

MSTP

(Multiple Spanning Tree Protocol)

Ethernet Switch

ZyNOS 4.0

Support Notes

Version 4.0

July 2011



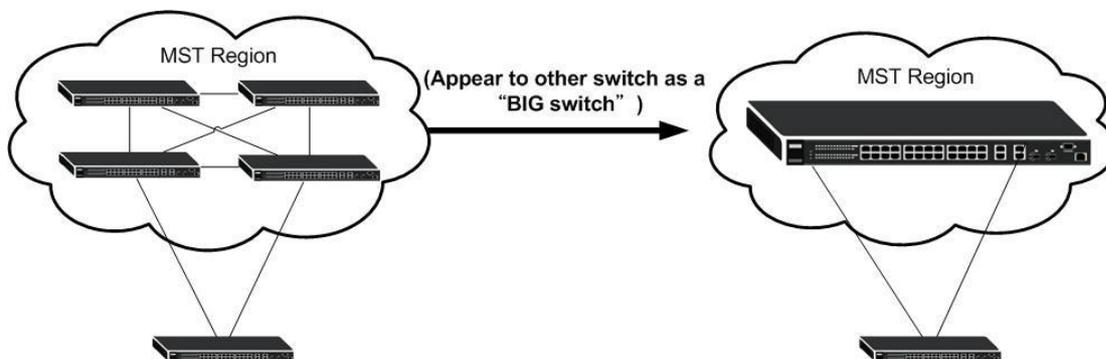
Overview of MSTP

Multiple Spanning Tree Protocol (IEEE 802.1s) is backward compatible with STP/RSTP and addresses the limitations of existing spanning tree protocols (STP and RSTP) in networks to include the following features:

- One Common and Internal Spanning Tree (CIST) that represents the entire network's connectivity.
- Grouping of multiple bridges (or switching devices) into regions that appear as one single bridge on the network.
- A VLAN can be mapped to a specific Multiple Spanning Tree Instance (MSTI). MSTI allows multiple VLANs to use the same spanning tree.
- Load-balancing is possible as traffic from different VLANs can use distinct paths in a region.

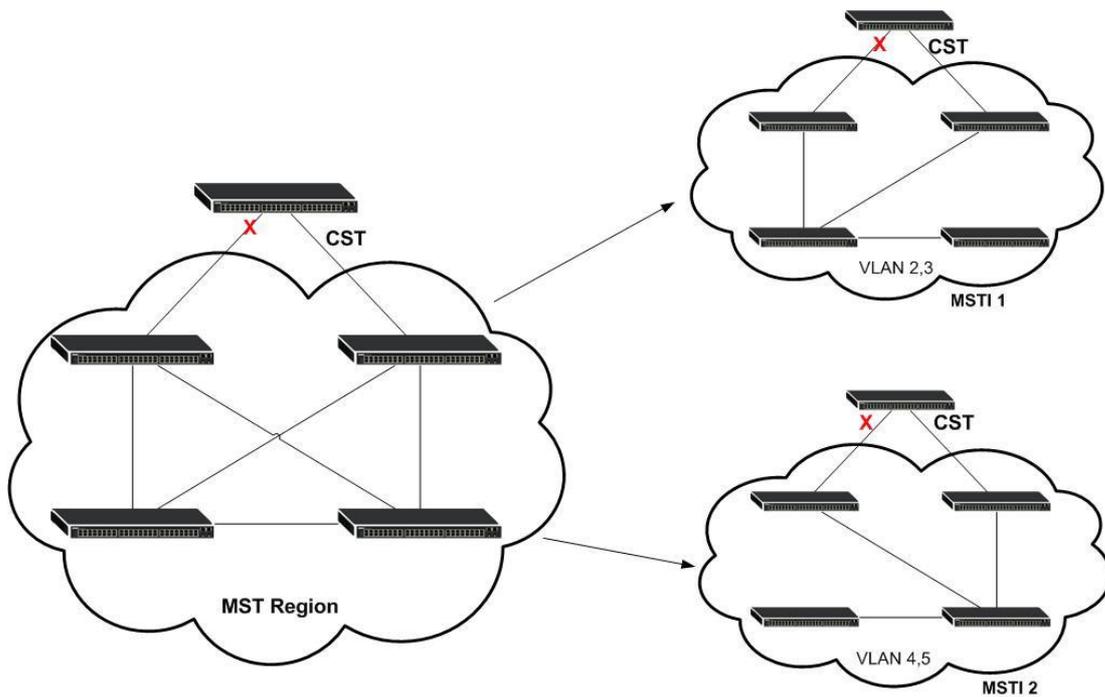
MST Region:

An MST region is a logical grouping of multiple network devices that appears as a single device to the rest of the network. Each MSTP-enabled device can only belong to one MST region.



MST Instance:

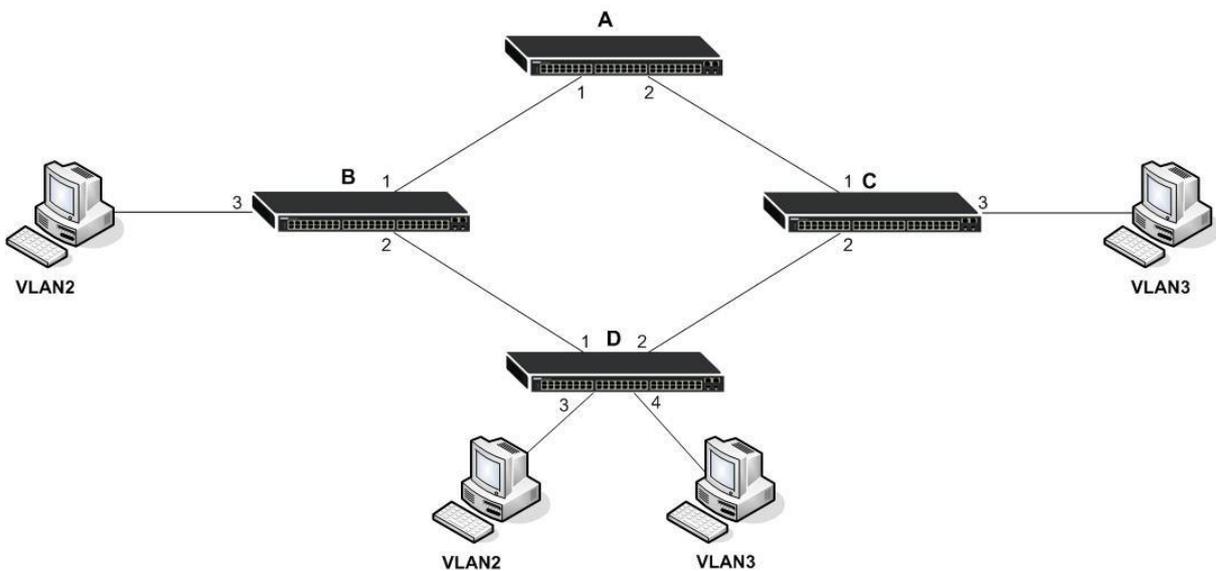
An MST Instance (MSTI) is a spanning tree instance. VLANs can be configured to run on a specific MSTI. Each created MSTI is identified by a unique number (known as an MST ID) known internally to a region. Thus an MSTI does not span across MST regions.



This MST Region can be decompose into two MSTIs. One for vlan 2,3 , and another for vlan 4,5. Different MSTIs have different topologies.

