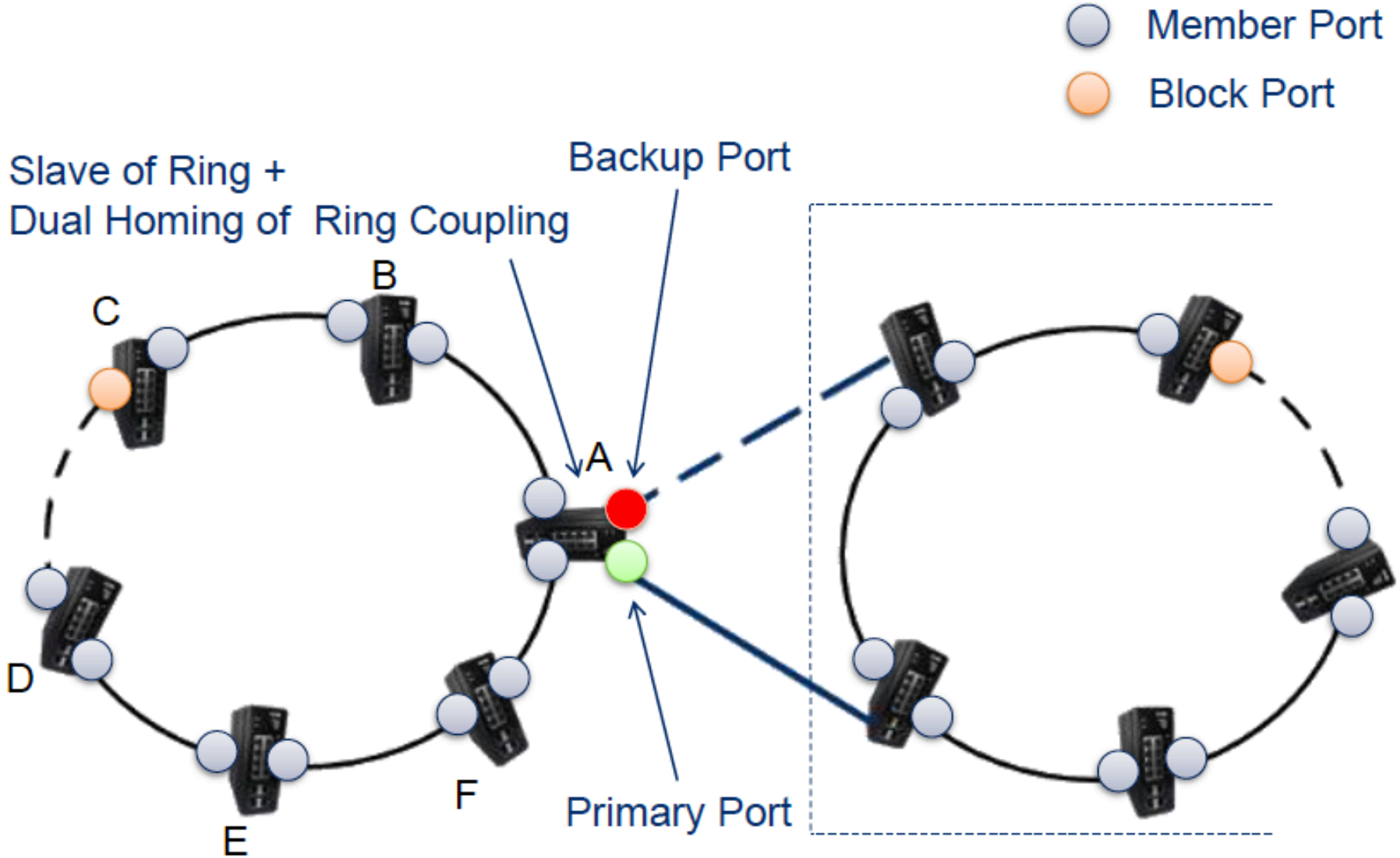


4. Dual Homing

- Dual Homing is a special case of coupling, use only 1 device to connect another Ring / Switch/ Chain ...etc.
- Dual Homing mode only can enable in the switch which already configured one Single Ring.
- These 2 links run as redundant path between each other. When 2 link path are in link up status, the Backup port of the switch will set to Blocked state.
- Ring Port - Primary & Backup port.

