

01. MSTP

- 1.1. MSTP
 - 1.1.1. MSTP
 - 1.1.1.1. MSTP
 - 1.1.1.2. MSTP
 - 1.1.1.3. MSTP
 - 1.2. MSTP
 - 1.3. MSTP
 - 1.4. MSTP

1.1. MSTP

STP RSTP, VLAN . , VLAN . PerVLAN Spanning Tree (PVST), VLAN. , VLAN CPU. VLAN , STP , . Multiple Spanning Tree Protocol (MSTP), (MSTI - Multiple Spanning Tree Instance) VLAN.

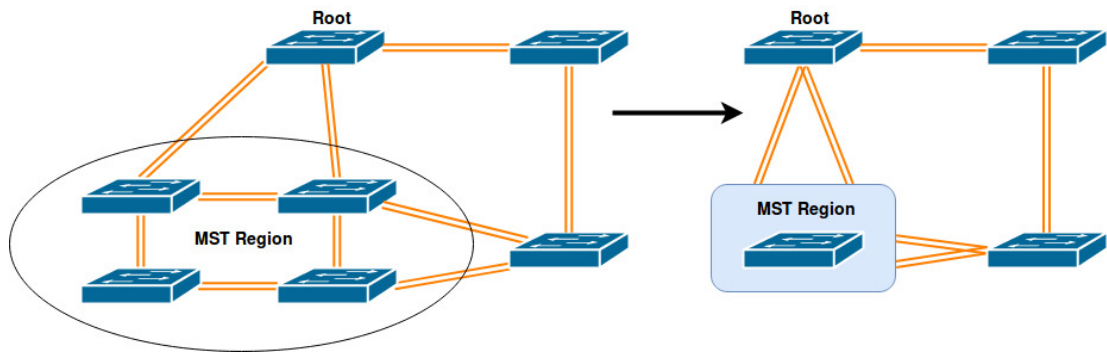
VLAN-MSTI . MSTP BPDU RSTP BPDU. , BPDU MSTI BPDU.

1.1.1. MSTP

, VLAN-MSTI . STP RSTP . MSTP MSID (MST Configuration Identification), :

- MSTP;
- ;
- VLAN-MSTI.

MSID MSTP BPDU , STP RSTP. MSTP BPDU, , STP/RSTP- RSTP BPDU (29.1). - MSTP .



29.1 - MST

MSTP

, (IST - Internal Spanning Tree), . , (,). , ID.

MSTP

(CST - Common Spanning Tree). CST , ID. MSTP CST .

CST IST (CIST - Common and Internal Spanning Tree).

1.1.2.

CIST , RSTP:

- Root port

(MSTI).

- Designated port

, (MSTI).

- Alternate port

Root port.

- Backup port

Designated port.

MSTI - **Master port** - **CIST**.

1.1.3. MSTP

MSTI , **VLAN** , .

1.2. MSTP

1. spanning-tree ;
2. MSTI;
3. MSTP;
4. MSTP;
5. ;
6. MSTP BPDU;
7. ;
8. ;
9. spanning-tree.

1. spanning-tree

spanning-tree no spanning-tree !	spanning-tree. no .
spanning-tree mode {stp rstp mstp} no spanning-tree mode !	spanning-tree. no -.
spanning-tree mcheck !	STP .

2. MSTI

spanning-tree priority <bridge-priority> no spanning-tree priority !	spanning-tree . no -.
spanning-tree mst <instance-id> priority <bridge-priority> no spanning-tree mst <instance-id> priority !	MSTI. no -.

spanning-tree mst <instance-id> cost <cost> no spanning-tree mst <instance-id> cost !	MSTI. no -.
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spanning-tree mst <instance-id> port-priority <port-priority> no spanning-tree mst <instance-id> port-priority !	spanning-tree MSTI. no -.
spanning-tree [mst <instance-id>] rootguard no spanning-tree mst <instance-id> rootguard !	/ rootguard spanning-tree MSTI. rootguard root port.
spanning-tree [mst <instance-id>] loopguard no spanning-tree [mst <instance-id>] loopguard !	/ loopguard spanning-tree MSTI. Loopguard , spanning-tree (, BPDU).