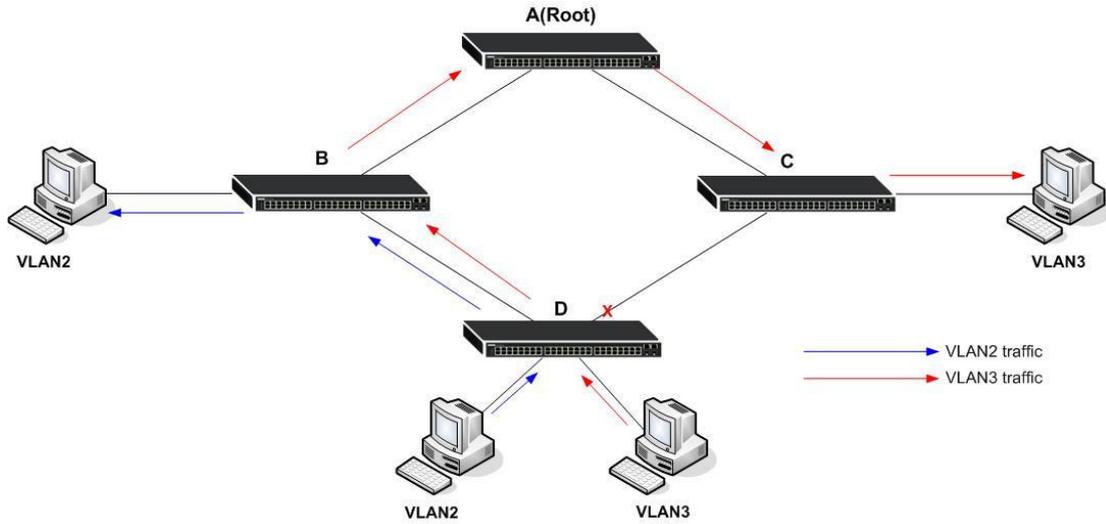
Scenario&Benefits

Consider the following topology:

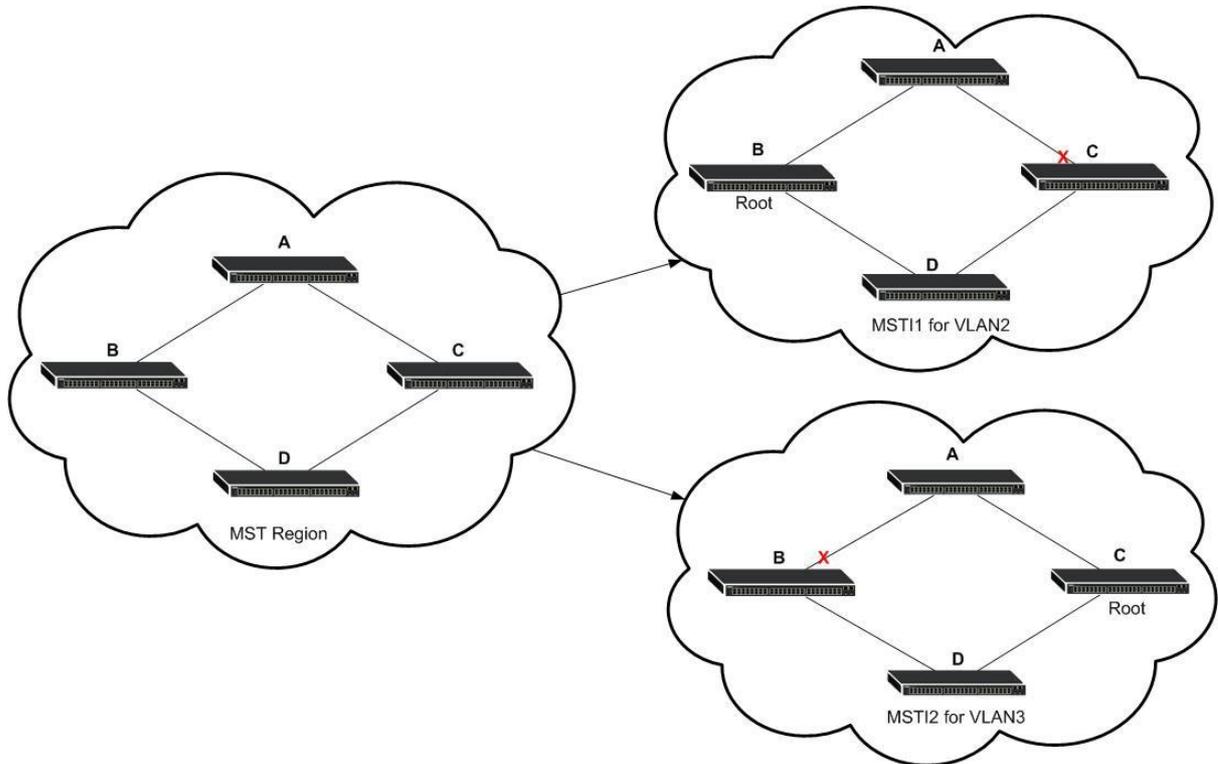


If we use STP/RSTP in this topology. All traffics from D to hosts connect to other switches will go through the root port.

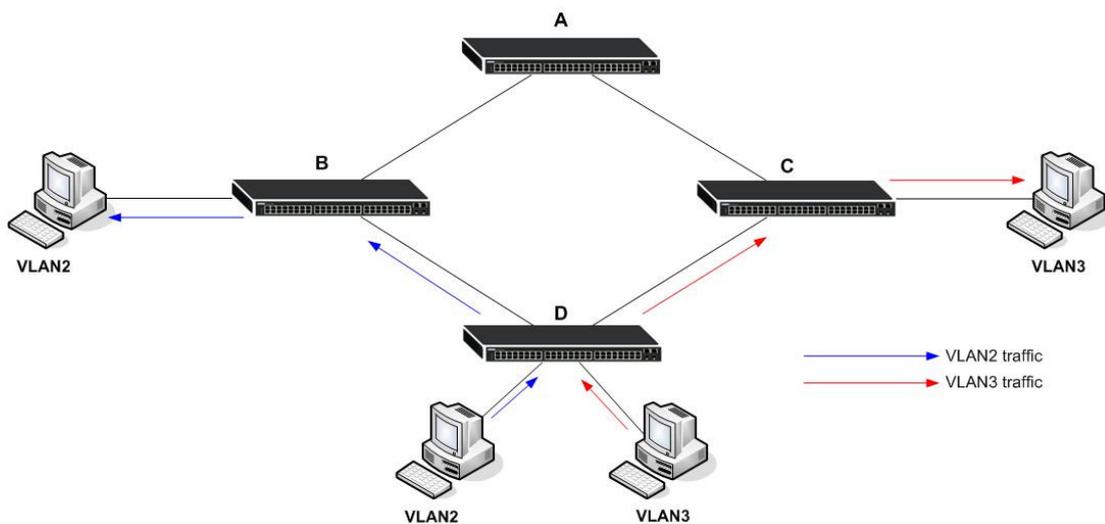
Traffic on STP/RSTP enabled topology.



Now what if we applied MSTP in the same topology?



When there're traffics belong to VLAN2 and VLAN3. Each of them can go through different uplinks.



With multiple uplink ports be enabled. The traffic loading will be balanced between two uplink ports, which also increase the network throughput and usage.

Configuration using the Web GUI – Switch A

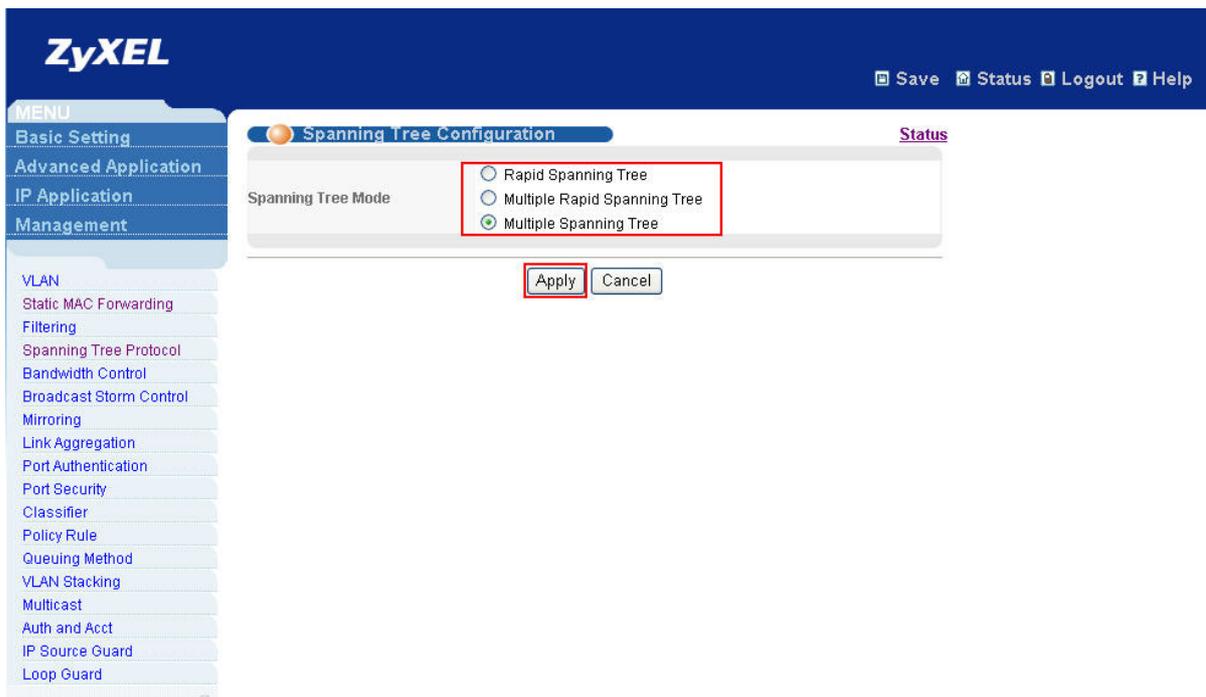
1. Connect MGMT port with a PC or Notebook via the RJ45 Cable.
2. By default, the MGMT IP of the out-band port is 192.168.0.1/24
3. Set your NIC to 192.168.0.100/24
4. Open an Internet browser (e.g. IE) and enter <http://192.168.0.1> in the URL field.
5. By default, the username for the administrator is “admin” and the corresponding password is “1234”.
6. After successful login you will see a screen similar to the one on the screenshot below.