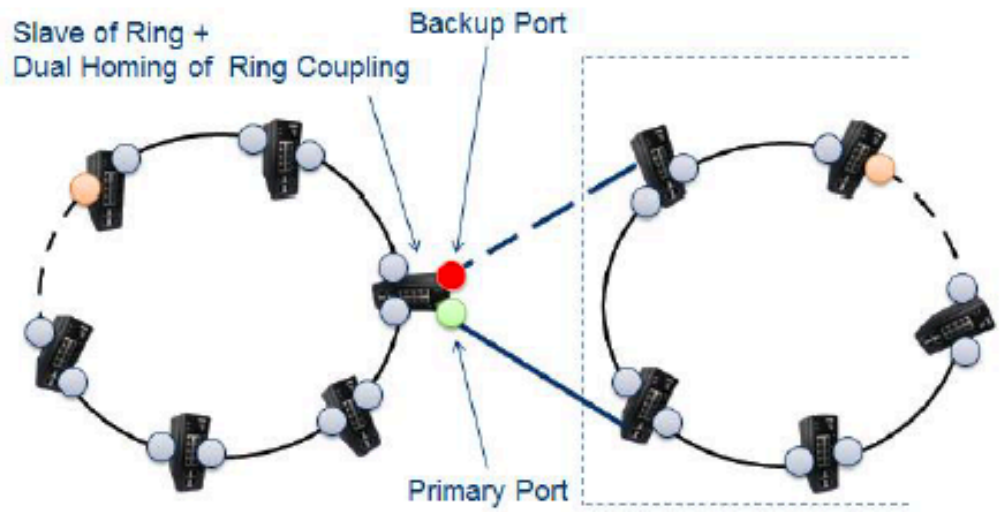
  Both in the dual homing switch

4. Dual Homing cont.

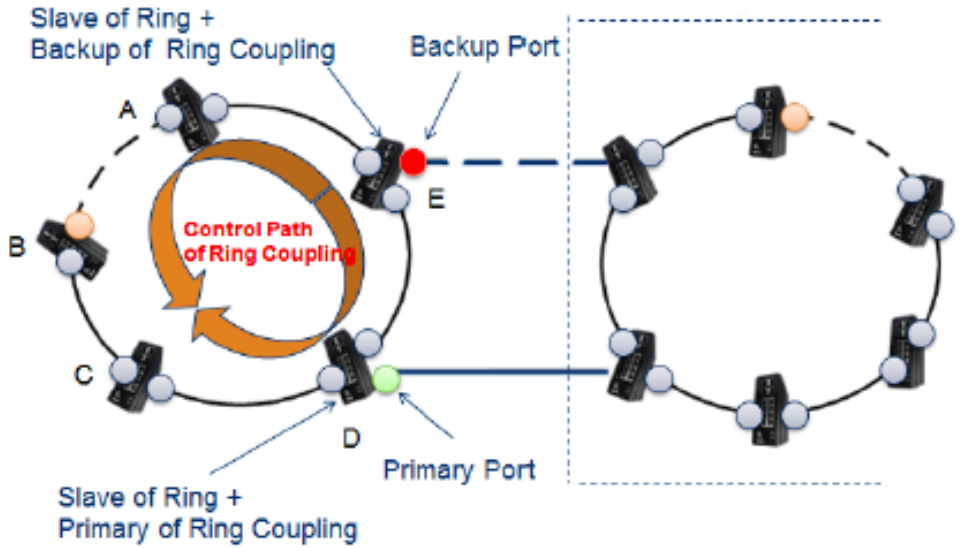


4. Dual Homing Characteristic

- Only 1 device is near the connected segment can use dual homing.
- Recovery time is better than coupling.
- Disadvantage: Dual Homing switch cannot occur error.



