Advantech AE Technical Share Document

Date	2017/10/02	**Release Note**	■External
Category	■SOP	**Related OS**	Windows OS
Abstract	How to configure X-ring Pro		
Keyword	X-ring , X-ring Pro, Couple-ring, Dual-ring, X-ring-Elite, Legacy Mode		
Related Product	EKI-7000, EKI-7700, EKI-7400 series, EKI-9200, EKI-9300 series, EKI-9500 series, EKI-9600 series, EKI-9700 series, EKI-5500/EKI-5600 Protocol switch		

■ Problem Description:

1. What is X-ring Pro technology?
2. How to configure the X-ring feature?

■ Answer:

[Purpose]

1. The X-ring feature provides improvements to Spanning Tree (STP) and Rapid Spanning Tree (RSTP), and is quickly and automatically restored when a network is broken,
2. X-ring is designed for the specific environments of industrial applications. It provides high speed redundancy for the network, when anyone of the port failed, the recovery time will be under 20ms.

[Definition]

1. It's a network topology where each node is connected to two other odes.
2. To provide Ethernet networks with high-speed redundancy.
3. Both X-ring and X-ring Pro are Advantech's proprietary ring redundancy technology.
4. Advantech's 1st generation ring redundancy technology => X-ring
5. Advantech's 2nd generation ring redundancy technology => X-ring Pro

[Comparison Table for X-ring]

	X-ring Elite	X-ring Pro	X-ring Pro	X-ring Pro	X-ring
	NOS5.0	NOS5.0	NOS3.0	NOS2.0	NOS1.8
Max. Support Unit	250	250	250	250	50
Recovery time	<20ms	<20ms	<20ms	<20ms	< 20ms
Auto Ring Master Selection	Not Required	Not Required	Not Required	Not Required	Required
Couple-Ring Support	NO	Yes	Yes	Yes	YES
Dual-Ring Support	NO	Yes	Yes	Yes	No
Coupling-Ring & Dual-Homing Limitation	No	No	No	No	Yes (*)
Coupling Ring Control Port	Not Required	Not Required	Not Required	Not Required	Required
Chipset Solution	Realtek	Realtek	Broadcom	Marvell	Marvell

[Note] X-ring with NOS1.8 is phase out

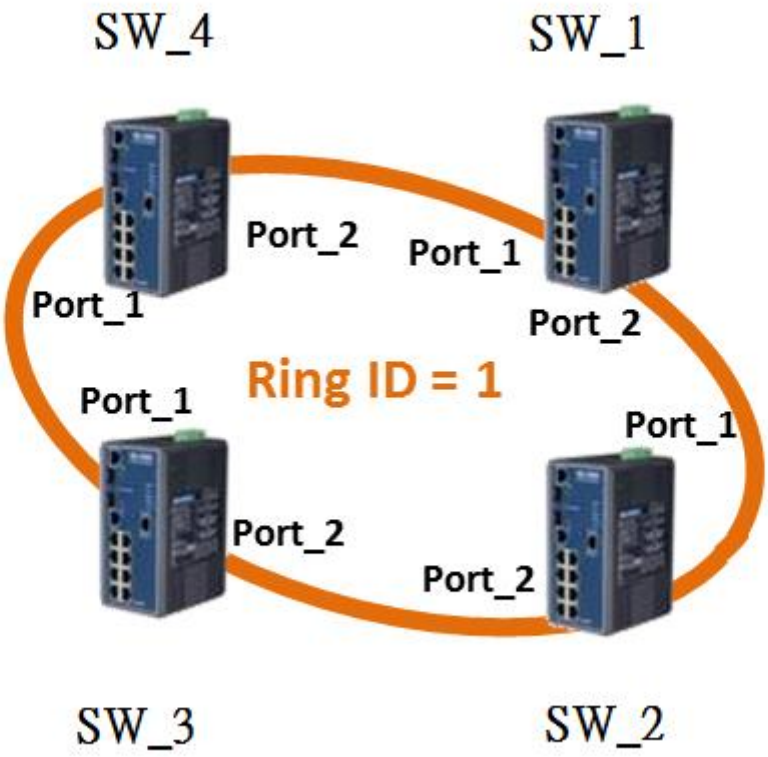
[Support model list]

	X-ring Elite	X-ring Pro	X-ring Pro	X-ring Pro
	NOS5.0	NOS5.0	NOS3.0	NOS2.0
Max. Support Unit	EKI-7428-4CI EKI-7428-4CPI EKI-7706E-2F/ EKI-7706G-2F EKI-7708E-4F(I)/ EKI-7708E-4FP(I) EKI-7708G-4F(I)/ EKI-7708G-4FP(I) EKI-7710E-2C(I)/ EKI-7710E-2CP(I) EKI-7710G-2C(I)/ EKI-7710G-2CP(I) EKI-7712E-4F(I)/ EKI-7712E-4FP(I) EKI-7712G-4F(I)/ EKI-7712G-4FP(I) EKI-7716E-4F(I)/ EKI-7716G-4F(I) EKI-7720E-4F(I)/ EKI-7720G-4F(I) EKI-9612 EKI-9628		EKI-9228 EKI-9312 EKI-9312P EKI-9316 EKI-9316P EKI-9512 EKI-9512P EKI-9512D EKI-9512D-P EKI-9516 EKI-9516P EKI-9516D EKI-9516D-P EKI-9728	EKI-7554M/S EKI-7559M/S EKI-7654C EKI-7659C EKI-7656C EKI-7657C EKI-7659CPI EKI-2748FI EKI-2748CI EKI-7758F EKI-6558TI EKI-6559TMI
	EKI-5528-PNMA EKI-5528(I)-PN EKI-5526(I)-PN EKI-5528(I)-EI EKI-5526(I)-EI EKI-5528(I)-MB EKI-5526(I)-MB EKI-5629C(I)-PN EKI-5626C(I)-PN EKI-5629C(I)-EI EKI-5626C(I)-EI EKI-5629C(I)-MB EKI-5626C(I)-MB			

1. Single X-ring Configuration

1. Topology Diagram

Below diagram is the example for the single ring application.



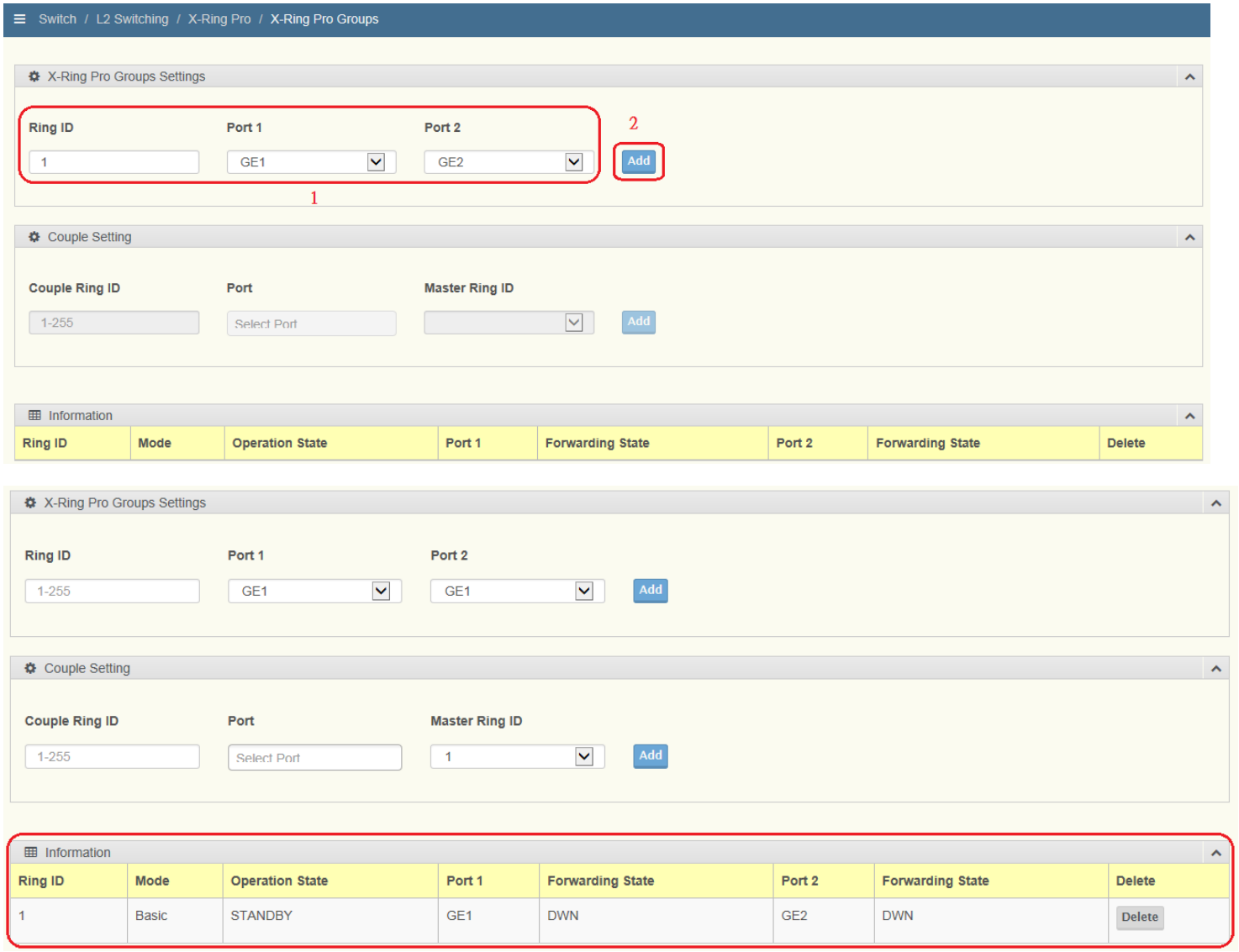
2. Web screen shot

Below screen shot show you the X-ring Pro configuration on the web:

SW_1~SW_4

(Each Ring must assign unique ring id, the maximum ring id is 255)

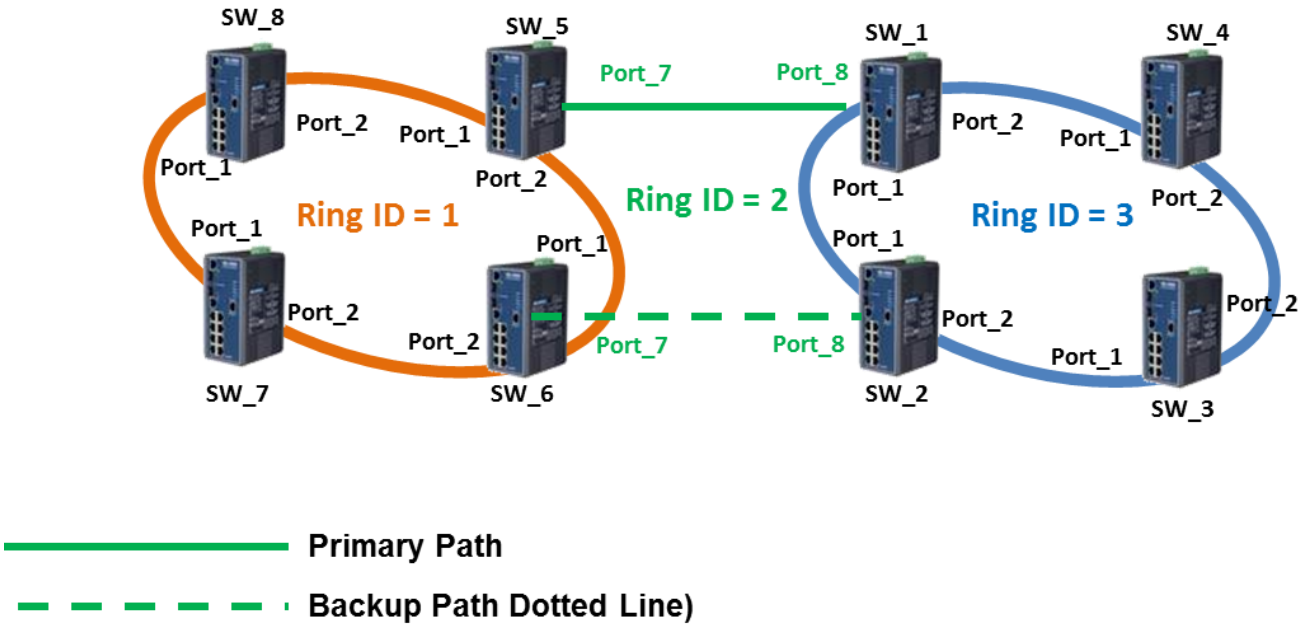
- Port 1 and Port 2 of SW_1 to SW_4 belong to same partition with Ring ID = 1



2. Couple Ring Configuration

1. Topology Diagram

Below diagram is the example for the couple ring application.

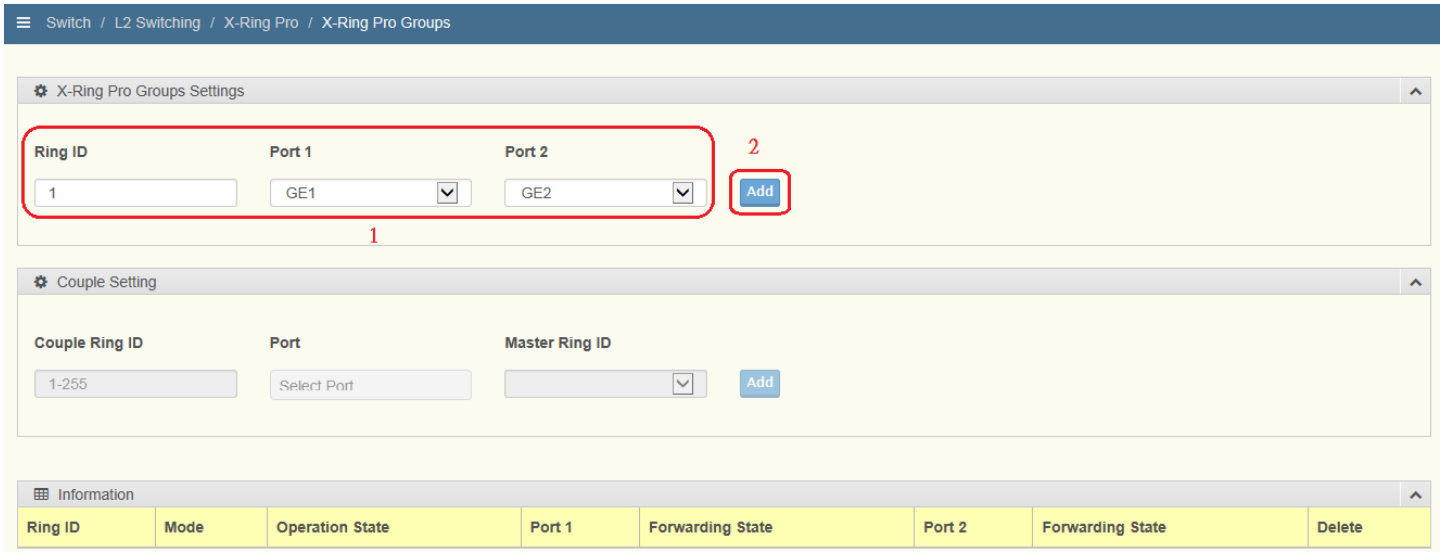


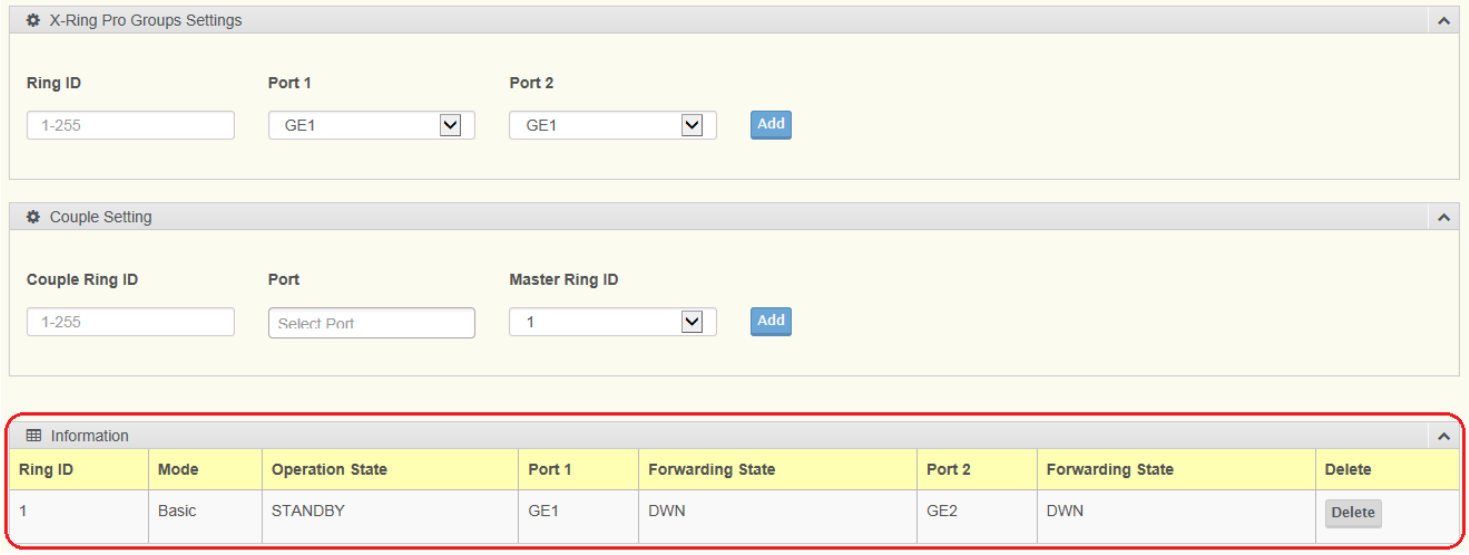
2. Web screen shot

Below screen shot show you the X-ring Pro configuration on the web:

SW_7, SW_8

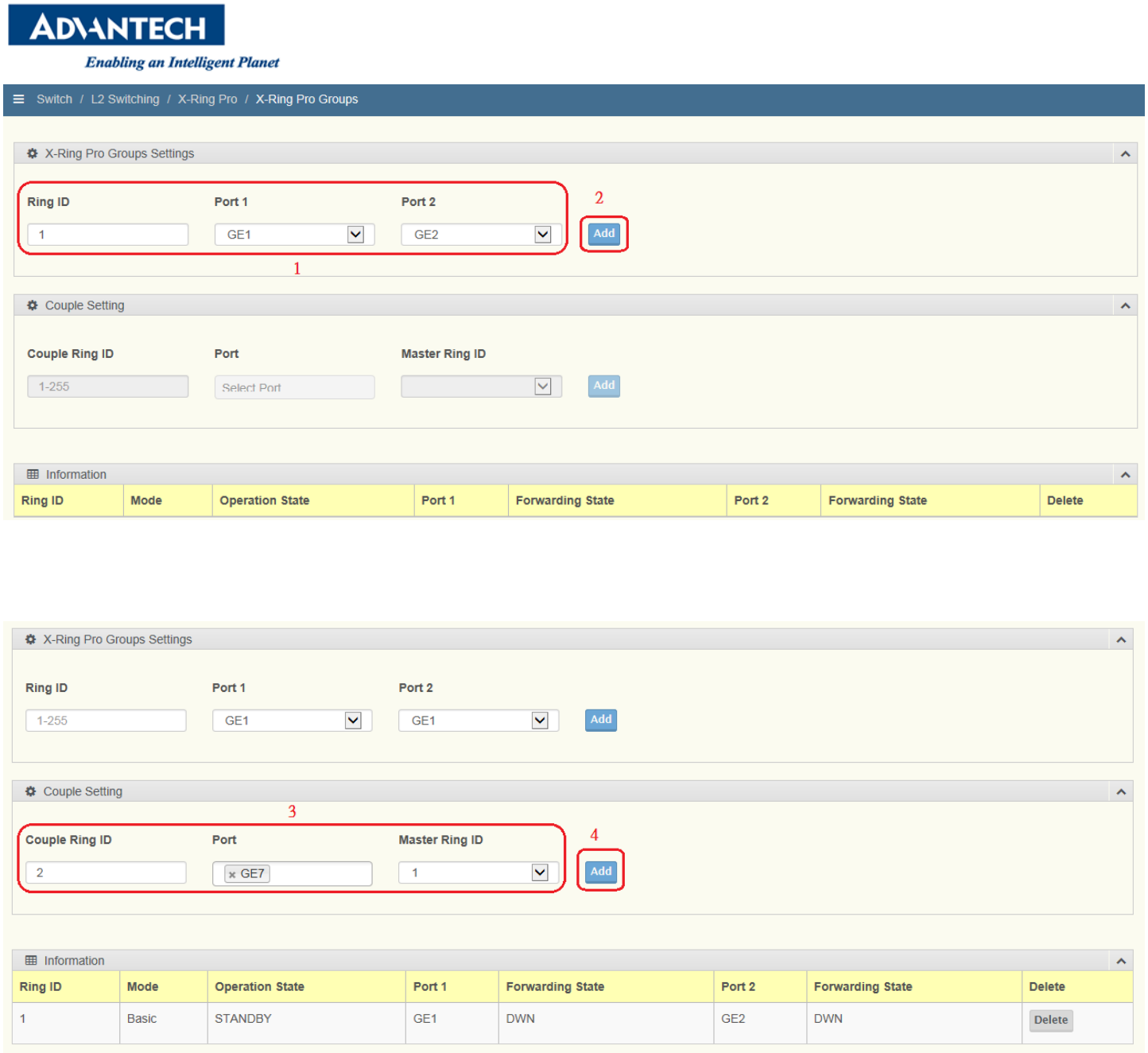
- Port 1 and Port 2 of SW_7 and SW_8 belong to same partition with Ring ID = 1



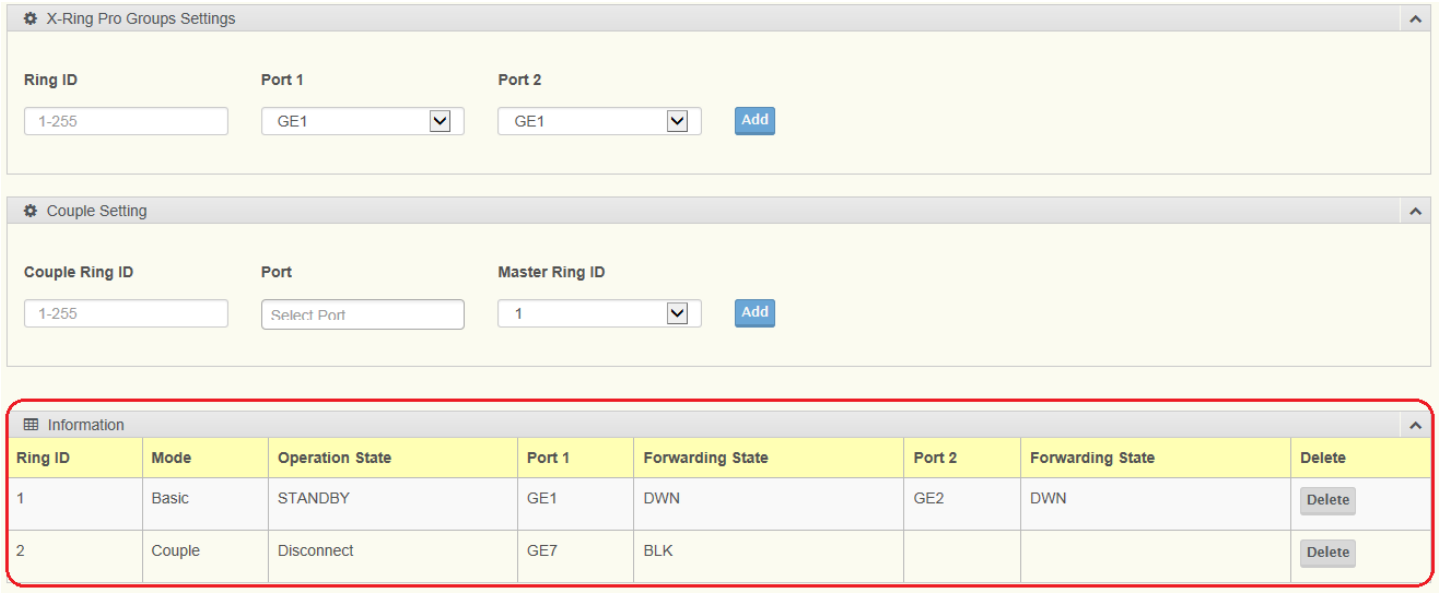


SW_5, SW_6

- Port 1 and Port 2 of SW_5 and SW_6 are also belong to same partition with Ring ID = 1
- Port 7 belong to different partition with Ring ID = 2 and associating it to Partition 1 by selecting "Ring 01" in the Master Ring Port