Port	Name	Link	State	LACP	TxPkts	RxPkts	Errors	Tx KB/s	Rx KB/s	Up Time
1	100MF	FORWARDING	FORWARDING	Disabled	345	674	0	0.0	0.64	0:03:52
2	100MF	FORWARDING	FORWARDING	Disabled	168	0	0	0.64	0.0	0:01:33
3		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
4		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
5		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
6		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
7		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
8		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
9		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
10		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
11		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
12		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
13		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
14		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
15		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
16		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
17		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
18		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
19		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
20		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00

7. First of all, you need to enable the switch’s MSTP function. To do so, click items depicted below. **Advanced Application -> Spanning Tree Protocol -> Configuration**

Bridge	Root	Our Bridge
Bridge ID	0000-000000000000	0000-000000000000
Hello Time (second)	0	0
Max Age (second)	0	0
Forwarding Delay (second)	0	0
Cost to Bridge	0	
Port ID	0X0000	
Topology Changed Times		0
Time Since Last Change		0:00:00

8. After step 7. It will direct you to a “Spanning Tree Configuration” page, choose “Multiple Spanning Tree” then click the “Apply” button.



9. Click **“Spanning Tree Protocol”** button and back to **“Spanning Tree Protocol Status”** page. Click **“MSTP”** and go to the **“Multiple Spanning Tree Protocol”** page, you can do detail MSTP configuration from here.

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10. At the “Multiple Spanning Tree Protocol” page, create a MSTI 0 setting by following steps. All ports want to join MSTP must be included into MSTI 0

1. Configure the MSTP bridge parameters. (All switches in the same region must have the same “Configuration Name”, “Revision Number” and “vlan-MSTI mapping”.)

- 1.) Check “Active” eeHello Time”
- 3.) Configure the “Max Age” time
- 4.) Configure the “Forwarding Delay” time
- 5.) Configure the “Max hops”
- 6.) Configure the “Configuration Name”
- 7.) Configure the “Revision Number”
- 8.) Click “Apply” button

Multiple Spanning Tree Protocol [Status](#)

Bridge:

Active	<input checked="" type="checkbox"/>
Hello Time	2 seconds
MAX Age	20 seconds
Forwarding Delay	15 seconds
Maximum hops	128
Configuration Name	demo
Revision Number	111

2. Configure the MSTI parameters and choose which vlan should join this MSTI and click "Add". Because switch A is the root of this region, we must set the "Bridge Priority" of MSTI 0 to "0"

Instance:

Instance	0
Bridge Priority	0
VLAN Range	Start <input type="text"/> End <input type="text"/>

Enabled VLAN(s)

1, 4-4094

3. Choose which port should be included in this MSTI. Click "Add"

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

11. At the “Multiple Spanning Tree Protocol” page, create a MSTI 1 setting by following steps.

1. Configure the MSTI parameters and choose which vlan should join this MSTI and click “Add”

Instance:

Instance	1
Bridge Priority	32768
VLAN Range	Start <input type="text"/> End <input type="text"/>

Enabled VLAN(s)

2. Choose which port should be included in this MSTI. Click “Add”

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

12. At the “Multiple Spanning Tree Protocol” page, create a MSTI 1 setting by following steps.

1. Configure the MSTI parameters and choose which vlan should join this MSTI and click “Add”

Instance:

Instance	2
Bridge Priority	32768
VLAN Range	Start <input type="text"/> End <input type="text"/>

Enabled VLAN(s)

3

2. Choose which port should be included in this MSTI. Click “Add”

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

13. Create vlans corresponding to MST instances.

1.)Go to “Static VLAN” page by clicking “Advanced Application” ”VLAN” “Static VLAN”

The screenshot shows the ZyXEL web management interface. In the top right corner, there are links for Save, Status, Logout, and Help. The left sidebar contains a 'MENU' section with 'Advanced Application' and 'VLAN' highlighted. The main content area is titled 'VLAN Status' and shows 'The Number of VLAN = 3'. Below this is a table with the following data:

Index	VID	Elapsed Time	Status
1	1	0:11:13	Static
2	2	0:11:13	Static
3	3	0:11:13	Static

At the bottom of the page, there are 'Change Pages' buttons for 'Previous' and 'Next'.

2.)Create vlan 2 for MSTI 1 and click “Add”

Static VLAN [VLAN Status](#)

ACTIVE	<input checked="" type="checkbox"/>
Name	<input type="text"/>
VLAN Group ID	2

Port	Control			Tagging
*		Normal	<input type="checkbox"/>	<input checked="" type="checkbox"/> Tx Tagging
1	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
2	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
3	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
4	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
5	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
6	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
7	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
8	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
9	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
10	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
11	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging

3.) Create vlan 3 for MSTI 2 and click “Add”

Port	Control			Tagging
*	<input type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
1	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
2	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
3	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
4	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
5	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
6	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
7	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
8	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
9	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
10	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
11	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
12	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
13	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging

Configuration using the Web GUI – Switch B

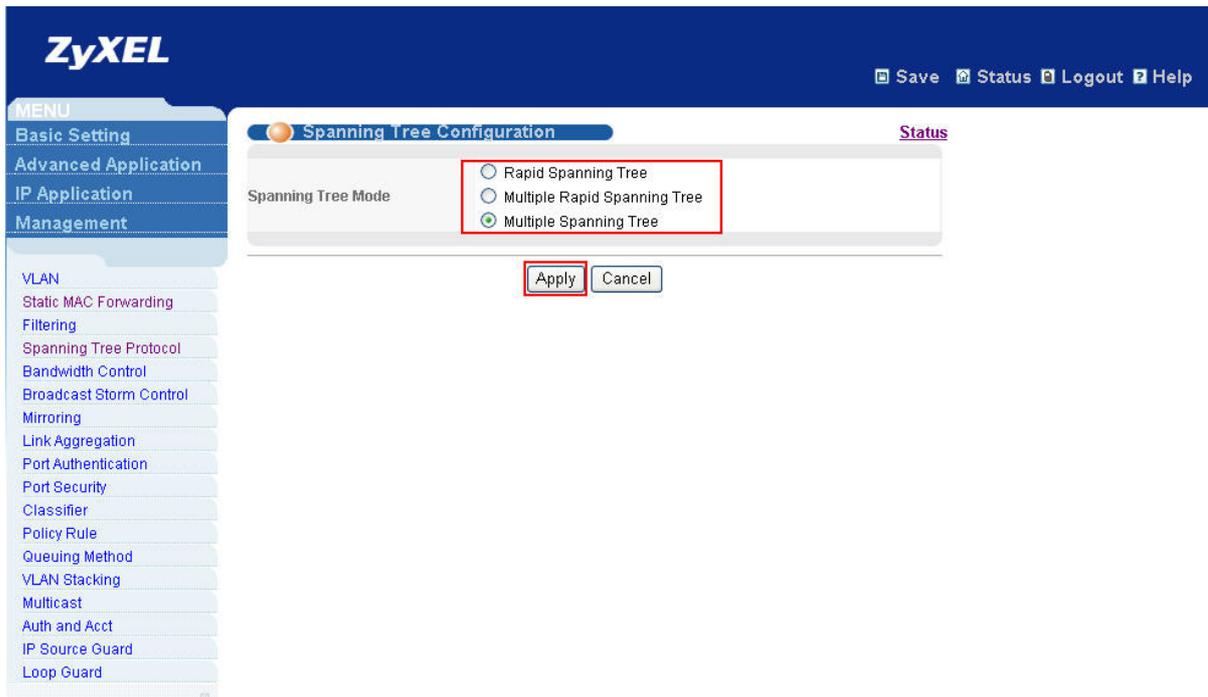
1. Connect MGMT port with a PC or Notebook via the RJ45 Cable.
2. By default, the MGMT IP of the out-band port is 192.168.0.1/24
3. Set your NIC to 192.168.0.100/24
4. Open an Internet browser (e.g. IE) and enter <http://192.168.0.1> in the URL field.
5. By default, the username for the administrator is “admin” and the corresponding password is “1234”.
6. After successful login you will see a screen similar to the one on the screenshot below.