3. MSTP

<i>spanning-tree mst configuration</i> <i>no spanning-tree mst configuration</i> !	MSTI. no MSTI.
show ! MSTI	MSTI.
instance <instance-id> vlan <vlan-list> no instance <instance-id> [vlan <vlan-list>] ! MSTI	VLAN-MSTI.
name <name> no name ! MSTI	MSTP.
revision-level <level> no revision-level ! MSTI	MSTP.
abort ! MSTI	MSTI .

4. MSTP

<i>spanning-tree forward-time <time></i> <i>no spanning-tree forward-time</i> !	Bridge_Forward_Delay . Bridge_Forward_Delay - blocking forwarding.
<i>spanning-tree hello-time <time></i> <i>no spanning-tree hello-time</i> !	Bridge_Hello_Time . Bridge_Hello_Time - spanning-tree BPDU.

spanning-tree maxage <time> no spanning-tree maxage !	Bridge_Max_Age . Bridge_Max_Age - spanning-tree BPDU.
spanning-tree max-hop <hop-count> no spanning-tree max-hop !	Max_Hop, BPDU, .

5.

spanning-tree link-type p2p {auto force-true force-false} no spanning-tree link-type !	. <i>auto</i> - ; <i>force-true</i> - point-to-point; <i>force-false</i> - shared.
spanning-tree portfast [bpdufilter] bpduguard] [recovery <30-3600>] no spanning-tree portfast !	/ portfast spanning-tree . <i>bpdufilter</i> - BPDU; <i>bpduguard</i> - BPDU.

6. MSTP BPDU

spanning-tree format standard spanning-tree format privacy spanning-tree format auto no spanning-tree format !	BPDU. <i>standard</i> - IEEE; <i>privacy</i> - Cisco- ; <i>auto</i> - BPDU.

7.

spanning-tree cost no spanning-tree cost !	spanning-tree.
spanning-tree port-priority no spanning-tree port-priority !	spanning-tree MSTI.

spanning-tree rootguard no spanning-tree rootguard !	/ rootguard spanning-tree. rootguard root port.
spanning-tree transmit-hold-count <tx-hold-count-value> no spanning-tree transmit-hold-count !	BPDU Bridge_Hello_Time.
spanning-tree cost-format {dot1d dot1t} !	. dot1d - 1-65535; dot1t - 1-200000000.

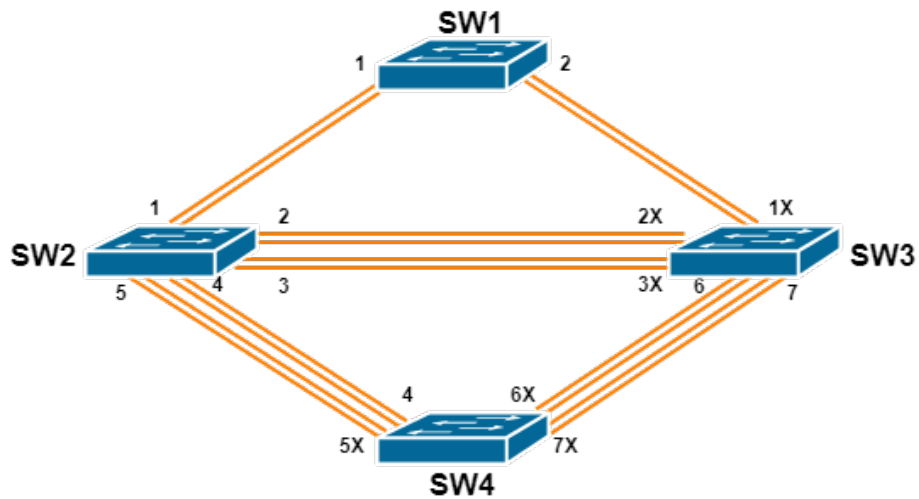
8.

spanning-tree digest-snooping no spanning-tree digest-snooping !	/ spanning-tree.
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9. spanning-tree

spanning-tree tflush {enable disable protect} no spanning-tree tflush !	spanning-tree. disable - FDB ; enable - FDB ; protect - FDB 10 .
spanning-tree tflush {enable disable protect} no spanning-tree tflush !	spanning-tree .

1.3. MSTP



29.2 -

(29.2) spanning-tree MSTP. spanning-tree .

MSTP , SW1, . X blocking, forwarding.