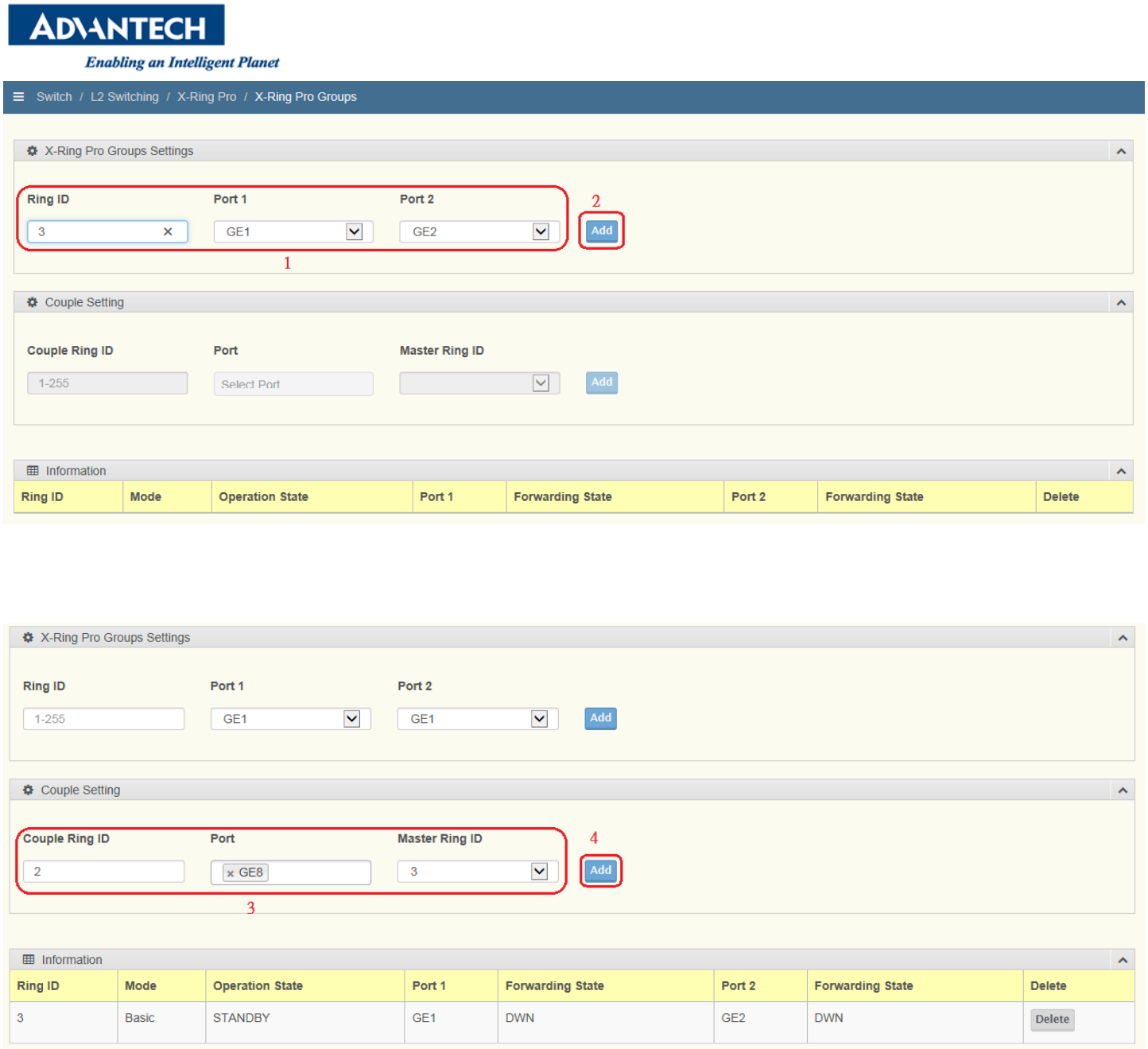

Switch / L2 Switching / X-Ring Pro / X-Ring Pro Groups
X-Ring Pro Groups Settings
Ring ID
Port 1
Port 2
1
GE1
GE2
Add
2
1
Couple Setting
Couple Ring ID
Port
Master Ring ID
1-255
Select Port
Add
Information
Ring ID
Mode
Operation State
Port 1
Forwarding State
Port 2
Forwarding State
Delete

X-Ring Pro Groups Settings
Ring ID
Port 1
Port 2
1-255
GE1
GE1
Add
Couple Setting
3
Couple Ring ID
Port
Master Ring ID
4
2
GE7
1
Add
Information
Ring ID
Mode
Operation State
Port 1
Forwarding State
Port 2
Forwarding State
Delete
1
Basic
STANDBY
GE1
DWN
GE2
DWN
Delete



SW_1, SW_2

- Port 1 and Port 2 of SW_1 and SW_2 are also belong to same partition with Ring ID = 3
- Port 8 belong to different partition with Ring ID = 2 and associating it to Partition 3 by selecting "Ring 03" in the Master Ring Port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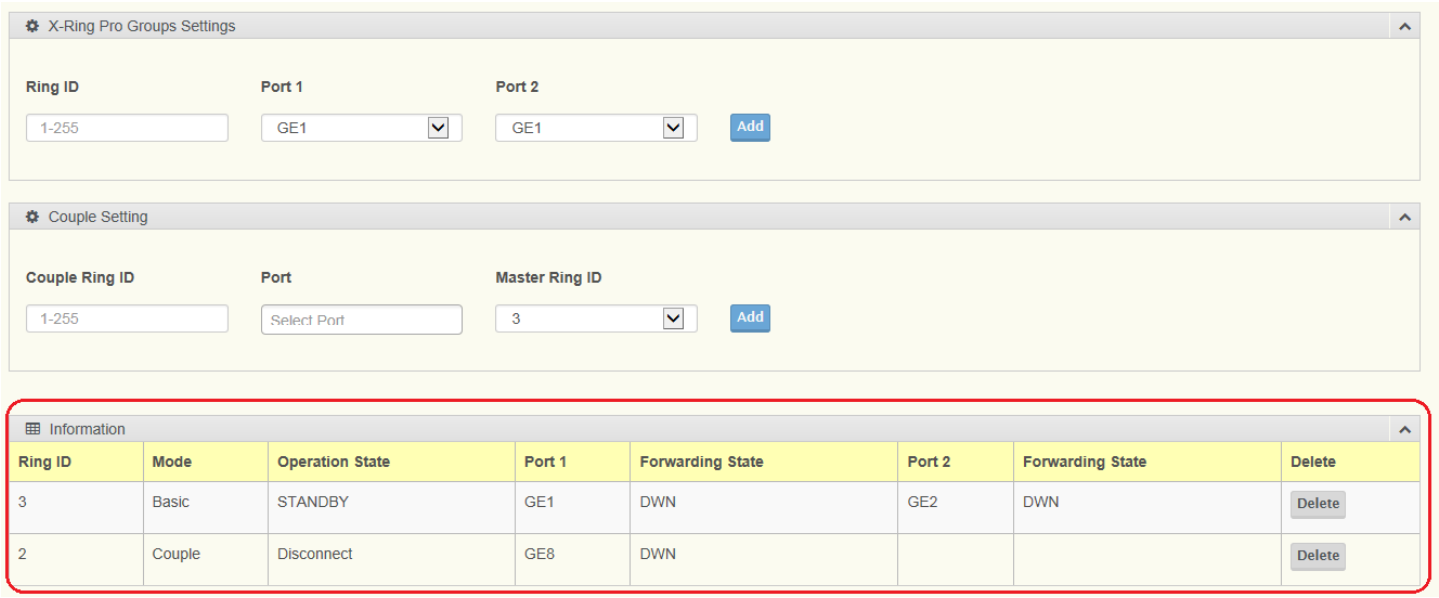
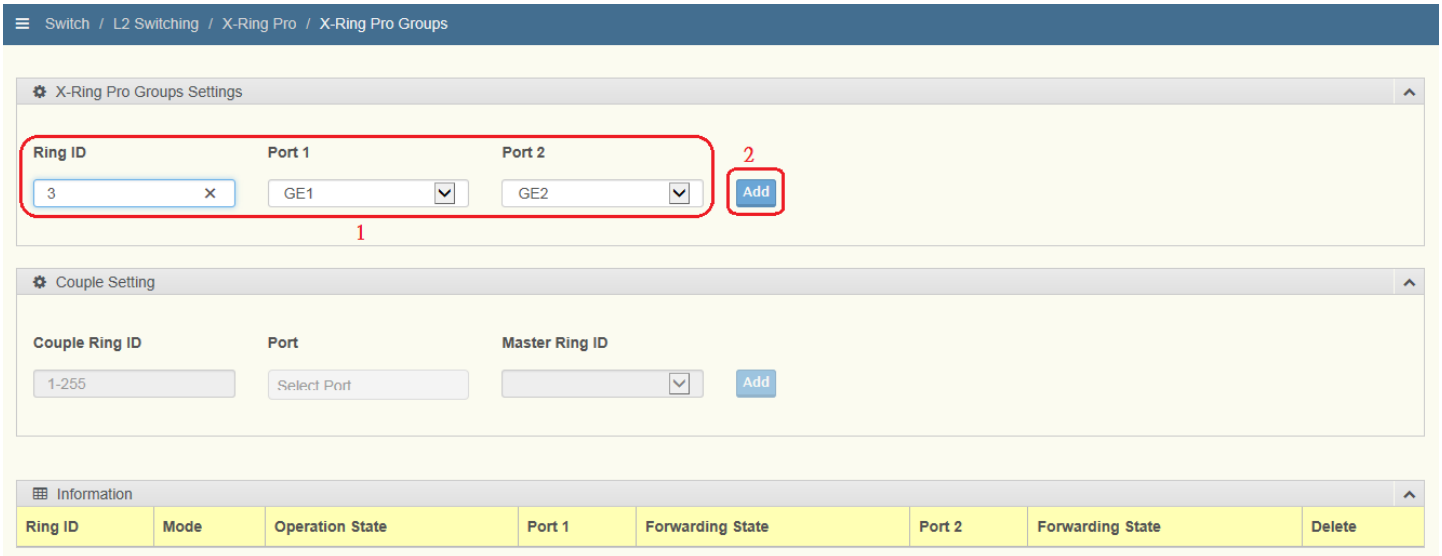
Switch / L2 Switching / X-Ring Pro / X-Ring Pro Groups
X-Ring Pro Groups Settings
Ring ID
Port 1
Port 2
3
GE1
GE2
Add
1
2
Couple Setting
Couple Ring ID
Port
Master Ring ID
1-255
Select Port
Add
Information
Ring ID
Mode
Operation State
Port 1
Forwarding State
Port 2
Forwarding State
Delete