Port	Name	Link	State	LACP	TxPkts	RxPkts	Errors	Tx KB/s	Rx KB/s	Up Time
1	100MF		FORWARDING	Disabled	345	674	0	0.0	0.64	0:03:52
2	100MF		FORWARDING	Disabled	168	0	0	0.64	0.0	0:01:33
3		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
4		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
5		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
6		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
7		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
8		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
9		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
10		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
11		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
12		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
13		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
14		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
15		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
16		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
17		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
18		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
19		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00
20		Down	STOP	Disabled	0	0	0	0.0	0.0	0:00:00

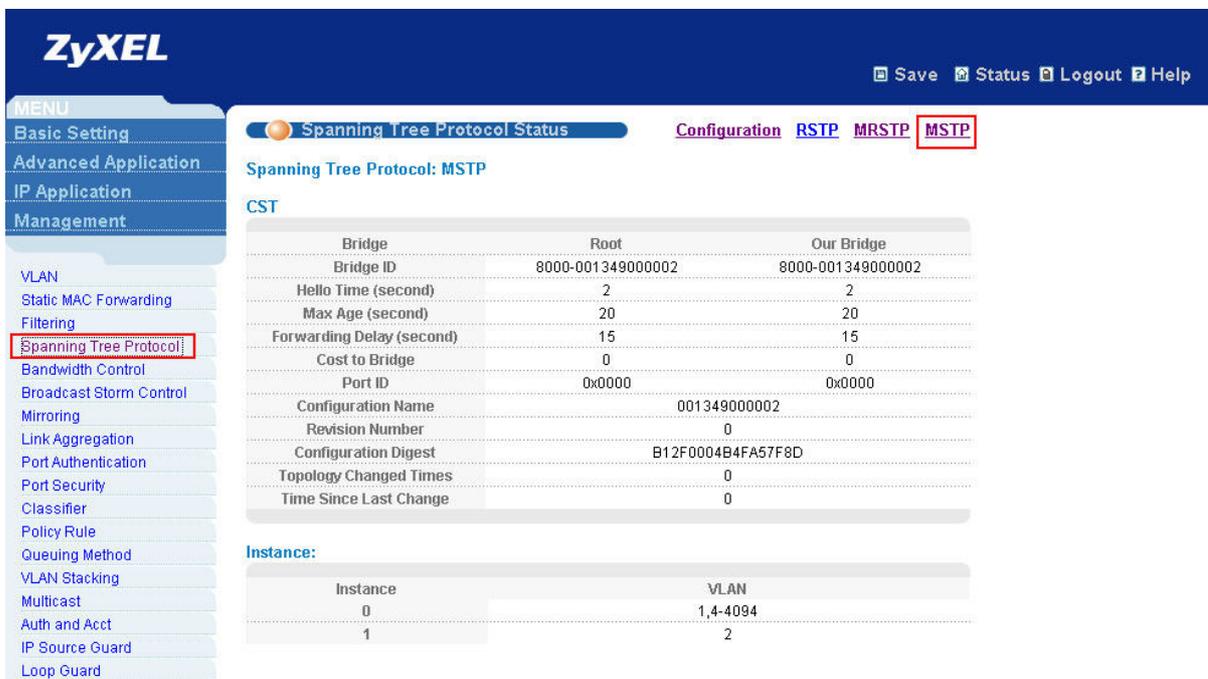
7. First of all, you need to enable the switch’s MSTP function. To do so, click items depicted below. **Advanced Application -> Spanning Tree Protocol -> Configuration**

Bridge	Root	Our Bridge
Bridge ID	0000-000000000000	0000-000000000000
Hello Time (second)	0	0
Max Age (second)	0	0
Forwarding Delay (second)	0	0
Cost to Bridge	0	
Port ID	0X0000	
Topology Changed Times		0
Time Since Last Change		0:00:00

8. After step 7. It will direct you to a “Spanning Tree Configuration” page, choose “Multiple Spanning Tree” then click the “Apply” button.



9. Click “Spanning Tree Protocol” button and back to “Spanning Tree Protocol Status” page. Click “MSTP” and go to the “Multiple Spanning Tree Protocol” page, you can do detail MSTP configuration from here.



10. At the “Multiple Spanning Tree Protocol” page, create a MSTI 0 setting by following steps. All ports want to join MSTP must be included into MSTI 0.

1. Configure the MSTP bridge parameters. (All switches in the same region must have the same "Configuration Name", "Revision Number" and "vlan-MSTI mapping".)

- 1.) Check "Active"
- 2.) Configure the "Hello Time"
- 3.) Configure the "Max Age" time
- 4.) Configure the "Forwarding Delay" time
- 5.) Configure the "Max hops"
- 6.) Configure the "Configuration Name"
- 7.) Configure the "Revision Number"
- 8.) Click "Apply" button

Multiple Spanning Tree Protocol [Status](#)

Bridge:

Active	<input checked="" type="checkbox"/>	
Hello Time	2	seconds
MAX Age	20	seconds
Forwarding Delay	15	seconds
Maximum hops	128	
Configuration Name	demo	
Revision Number	111	

2. Configure the MSTI parameters and choose which vlan should join this MSTI and click "Add"

Instance:

Instance	0		
Bridge Priority	32768 <input type="button" value="v"/>		
VLAN Range	Start <input type="text"/>	End <input type="text"/>	<input type="button" value="Add"/> <input type="button" value="Remove"/> <input type="button" value="Clear"/>
Enabled VLAN(s)	1, 4-4094		

3. Choose which port should be included in this MSTI. Click "Add"

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

11. At the “Multiple Spanning Tree Protocol” page, create a MSTI 1 setting by following steps.

1. Configure the MSTI parameters and choose which vlan should join this MSTI and click “Add”. Because Switch B is the root of MSTI 1, we need to configure the “Bridge Priority” of this instance to “0”

Instance:

Instance	<input type="text" value="1"/>
Bridge Priority	<input type="text" value="0"/> <input type="button" value="v"/>
VLAN Range	Start <input type="text"/> End <input type="text"/>

Enabled VLAN(s)

2

2. Choose which port should be included in this MSTI. Click “Add”

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

12. At the “Multiple Spanning Tree Protocol” page, create a MSTI 1 setting by following steps.

1. Configure the MSTI parameters and choose which vlan should join this MSTI and click “Add”

Instance:

Instance	2
Bridge Priority	32768
VLAN Range	Start <input type="text"/> End <input type="text"/>
<input type="button" value="Add"/> <input type="button" value="Remove"/> <input type="button" value="Clear"/>	
Enabled VLAN(s)	3

2. Choose which port should be included in this MSTI. Click “Add”

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

13. Create vlans corresponding to MST instances.

1.)Go to “Static VLAN” page by clicking “Advanced Application” ”VLAN” “Static VLAN”

The screenshot shows the ZyXEL web management interface. The top navigation bar includes 'Save', 'Status', 'Logout', and 'Help'. The left sidebar menu has 'VLAN' highlighted. The main content area is titled 'VLAN Status' and shows 'The Number of VLAN = 3'. A table below lists the VLANs:

Index	VID	Elapsed Time	Status
1	1	0:11:13	Static
2	2	0:11:13	Static
3	3	0:11:13	Static

At the bottom of the table, there are 'Change Pages' buttons for 'Previous' and 'Next'.