		SW1	SW2	SW3	SW4
MAC-		...00-00-01	...00-00-02	...00-00-03	...00-00-04
		32768	32768	32768	32768
	1	128	128	128	
	2	128	128	128	
	3		128	128	
	4		128		128
	5		128		128
	6			128	128
	7			128	128
	1	200000	200000	200000	
	2	200000	200000	200000	
	3		200000	200000	
	4		200000		200000
	5		200000		200000
	6			200000	200000
	7			200000	200000

:

- VLAN:
 - VLAN 20, 30, 40, 50 SW2, SW3 SW4;
 - 1-7 SW2, SW3 SW4 trunk.
- MSTP:
 - SW2, SW3 SW4 MSTP;
 - VLAN 20 30 - MSTI 3;
 - VLAN 40 50 - MSTI 4.
- , MSTI:

- SW3 0 MSTI 3;
- SW4 0 MSTI 4;

:

SW2

```
SW2(config)#vlan 20
SW2(Config-Vlan20)#exit
SW2(config)#vlan 30
SW2(Config-Vlan30)#exit
SW2(config)#vlan 40
SW2(Config-Vlan40)#exit
SW2(config)#vlan 50
SW2(Config-Vlan50)#exit
SW2(config)#spanning-tree mst configuration
SW2(Config-Mstp-Region)#name sw2-sw3-sw4
SW2(Config-Mstp-Region)#instance 3 vlan 20;30
SW2(Config-Mstp-Region)#instance 4 vlan 40;50
SW2(Config-Mstp-Region)#exit
SW2(config)#interface e1/0/1-7
SW2(Config-Port-Range)#switchport mode trunk
SW2(Config-Port-Range)#exit
SW2(config)#spanning-tree
```

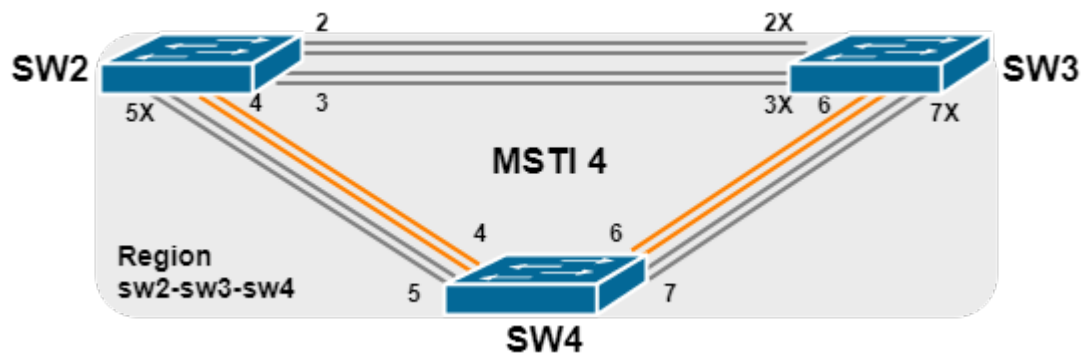
SW3

```
SW3(config)#vlan 20
SW3(Config-Vlan20)#exit
SW3(config)#vlan 30
SW3(Config-Vlan30)#exit
SW3(config)#vlan 40
SW3(Config-Vlan40)#exit
SW3(config)#vlan 50
SW3(Config-Vlan50)#exit
SW3(config)#spanning-tree mst configuration
SW3(Config-Mstp-Region)#name sw2-sw3-sw4
SW3(Config-Mstp-Region)#instance 3 vlan 20;30
SW3(Config-Mstp-Region)#instance 4 vlan 40;50
SW3(Config-Mstp-Region)#exit
SW3(config)#interface e1/0/1-7
SW3(Config-Port-Range)#switchport mode trunk
SW3(Config-Port-Range)#exit
SW3(config)#spanning-tree
SW3(config)#spanning-tree mst 3 priority 0
```

SW4

SW1 MST 0 . sw2-sw3-sw4 SW2 MSTI 0, SW3 - MSTI 3, SW4 - MSTI 4.
MSTP MSTI 0, MSTI 3, MSTI 4. X blocking, forwarding.





29.5 - MSTI 4

1.4. MSTP

- MSTP , MSTP .
- MSTP , MSTP :

```
2 x (Bridge_Forward_Delay - 1 sec) >= Bridge_Max_Age
Bridge_Max_Age >= 2 x (Bridge_Hello_Time + 1 sec)
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- , MSTP .