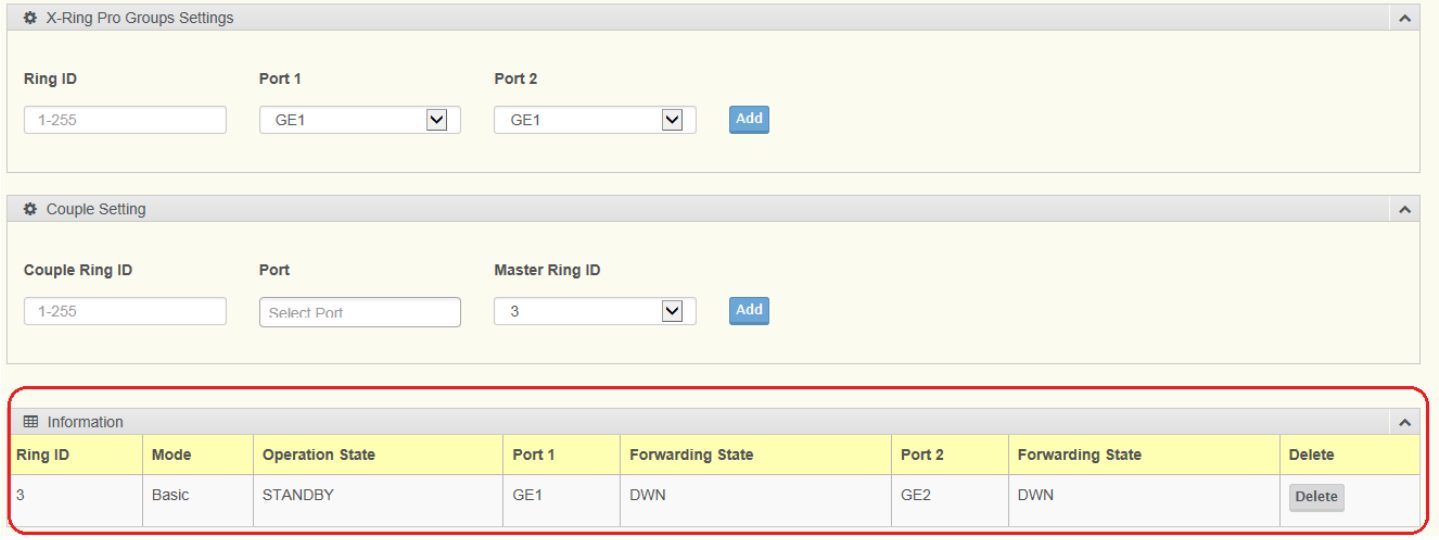
X-Ring Pro Groups Settings
Ring ID
Port 1
Port 2
1-255
GE1
GE1
Add
Couple Setting
Couple Ring ID
Port
Master Ring ID
2
GE8
3
Add
4
3
Information
Ring ID
Mode
Operation State
Port 1
Forwarding State
Port 2
Forwarding State
Delete
3
Basic
STANDBY
GE1
DWN
GE2
DWN
Delete



SW_3, SW_4

- Port 1 and Port 2 of SW_3 and SW_4 belong to same partition with Ring ID = 3




X-Ring Pro Groups Settings
Ring ID
Port 1
Port 2
1-255
GE1
GE1
Add
Couple Setting
Couple Ring ID
Port
Master Ring ID
1-255
Select Port
3
Add
Information
Ring ID
Mode
Operation State
Port 1
Forwarding State
Port 2
Forwarding State
Delete
3
Basic
STANDBY
GE1
DWN
GE2
DWN
Delete

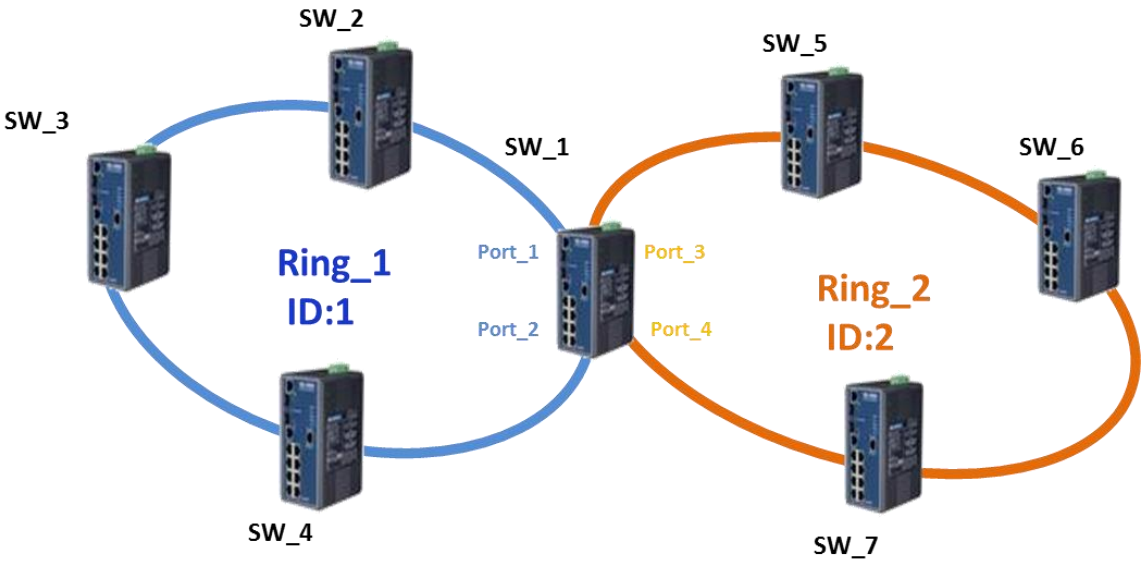
3. Dual Ring Configuration

1. Topology Diagram

Below diagram is the example for the Dual Ring application

Dual-Ring:

- Two adjacent rings share one switch.
- Ideal for application that have inherent cabling difficulties.