2.)Create vlan 2 for MSTI 1 and click “Add”

Static VLAN [VLAN Status](#)

ACTIVE	<input checked="" type="checkbox"/>
Name	<input type="text"/>
VLAN Group ID	2

Port	Control			Tagging
*		Normal <input type="button" value="v"/>		<input checked="" type="checkbox"/> Tx Tagging
1	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
2	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
3	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
4	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
5	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
6	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
7	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
8	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
9	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
10	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
11	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging

3.) Create vlan 3 for MSTI 2 and click "Add"

Static VLAN
VLAN Status

ACTIVE

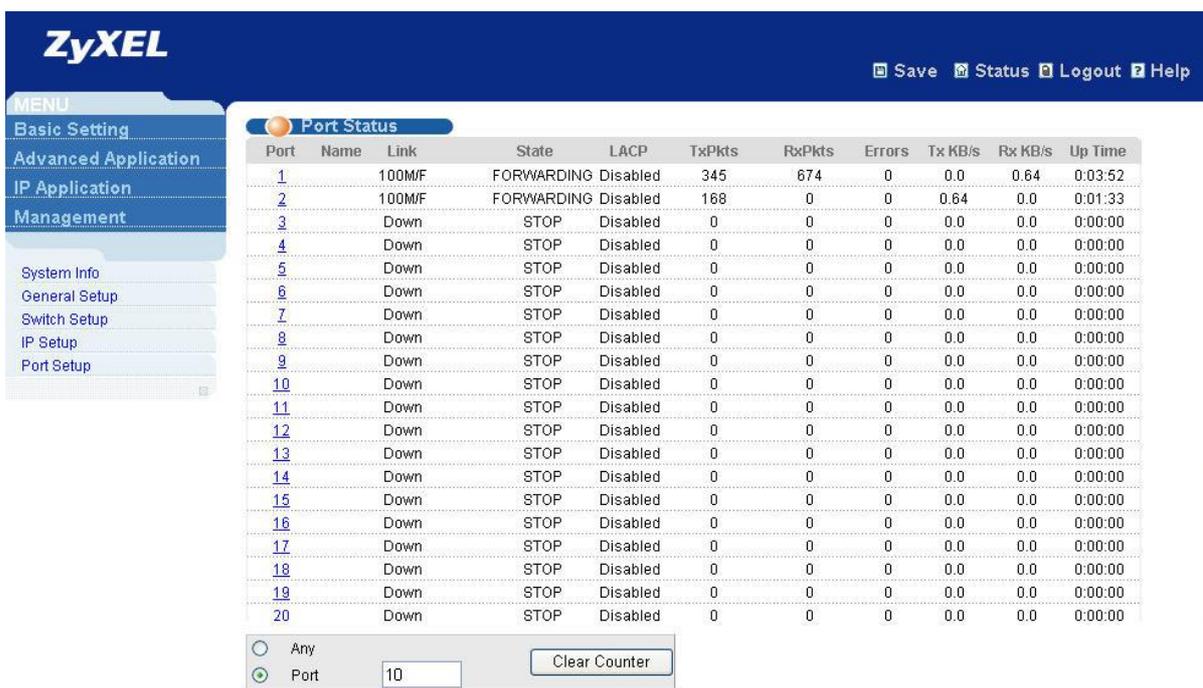
Name

VLAN Group ID

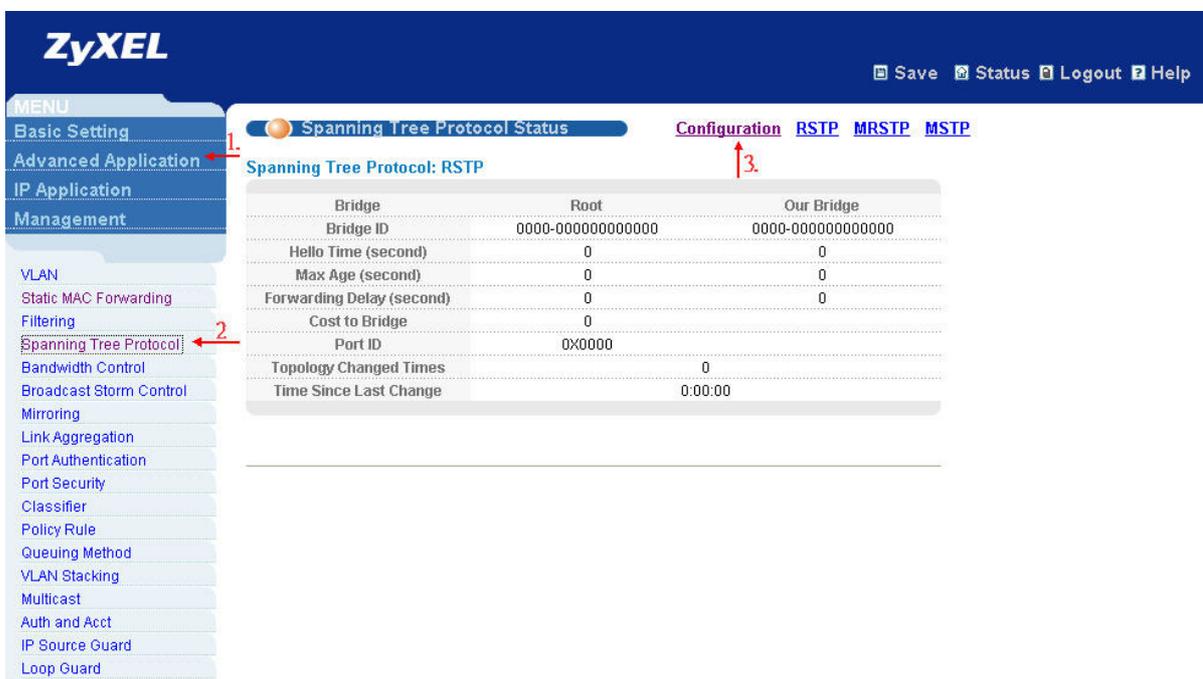
Port	Control			Tagging
*	<input type="radio"/> Normal	<input checked="" type="radio"/> Normal	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
1	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
2	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
3	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
4	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
5	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
6	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
7	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
8	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
9	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
10	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
11	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
12	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
13	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging

Configuration using the Web GUI – Switch C

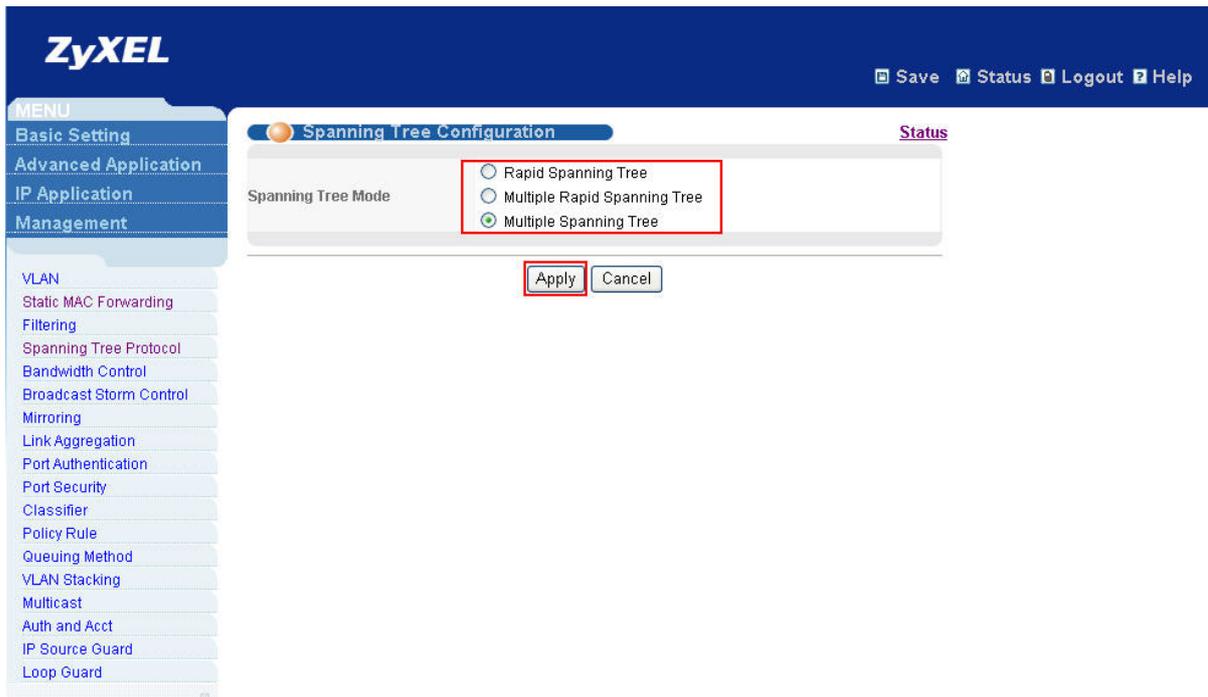
1. Connect MGMT port with a PC or Notebook via the RJ45 Cable.
2. By default, the MGMT IP of the out-band port is 192.168.0.1/24
3. Set your NIC to 192.168.0.100/24
4. Open an Internet browser (e.g. IE) and enter <http://192.168.0.1> in the URL field.
5. By default, the username for the administrator is “admin” and the corresponding password is “1234”.
6. After successful login you will see a screen similar to the one on the screenshot below.



7. First of all, you need to enable the switch’s MSTP function. To do so, click items depicted below. **Advanced Application -> Spanning Tree Protocol -> Configuration**



8. After step 7. It will direct you to a “Spanning Tree Configuration” page, choose “Multiple Spanning Tree” then click the “Apply” button.



9. Click “Spanning Tree Protocol” button and back to “Spanning Tree Protocol Status” page. Click “MSTP” and go to the “Multiple Spanning Tree Protocol” page, you can do detail MSTP configuration from here.



10. At the “Multiple Spanning Tree Protocol” page, create a MSTI 0 setting by following steps. All ports want to join MSTP must be included into MSTI 0.

1. Configure the MSTP bridge parameters. (All switches in the same region must have the same "Configuration Name", "Revision Number" and "vlan-MSTI mapping".)

- 1.) Check "Active"
- 2.) Configure the "Hello Time"
- 3.) Configure the "Max Age" time
- 4.) Configure the "Forwarding Delay" time
- 5.) Configure the "Max hops"
- 6.) Configure the "Configuration Name"
- 7.) Configure the "Revision Number"
- 8.) Click "Apply" button

Multiple Spanning Tree Protocol [Status](#)

Bridge:

Active	<input checked="" type="checkbox"/>	
Hello Time	2	seconds
MAX Age	20	seconds
Forwarding Delay	15	seconds
Maximum hops	128	
Configuration Name	demo	
Revision Number	111	

2. Configure the MSTI parameters and choose which vlan should join this MSTI and click "Add"

Instance:

Instance	0		
Bridge Priority	32768 <input type="button" value="v"/>		
VLAN Range	Start <input type="text"/>	End <input type="text"/>	<input type="button" value="Add"/> <input type="button" value="Remove"/> <input type="button" value="Clear"/>
Enabled VLAN(s)	1, 4-4094		

3. Choose which port should be included in this MSTI. Click "Add"

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

11. At the “Multiple Spanning Tree Protocol” page, create a MSTI 1 setting by following steps.

1. Configure the MSTI parameters and choose which vlan should join this MSTI and click “Add”.

Instance:

Instance	<input type="text" value="1"/>
Bridge Priority	<input type="text" value="32768"/> ▼
VLAN Range	Start <input type="text"/> End <input type="text"/> <input type="button" value="Add"/> <input type="button" value="Remove"/> <input type="button" value="Clear"/>
Enabled VLAN(s)	<input type="text" value="2"/>

2. Choose which port should be included in this MSTI. Click “Add”

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

12. At the “Multiple Spanning Tree Protocol” page, create a MSTI 1 setting by following steps.

1. Configure the MSTI parameters and choose which vlan should join this MSTI and click “Add”. Because Switch C is the root of MSTI 2, we need to configure the “Bridge Priority” of this instance to “0”

Instance:

Instance	<input type="text" value="2"/>
Bridge Priority	<input type="text" value="0"/> ▼
VLAN Range	Start <input type="text"/> End <input type="text"/> <input type="button" value="Add"/> <input type="button" value="Remove"/> <input type="button" value="Clear"/>
Enabled VLAN(s)	<input type="text" value="3"/>

2. Choose which port should be included in this MSTI. Click “Add”

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

13. Create vlans corresponding to MST instances.

1.)Go to “Static VLAN” page by clicking “Advanced Application” ”VLAN” “Static VLAN”

The screenshot shows the ZyXEL web management interface. In the top navigation bar, the 'Static VLAN' menu item is highlighted with a red box. Below the navigation bar, the 'VLAN Status' page is displayed, showing a table with the following data:

Index	VID	Elapsed Time	Status
1	1	0:11:13	Static
2	2	0:11:13	Static
3	3	0:11:13	Static

2.)Create vlan 2 for MSTI 1 and click “Add”

Static VLAN [VLAN Status](#)

ACTIVE	<input checked="" type="checkbox"/>
Name	<input type="text"/>
VLAN Group ID	2

Port	Control			Tagging
*		Normal	<input type="checkbox"/>	<input checked="" type="checkbox"/> Tx Tagging
1	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
2	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
3	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
4	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
5	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
6	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
7	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
8	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
9	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
10	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
11	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging

3.) Create vlan 3 for MSTI 2 and click “Add”