Dual Homing



Coupling

5. Chain

- Before using chain for redundancy protection, disable ring1 and ring2.
- Chain use 2 link paths with one head and one tail switch nodes , which connect chain to another Ring / Switch/ Chain ...etc.
- These 2 links run as redundant path between each other. When 2 link path are in link up status, the tail port of the switch will set to Blocked state.
- Ring Port -

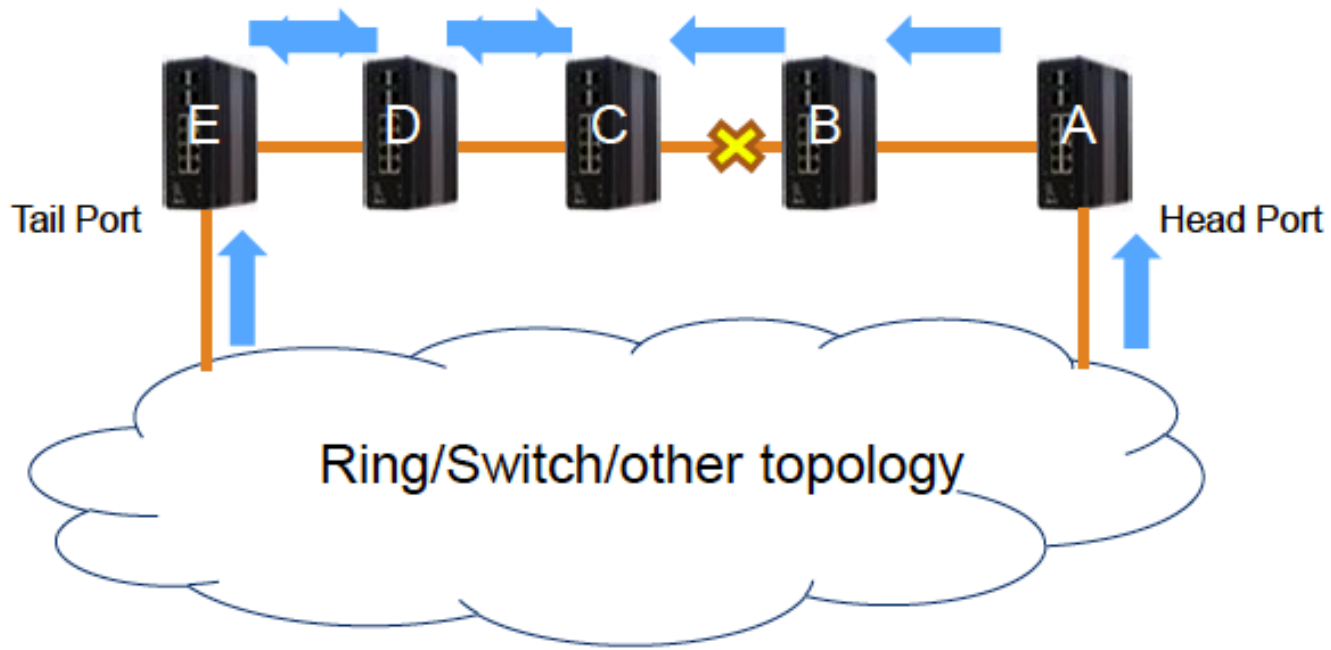
  Head Port: a ring port in head of chain switch.

  Tail Port: a ring port in tail of chain switch.

  member port: the other ring ports join chain topology

5. Chain Operation

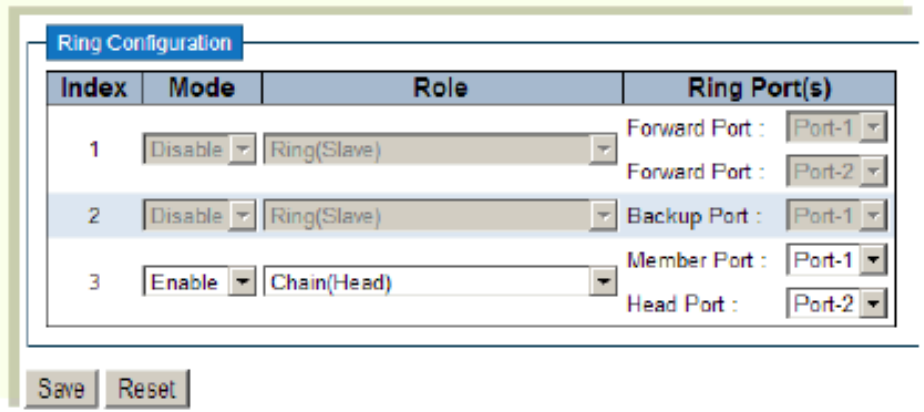
- Normally, tail port is a blocking port. (data cannot pass through)
- Tail port will change to forwarding port when a link failure between the chain.