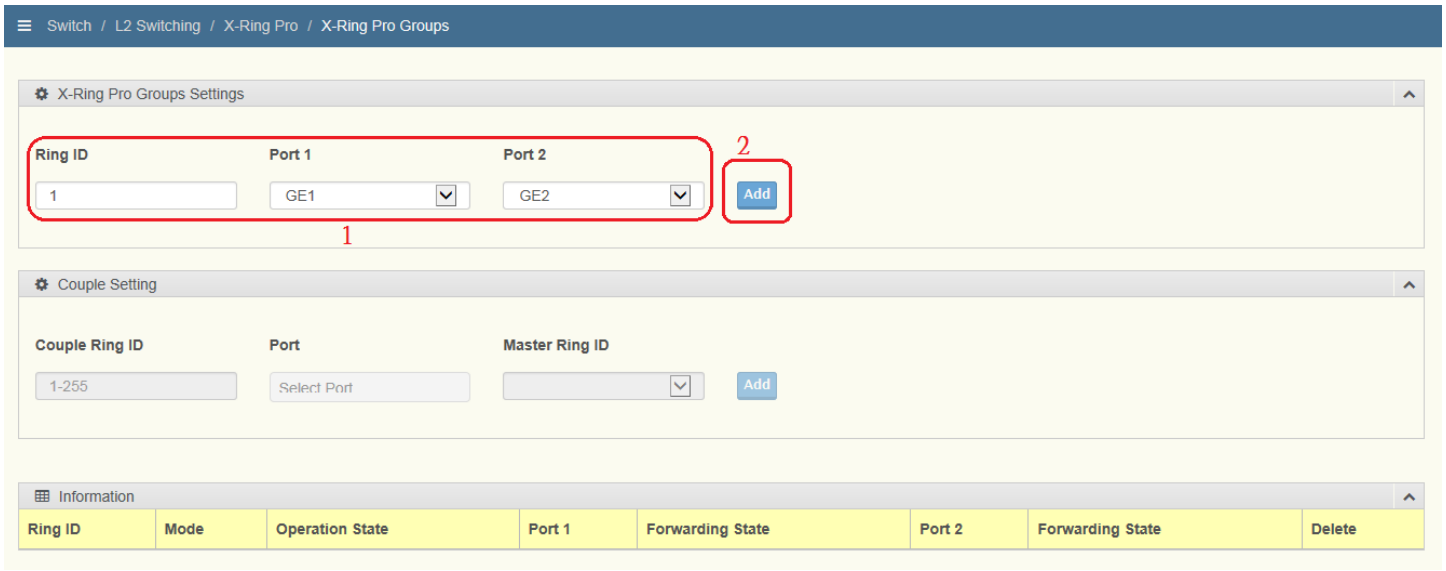


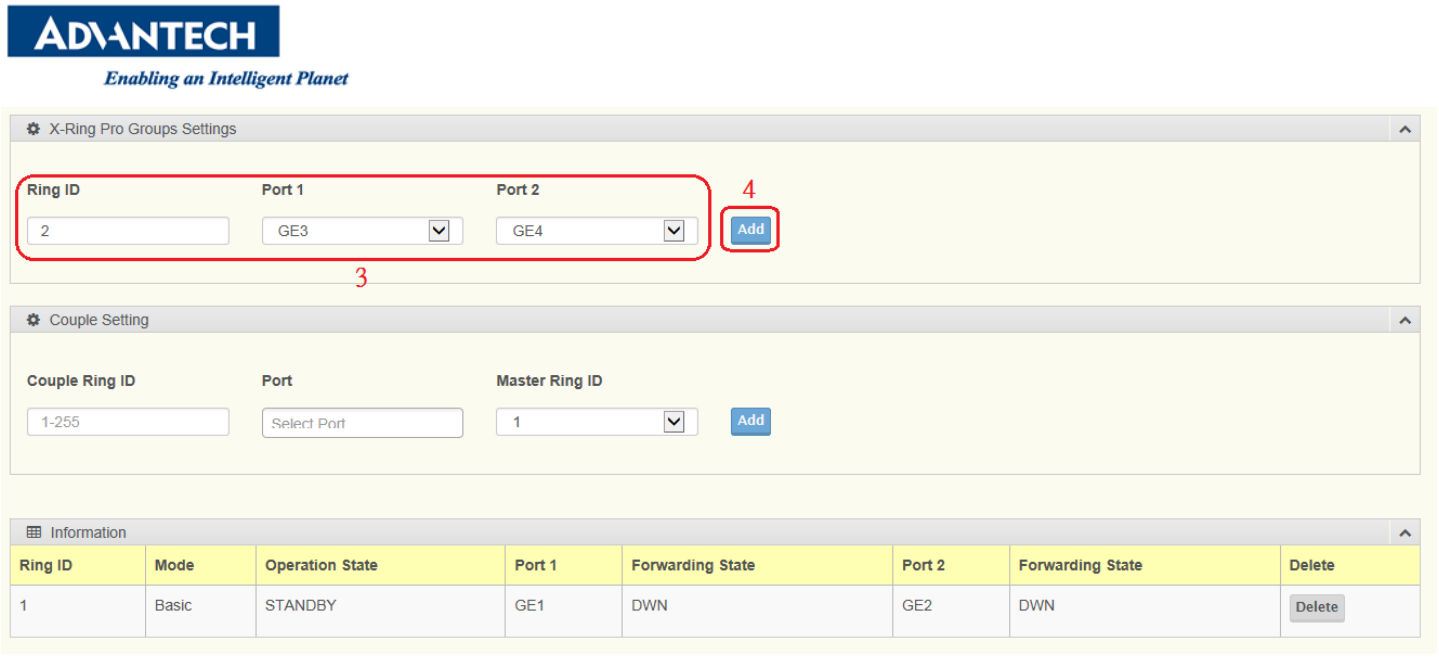
2. Web screen shot

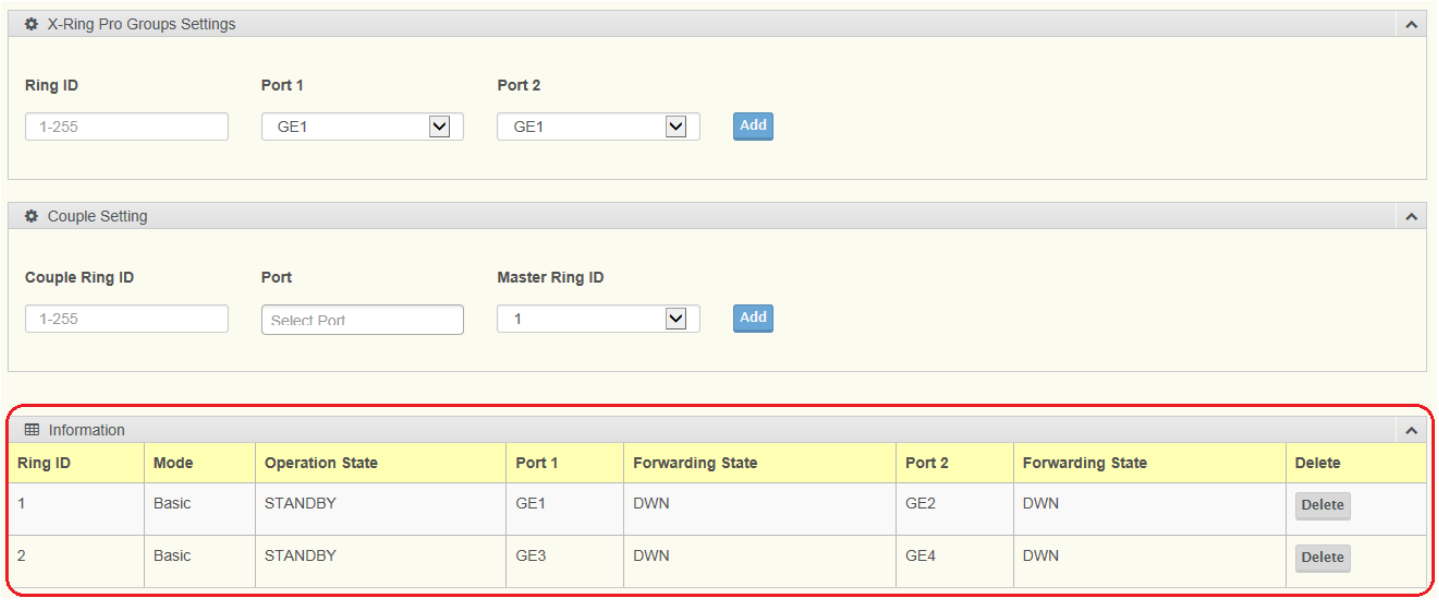
SW_1

SW_1 Configuration:

- Port 1 and Port 2 => Ring ID 1
- Port 3 and Port 4 => Ring ID 2



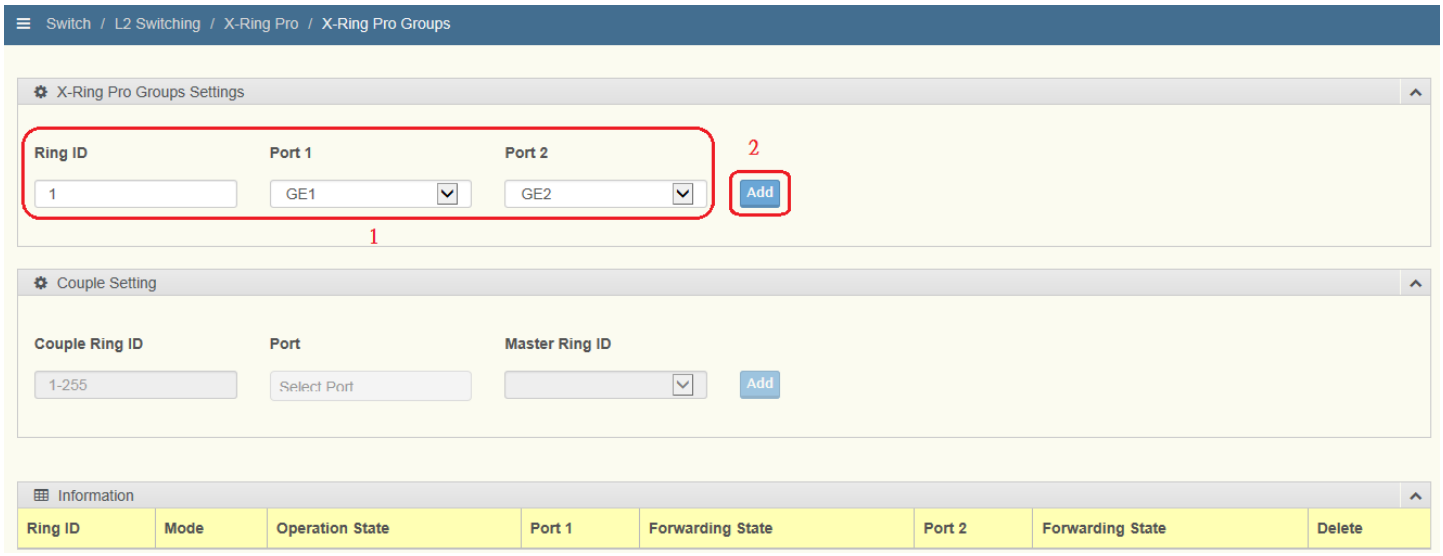

X-Ring Pro Groups Settings
Ring ID
Port 1
Port 2
2
GE3
GE4
Add
4
3
Couple Setting
Couple Ring ID
Port
Master Ring ID
1-255
Select Port
1
Add
Information
Ring ID
Mode
Operation State
Port 1
Forwarding State
Port 2
Forwarding State
Delete
1
Basic
STANDBY
GE1
DWN
GE2
DWN
Delete