Static VLAN
VLAN Status

ACTIVE

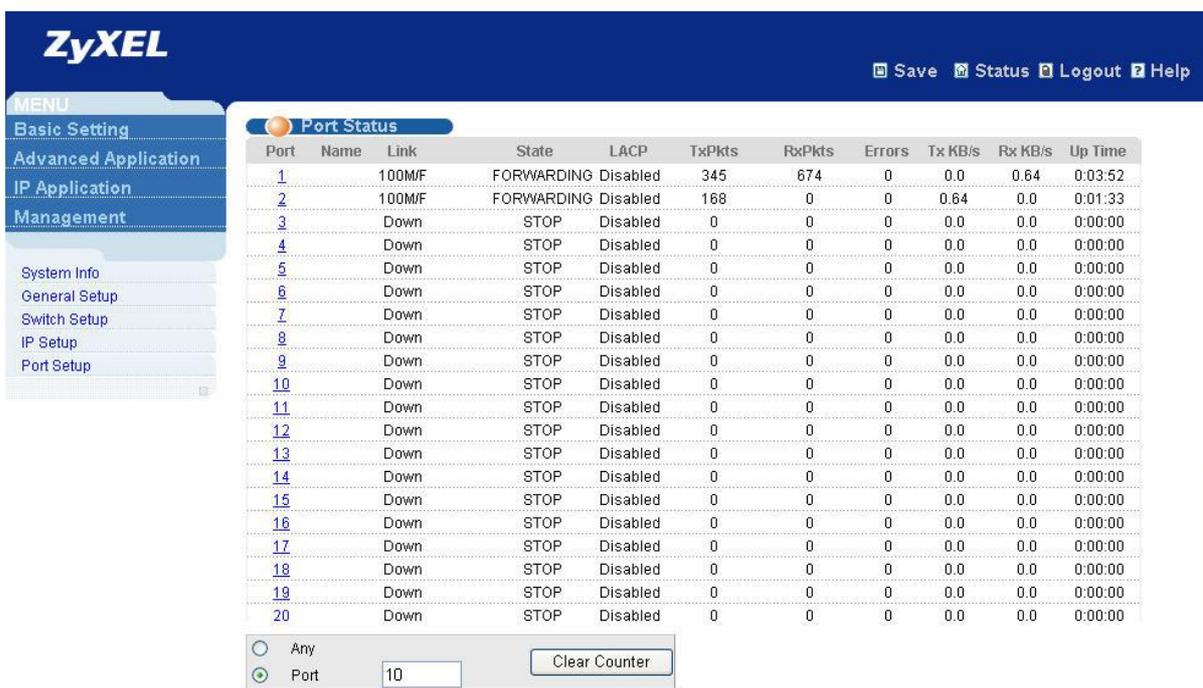
Name

VLAN Group ID

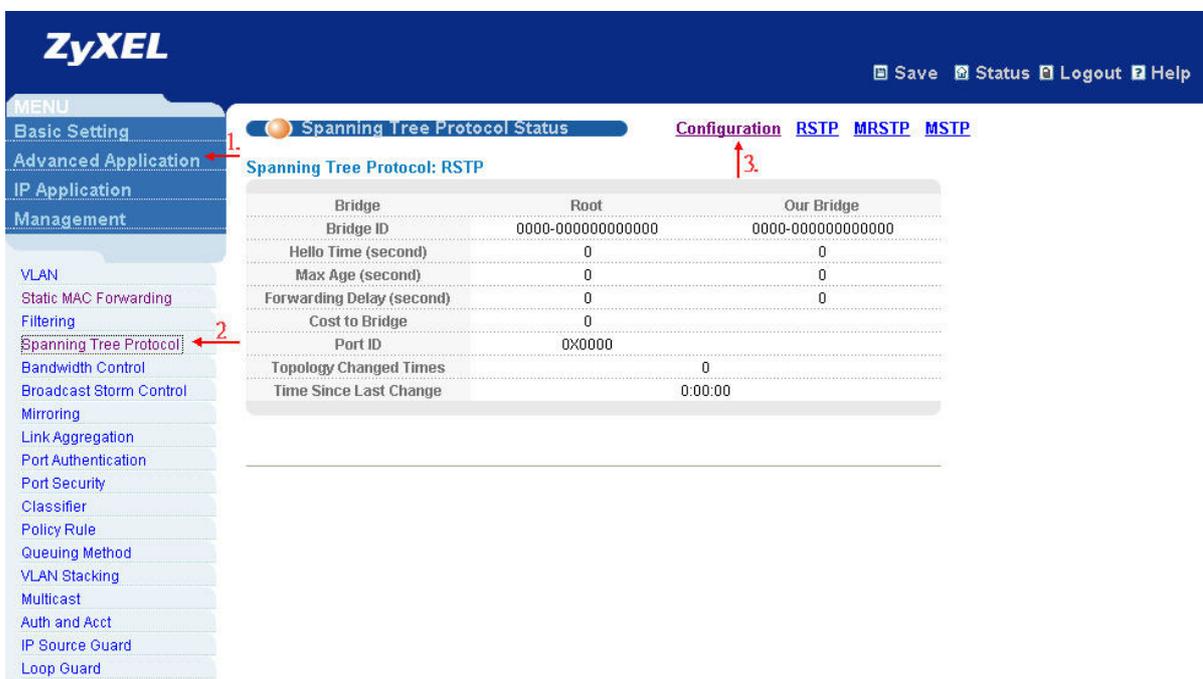
Port	Control			Tagging
*	<input type="radio"/> Normal	<input checked="" type="radio"/> Normal	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
1	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
2	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
3	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
4	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
5	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
6	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
7	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
8	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
9	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
10	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
11	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
12	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
13	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging

Configuration using the Web GUI – Switch D

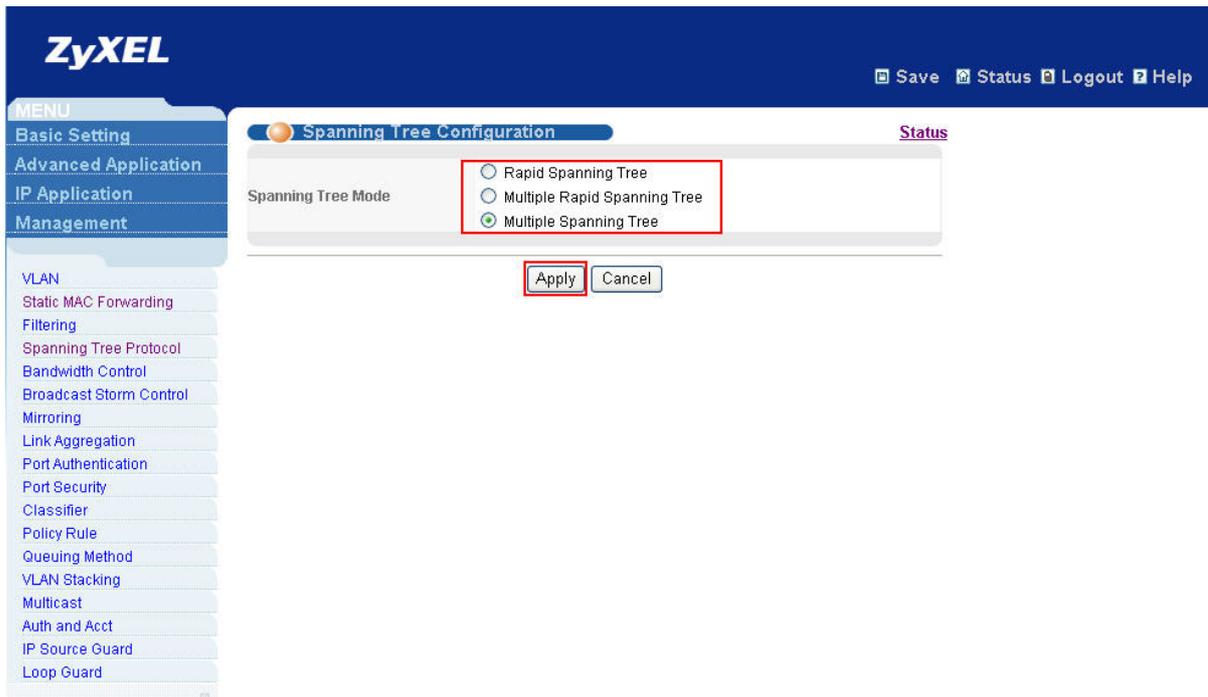
1. Connect MGMT port with a PC or Notebook via the RJ45 Cable.
2. By default, the MGMT IP of the out-band port is 192.168.0.1/24
3. Set your NIC to 192.168.0.100/24
4. Open an Internet browser (e.g. IE) and enter <http://192.168.0.1> in the URL field.
5. By default, the username for the administrator is “admin” and the corresponding password is “1234”.
6. After successful login you will see a screen similar to the one on the screenshot below.



7. First of all, you need to enable the switch’s MSTP function. To do so, click items depicted below. **Advanced Application -> Spanning Tree Protocol -> Configuration**



8. After step 7. It will direct you to a “Spanning Tree Configuration” page, choose “Multiple Spanning Tree” then click the “Apply” button.



9. Click “Spanning Tree Protocol” button and back to “Spanning Tree Protocol Status” page. Click “MSTP” and go to the “Multiple Spanning Tree Protocol” page, you can do detail MSTP configuration from here.



10. At the “Multiple Spanning Tree Protocol” page, create a MSTI 0 setting by following steps. All ports want to join MSTP must be included into MSTI 0

1. Configure the MSTP bridge parameters. (All switches in the same region must have the same “Configuration Name”, “Revision Number” and “vlan-MSTI mapping”).)