To Configure Chain

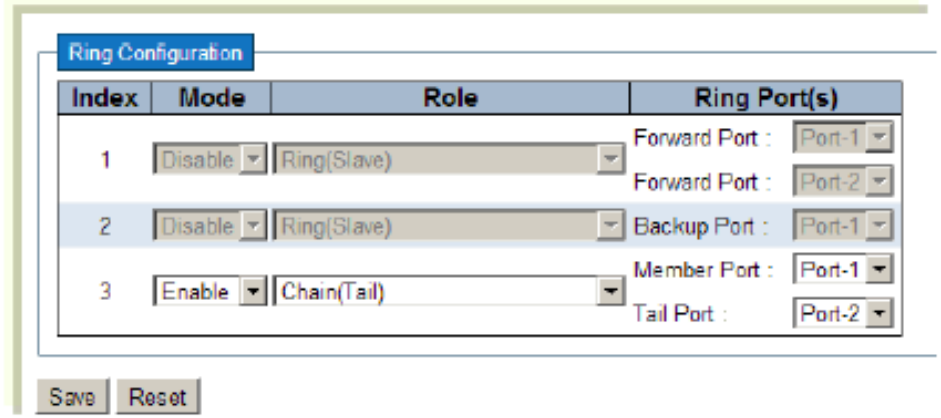
1.Go to “Configuration→Ringv2” Web page
2.Enable Group3, and Select Role be “Chain(Head)”
3.Select one port link to other ring or networks be “Head Port”,
Click “Save” bottom

Chain Haed



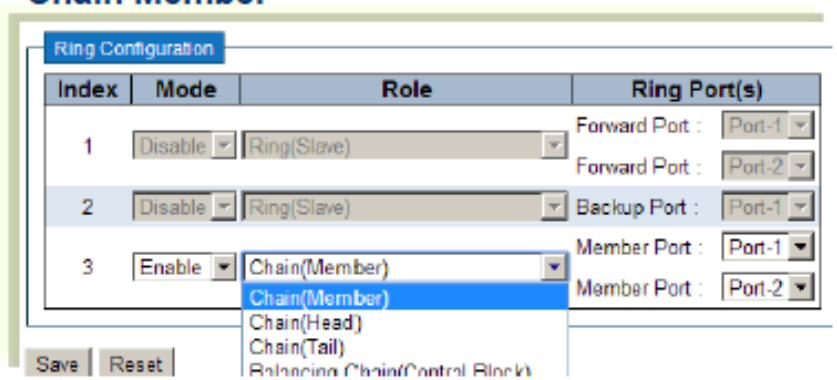
1.Go to “Configuration→Ringv2” Web page
2.Enable Group3, and Select Role be “Chain(Tail)”
3.Select one port link to other ring or networks be “Tail Port”,
Click “Save” bottom

Chain Tail



1.Go to “Configuration→Ringv2” Web page
2.Enable Group3, and Select Role be “Chain(Member)”
3.Select one port link to other ring or networks be “Member Port”,
Click “Save” bottom