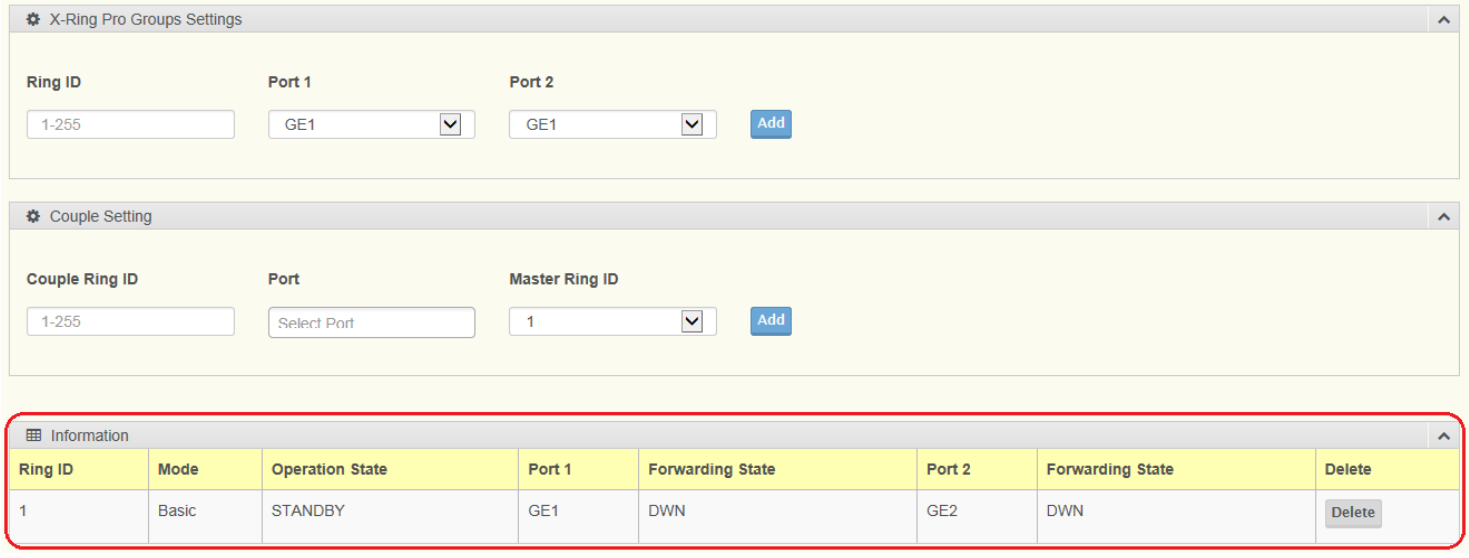

X-Ring Pro Groups Settings
Ring ID
Port 1
Port 2
1-255
GE1
GE1
Add
Couple Setting
Couple Ring ID
Port
Master Ring ID
1-255
Select Port
1
Add
Information
Ring ID
Mode
Operation State
Port 1
Forwarding State
Port 2
Forwarding State
Delete
1
Basic
STANDBY
GE1
DWN
GE2
DWN
Delete
2
Basic
STANDBY
GE3
DWN
GE4
DWN
Delete

SW_2, SW_3 and SW_4

SW_2, SW_3 and SW_4 Configuration:

- Port 1 and Port 2 => Ring ID 1

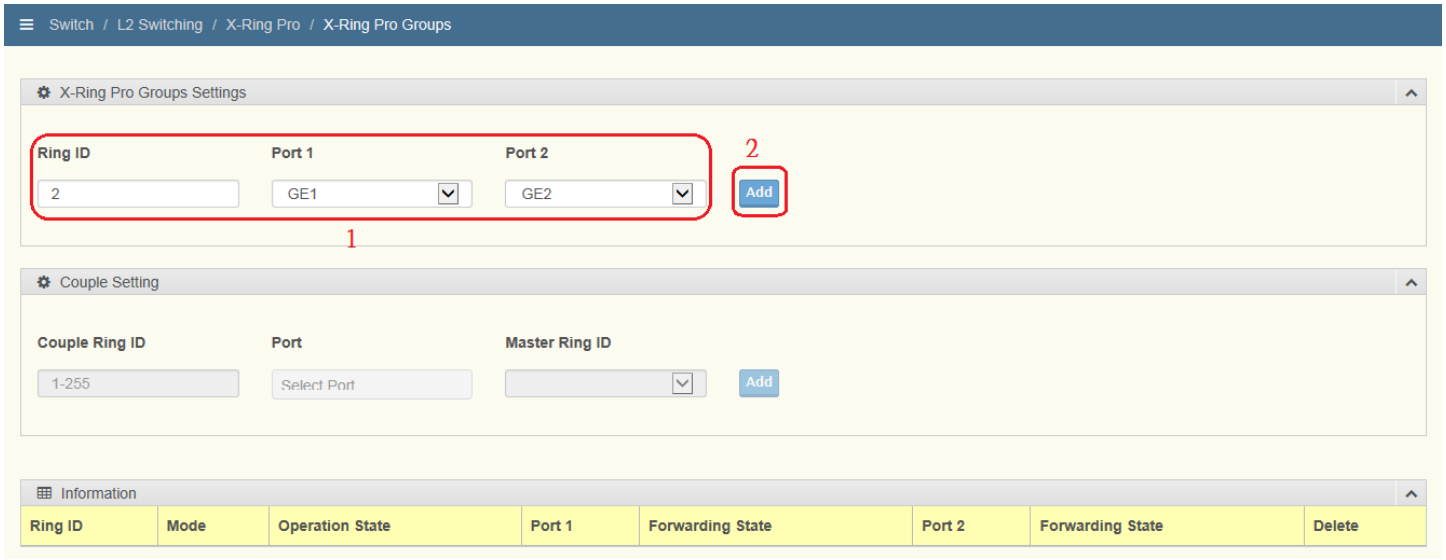


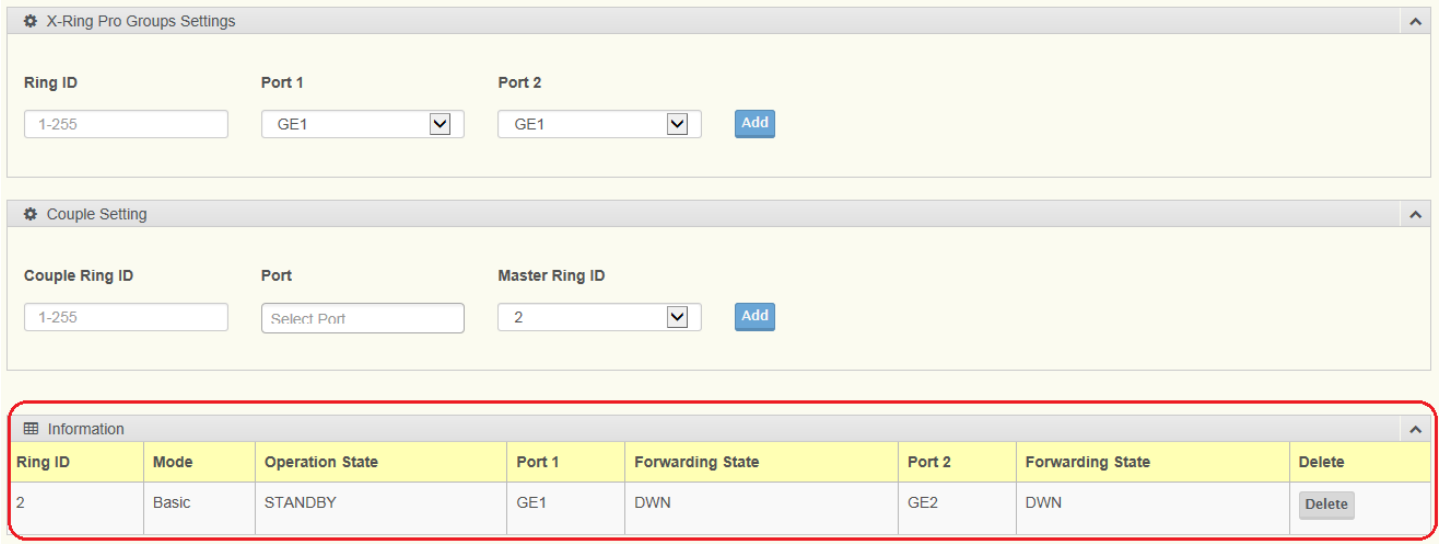


SW_5, SW_6 and SW_7

SW_5, SW_6 and SW_7 Configuration:

- Port 1 and Port 2 => Ring ID 2



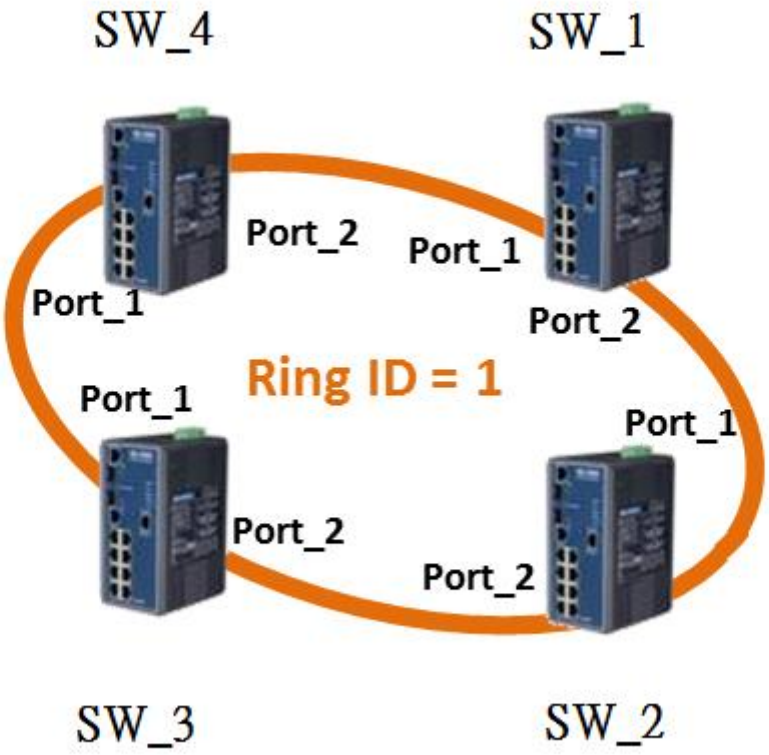


4. X-ring Elite Configuration

1. Topology Diagram

Below diagram is the example for the X-ring Elite application for a single ring. You may extend the topology to dual ring, multi ring.

[Note: X-ring Elite is support Dual Ring, Multi Ring. But X-ring Elite do not support couple ring]



2. Web screen shot

Below screen shot show you the X-ring Elite configuration on the web:

SW_1~SW_4

(Each Ring must assign unique ring id, the maximum ring id is 255)

- Port 1 and Port 2 of SW_1 to SW_4 belong to same partition with Ring ID = 1

APPENDIX

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5. Compatible with previous X-ring Configuration (X-ring Pro Legacy Mode)

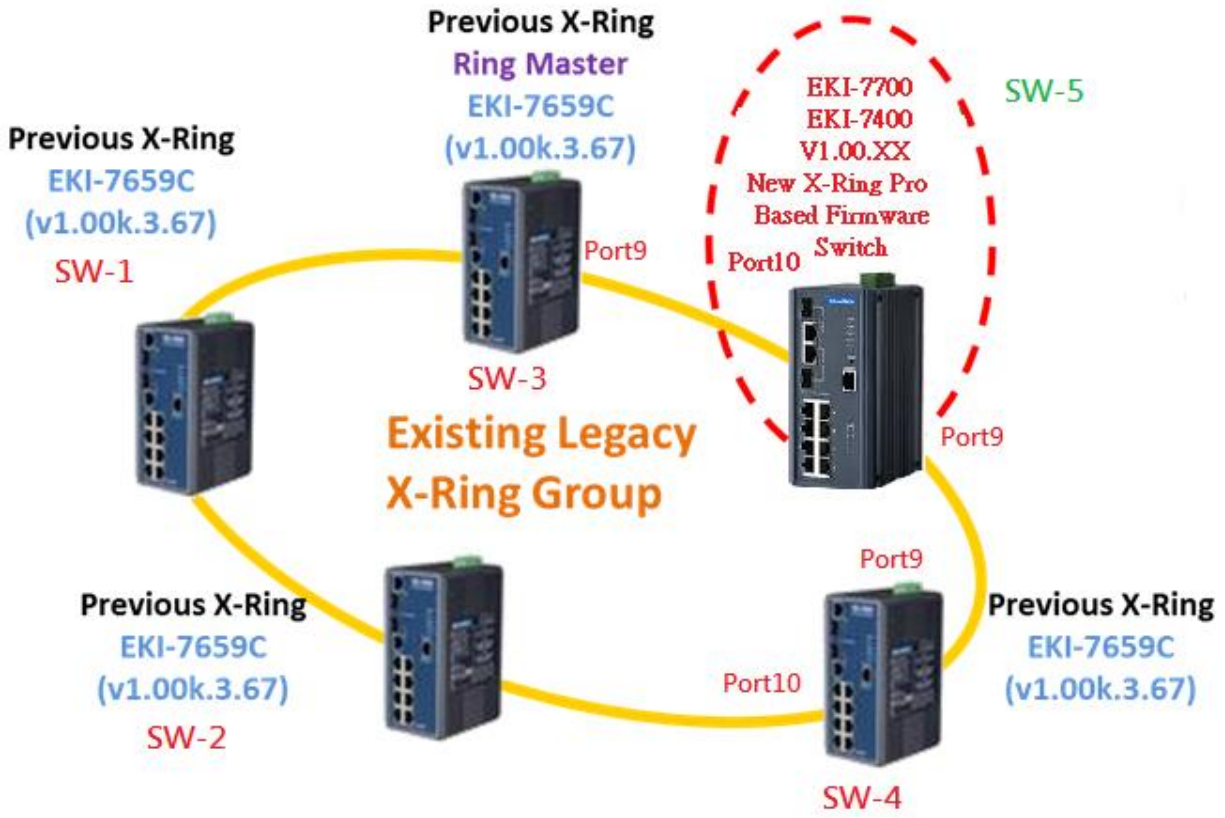
EKI-7000

1. Topology Diagram

- The New X-ring Pro Based FW Switch is backwards compatible with previous X-ring in the existing legacy X-ring network.
- Co-existence Requirement Between X-ring Pro and X-ring:
  - "Legacy Ring" must be manually enabled under X-ring Elite Based FW Switch.
  - Making sure at least one switch from the existing legacy X-ring group configured as "Ring Master"

Below diagram is the example to add a new EKI-7700 and EKI-7400 switch into X-ring (EKI-7000) as a ring member application.

[Purpose] Adding new EKI-7700 and EKI-7400 switches into original EKI-7000 X-ring



2. [Process]

Step1: Configure new switch SW-5 as legacy mode and setting the ring port is port9, and port 10.

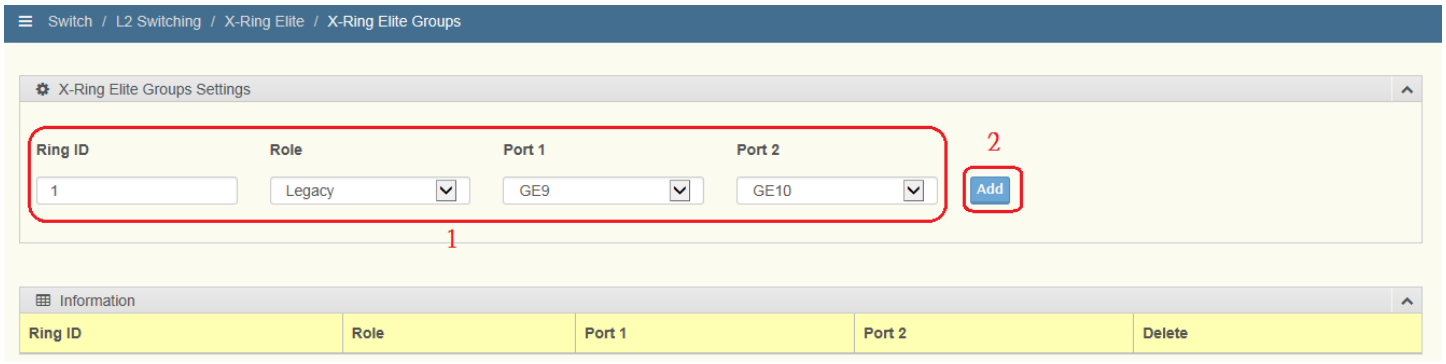
Step2: Disconnect the link between SW-3 and SW-4

Step3: Link SW-3 port9 to SW-5 port10 and SW-4 port9 to SW-5 port9

3. Web screen shot

Below screen shot show you the X-ring Elite configuration as Legacy Mode on the web, after the setting, you can connect SW5 into the X-ring environment.

SW-5



■ **Contact Window and File Link:**

If you have any questions, please contact with local technical support