- 1.) Check “Active”
- 2.) Configure the “Hello Time”
- 3.) Configure the “Max Age” time
- 4.) Configure the “Forwarding Delay” time
- 5.) Configure the “Max hops”
- 6.) Configure the “Configuration Name”
- 7.) Configure the “Revision Number”
- 8.) Click “Apply” button

Multiple Spanning Tree Protocol [Status](#)

Bridge:

Active	<input checked="" type="checkbox"/>	
Hello Time	2	seconds
MAX Age	20	seconds
Forwarding Delay	15	seconds
Maximum hops	128	
Configuration Name	demo	
Revision Number	111	

2. Configure the MSTI parameters and choose which vlan should join this MSTI and click “Add”

Instance:

Instance	0		
Bridge Priority	32768 <input type="button" value="v"/>		
VLAN Range	Start <input type="text"/>	End <input type="text"/>	<input type="button" value="Add"/> <input type="button" value="Remove"/> <input type="button" value="Clear"/>
Enabled VLAN(s)	1, 4-4094		

3. Choose which port should be included in this MSTI. Click “Add”

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

11. At the “Multiple Spanning Tree Protocol” page, create a MSTI 1 setting by following steps.

1. Configure the MSTI parameters and choose which vlan should join this MSTI and click “Add”

Instance:

Instance	1
Bridge Priority	32768
VLAN Range	Start <input type="text"/> End <input type="text"/>
	<input type="button" value="Add"/> <input type="button" value="Remove"/> <input type="button" value="Clear"/>
Enabled VLAN(s)	2

2. Choose which port should be included in this MSTI. Click “Add”

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

12. At the “Multiple Spanning Tree Protocol” page, create a MSTI 1 setting by following steps.

1. Configure the MSTI parameters and choose which vlan should join this MSTI and click “Add”

Instance:

Instance	2
Bridge Priority	32768
VLAN Range	Start <input type="text"/> End <input type="text"/>

Enabled VLAN(s)

3

2. Choose which port should be included in this MSTI. Click “Add”

Port	Active	Priority	Path Cost
*	<input type="checkbox"/>		
1	<input checked="" type="checkbox"/>	128	19
2	<input checked="" type="checkbox"/>	128	19
3	<input type="checkbox"/>	128	19
4	<input type="checkbox"/>	128	19
5	<input type="checkbox"/>	128	19
6	<input type="checkbox"/>	128	19
7	<input type="checkbox"/>	128	19
8	<input type="checkbox"/>	128	19
9	<input type="checkbox"/>	128	19
10	<input type="checkbox"/>	128	19
11	<input type="checkbox"/>	128	19
12	<input type="checkbox"/>	128	19
13	<input type="checkbox"/>	128	19
14	<input type="checkbox"/>	128	19
15	<input type="checkbox"/>	128	19
16	<input type="checkbox"/>	128	19

13. Create vlans corresponding to MST instances.

1.)Go to “Static VLAN” page by clicking “Advanced Application” ”VLAN” “Static VLAN”

ZyXEL Save Status Logout Help

MENU
 Basic Setting
 Advanced Application
 IP Application
 Management

VLAN
 Static MAC Forwarding
 Filtering
 Spanning Tree Protocol
 Bandwidth Control
 Broadcast Storm Control
 Mirroring
 Link Aggregation
 Port Authentication
 Port Security
 Classifier
 Policy Rule
 Queuing Method
 VLAN Stacking
 Multicast
 Auth and Acct
 IP Source Guard
 Loop Guard

VLAN Status VLAN Port Setting **Static VLAN**
 The Number of VLAN = 3

Index	VID	Elapsed Time	Status
1	1	0:11:13	Static
2	2	0:11:13	Static
3	3	0:11:13	Static

Change Pages Previous Next

2.)Create vlan 2 for MSTI 1 and click “Add”

Static VLAN [VLAN Status](#)

ACTIVE	<input checked="" type="checkbox"/>
Name	<input type="text"/>
VLAN Group ID	2

Port	Control			Tagging
*		Normal	<input type="checkbox"/>	<input checked="" type="checkbox"/> Tx Tagging
1	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
2	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
3	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
4	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
5	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
6	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
7	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
8	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
9	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
10	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
11	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging

3.) Create vlan 3 for MSTI 2 and click “Add”

Static VLAN
VLAN Status

ACTIVE

Name

VLAN Group ID

Port	Control			Tagging
*	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
1	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
2	<input type="radio"/> Normal	<input checked="" type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
3	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
4	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
5	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
6	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
7	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
8	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
9	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
10	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
11	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
12	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging
13	<input checked="" type="radio"/> Normal	<input type="radio"/> Fixed	<input type="radio"/> Forbidden	<input checked="" type="checkbox"/> Tx Tagging

Configuration using the CLI – Switch A

```

vlan 1 name 1
  normal ""
  fixed 1-28
  forbidden ""
  untagged 1-28
  ip address 192.168.1.1 255.255.255.0
exit
vlan 2
  normal 3-28
  fixed 1-2
  forbidden ""
  untagged ""
exit
vlan 3
  normal 3-28
  
```

```
fixed 1-2
forbidden ""
untagged ""
exit
interface route-domain 192.168.1.1/24
exit
ip address 192.168.0.1 255.255.255.0
spanning-tree mode MSTP
mstp
mstp configuration-name demo
mstp revision 111
mstp instance 0 vlan 1,4-4094
mstp instance 1 vlan 2
mstp instance 2 vlan 3
mstp instance 0 priority 0
mstp instance 0 interface port-channel 1
mstp instance 0 interface port-channel 2
mstp instance 1 interface port-channel 1
mstp instance 1 interface port-channel 2
mstp instance 2 interface port-channel 1
mstp instance 2 interface port-channel 2
```

Configuration using the CLI – Switch B

```
vlan 1 name 1
normal ""
fixed 1-28
forbidden ""
untagged 1-28
ip address 192.168.1.2 255.255.255.0
exit
vlan 2
normal 3-28
fixed 1-2
forbidden ""
untagged ""
```

```
exit
vlan 3
    normal 3-28
    fixed 1-2
    forbidden ""
    untagged ""
exit
interface route-domain 192.168.1.2/24
exit
ip address 192.168.0.1 255.255.255.0
spanning-tree mode MSTP
mstp
mstp configuration-name demo
mstp revision 111
mstp instance 0 vlan 1,4-4094
mstp instance 1 vlan 2
mstp instance 2 vlan 3
mstp instance 1 priority 0
mstp instance 0 interface port-channel 1
mstp instance 0 interface port-channel 2
mstp instance 1 interface port-channel 1
mstp instance 1 interface port-channel 2
mstp instance 2 interface port-channel 1
mstp instance 2 interface port-channel 2
```

Configuration using the CLI – Switch C

```
vlan 1 name 1
    normal ""
    fixed 1-28
    forbidden ""
    untagged 1-28
    ip address 192.168.1.3 255.255.255.0
exit
vlan 2
    normal 3-28
```

```
    fixed 1-2
    forbidden ""
    untagged ""
exit
vlan 3
    normal 3-28
    fixed 1-2
    forbidden ""
    untagged ""
exit
interface route-domain 192.168.1.3/24
exit
ip address 192.168.0.1 255.255.255.0
spanning-tree mode MSTP
mstp
mstp configuration-name demo
mstp revision 111
mstp instance 0 vlan 1,4-4094
mstp instance 1 vlan 2
mstp instance 2 vlan 3
mstp instance 2 priority 0
mstp instance 0 interface port-channel 1
mstp instance 0 interface port-channel 2
mstp instance 1 interface port-channel 1
mstp instance 1 interface port-channel 2
mstp instance 2 interface port-channel 1
mstp instance 2 interface port-channel 2
```

Configuration using the CLI – Switch D

```
vlan 1 name 1
    normal ""
    fixed 1-28
    forbidden ""
    untagged 1-28
ip address 192.168.1.4 255.255.255.0
```

```
exit
vlan 2
    normal 3-28
    fixed 1-2
    forbidden ""
    untagged ""
exit
vlan 3
    normal 3-28
    fixed 1-2
    forbidden ""
    untagged ""
exit
interface route-domain 192.168.1.4/24
exit
ip address 192.168.0.1 255.255.255.0
spanning-tree mode MSTP
mstp
mstp configuration-name demo
mstp revision 111
mstp instance 0 vlan 1,4-4094
mstp instance 1 vlan 2
mstp instance 2 vlan 3
mstp instance 0 interface port-channel 1
mstp instance 0 interface port-channel 2
mstp instance 1 interface port-channel 1
mstp instance 1 interface port-channel 2
mstp instance 2 interface port-channel 1
mstp instance 2 interface port-channel 2
```