Chain Member



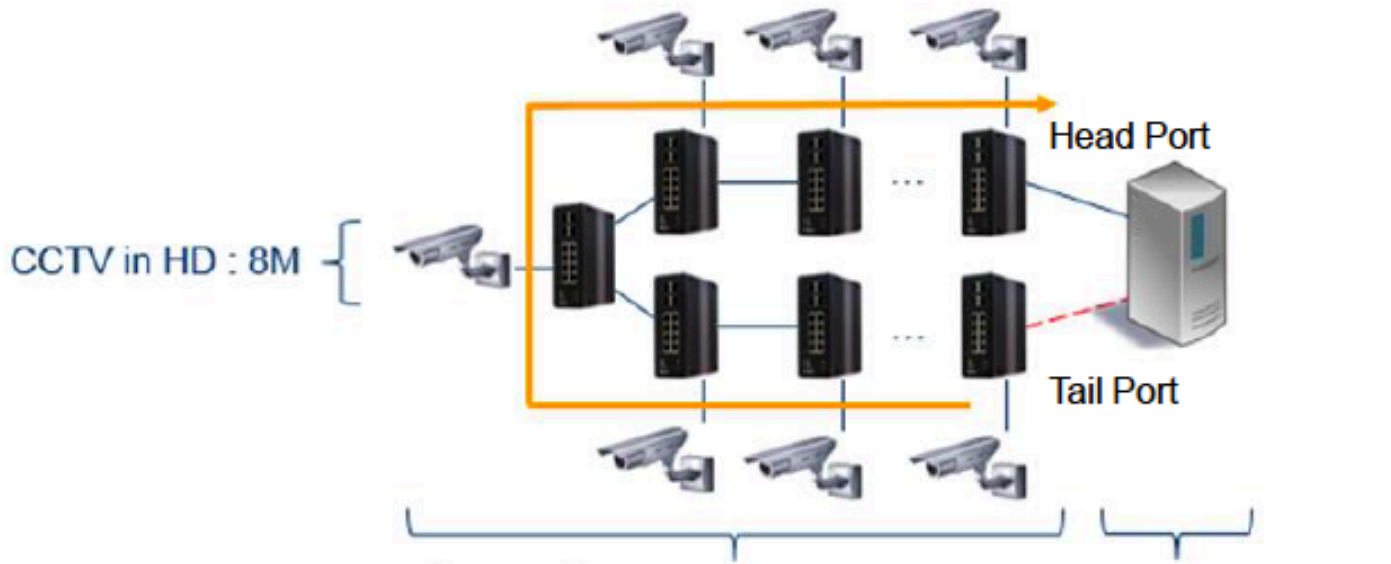
6. Balancing Chain

- Motivation:

  It takes much time to transmit data to the tail of the chain.

  And head of chain must transmit all traffic of the chain. (too heavy)

  → To select a device of the chain to share the traffic and save time.

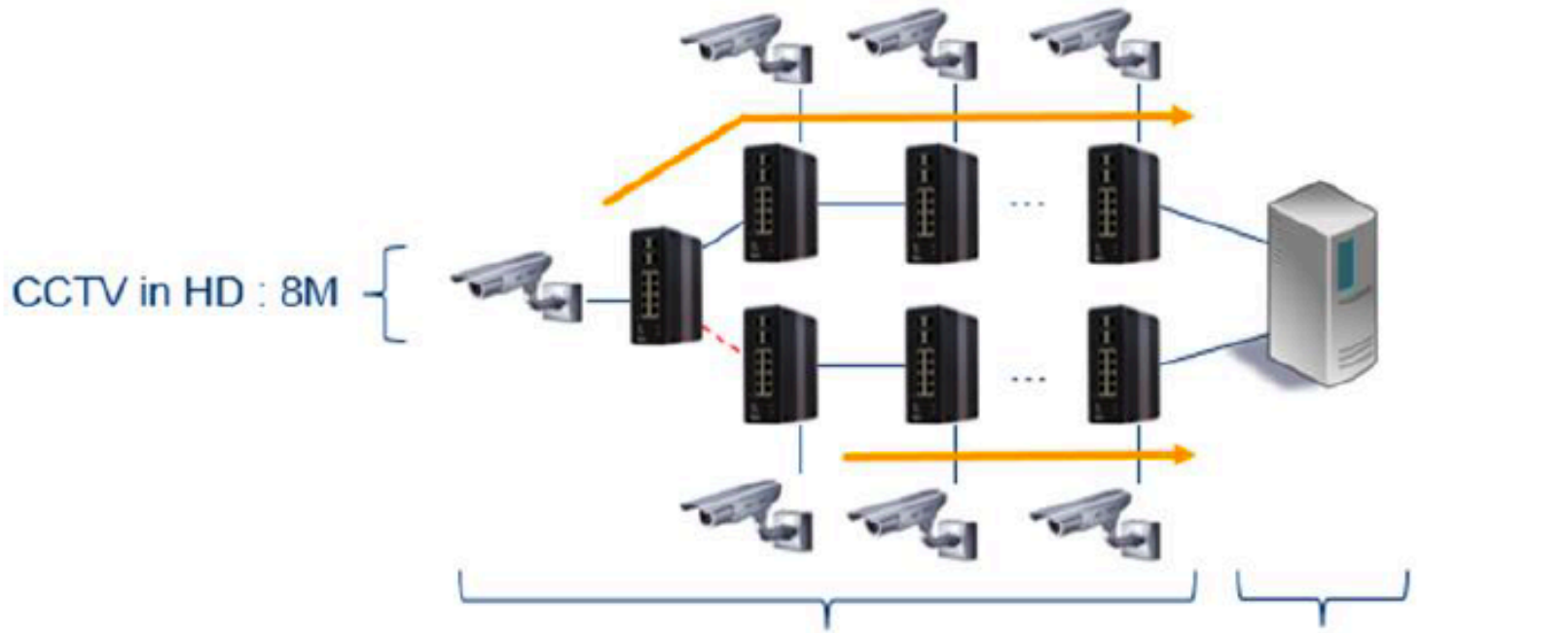


A fast sender from overwhelming a slow receiver

6. Balancing Chain cont.

- Modified of chain:

  → To select a device of the chain to share the traffic and save time.



Balancing Chain : A better chain for extreme situation

6. Balancing Chain cont.

- Before using balancing chain for redundancy protection, disable ring1 and ring2.
- Balancing Chain use 2 link paths with Primary & secondary terminal switch, which connect chain to another Ring / Switch/ Chain ...etc.
- Ring Port -

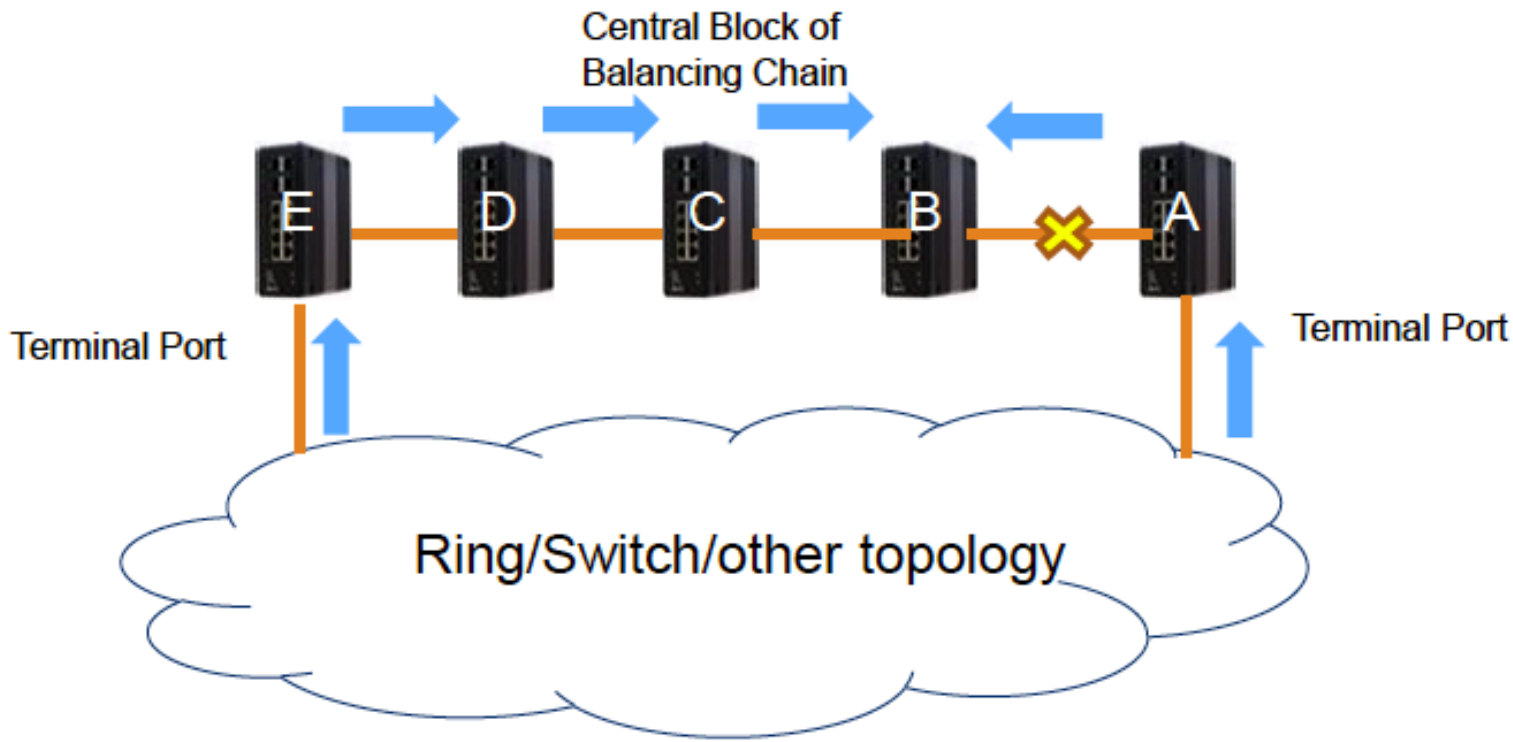
  Terminal Port: a ring port connect between chain & other segment

  Central Block Port: a ring port in central block of balancing chain

  Member port: the other ring port join balancing chain topology

6. Balancing Chain Operation

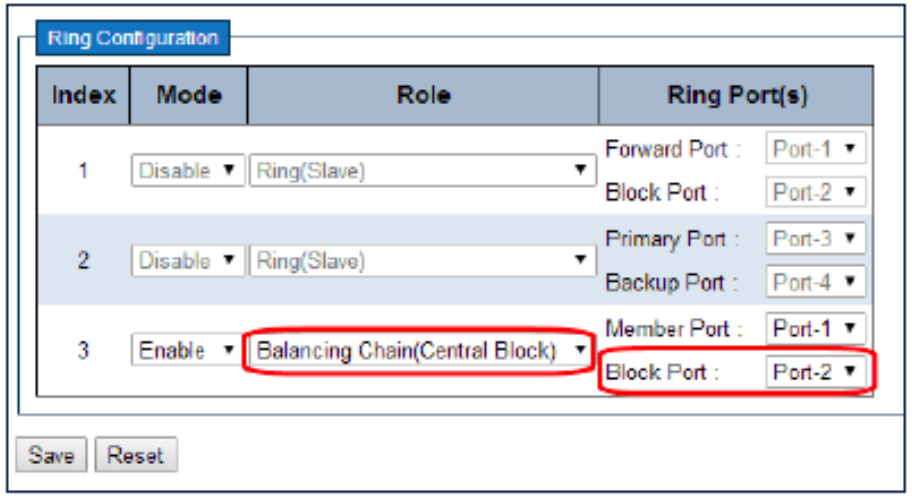
- First, disable ring 1 and ring2.
- Then, enable ring ports of each switch in the balancing chain.



To configure Balancing Chain

1.Go to “Configuration→Ringv2” Web page
2.Enable Group3, and Select Role be “Balance Chain(Central Block)”
3.Select one port be “Block Port” which could distribute traffic loading
Click “Save” bottom

Balance Chain(Central Block)



1.Go to “Configuration→Ringv2” Web page
2.Enable Group3, and Select Role be “Balance Chain(Terminal-1(or2))”
3.Select one port be “Terminal Port” which connect to other ring group.
4.Click “Save” bottom

Balance Chain(Terminal)