



**Department of Computer
Science and Engineering**

Advanced Computer Networks

UE16CS346

Lab Assignment: RSTP

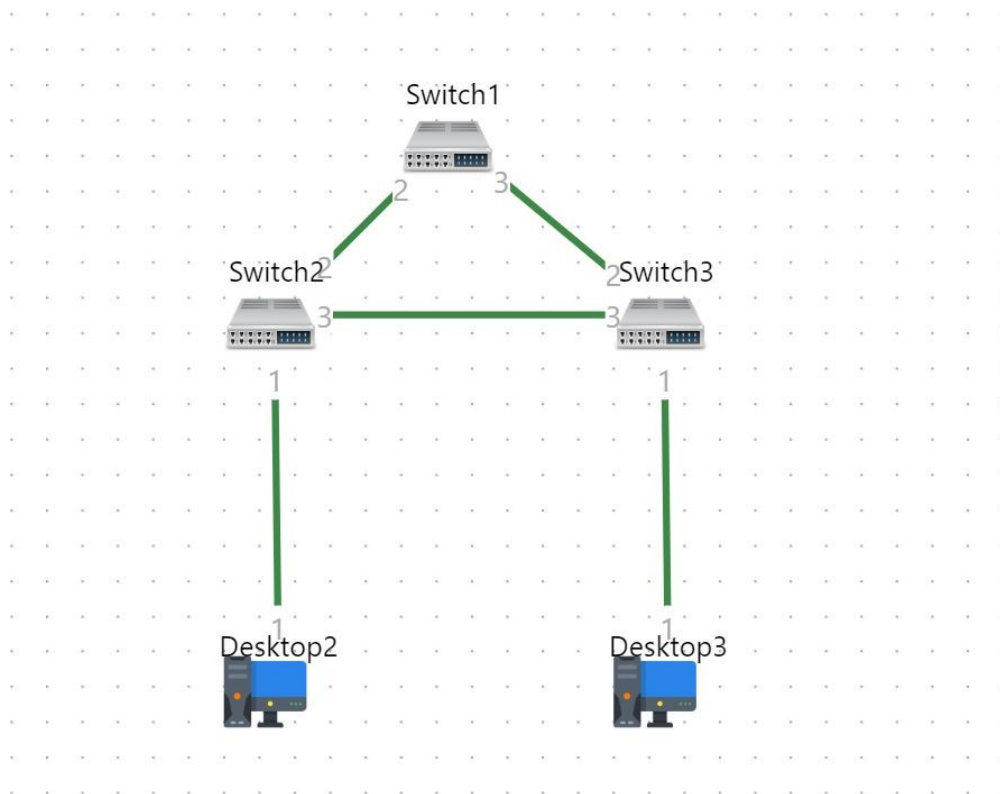
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Introduction

Nowadays we see more and more routing in our networks. Routing protocols like OSPF and EIGRP are much faster than spanning-tree when they have to deal with changes in the network. To keep up with the speed of these routing protocols another flavor of spanning-tree was created rapid spanning-tree. Rapid spanning-tree is not a revolution of the original spanning-tree but an evolution. Behind the scenes some things have been changed to speed up the process, configuration-wise it's the same as what you have seen so far.

RSTP is a network protocol that ensures a loop-free topology for Ethernet networks. RSTP defines three port states: discarding, learning, and forwarding and five port roles: root, designated, alternate, backup, and disabled.

• Topology



Procedure

Enable RSTP

```
> modify parameter-group bridge system
> set spanning-tree enable yes
> set spanning-tree mode rstp
> save

> modify parameter- group fast-
ethernet{ shelf- 1{ active-controller base-slot}
port-1  }
> enter spanning-tree
> modify parameter- group fast-
ethernet{ shelf- 1{ active-controller base-slot}
port-2  }
> set enable yes> show draft -e
```

Enable RSTP on all active ports of switches.

```
link-type point-to-point
root-protect disable
block-bpdu-on-edge no
rstp {
    priority 128
    path-cost {
        selection automatic
        value 200000
    }
}
mstp {
    priority 128
    hello-time 2
    path-cost {
        selection automatic
        value 200000
    }
    instance [+] {
configure> set enable yes
configure> save
Info: No modifications to save
configure> EXIT
Switch-operational> show spanning-tree summary

> Bridge : system

Mode                               : rstp
Bridge role                         : Root bridge
Bridge priority                     : 32768
Bridge identifier                   : 32768:0:00:a2:26:00:06:
Root bridge identifier              : 32768:0:00:a2:26:00:06:
Root path cost                      : 0

Total number of stp bridges displayed : 1
```

```

Login: test
Password:
Switch-operations> show spanning-tree member summary system

> Bridge : system

>> Port-type : fast-ethernet

Location                                     State      Role
-----
{ shelf-1 { active-controller base-slot } port-1 } forwarding designated
{ shelf-1 { active-controller base-slot } port-2 } forwarding designated

Number of STP member(s) displayed : 2
Total number of STP member(s) displayed : 2

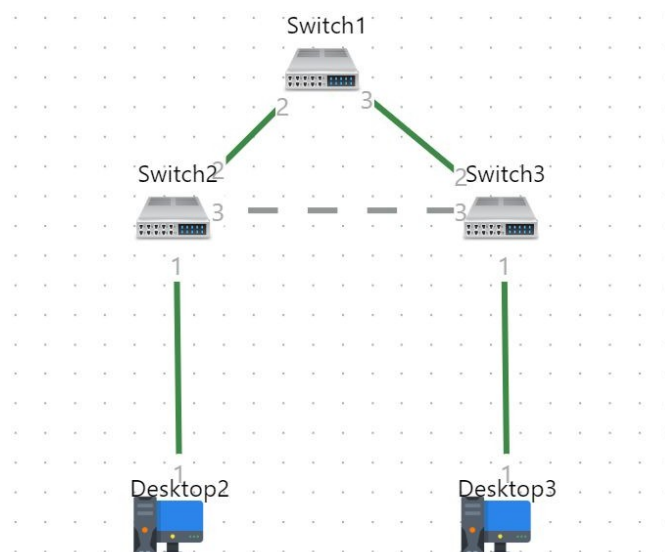
Switch-operations>

```

Wireshark Output

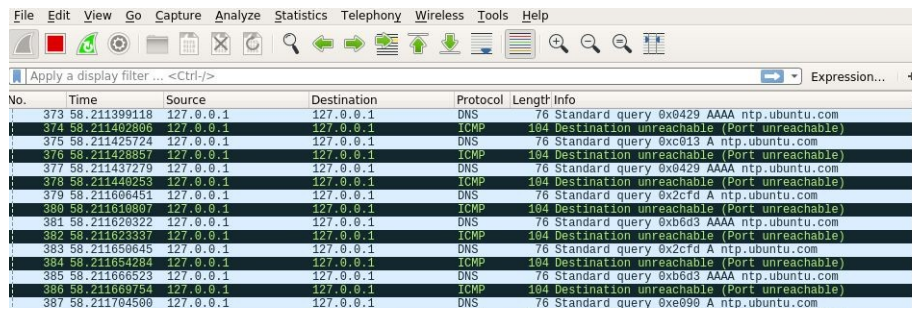
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000000	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=6/1536, ttl=64...
2	0.000026345	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=6/1536, ttl=64...
3	0.687213633	00:a2:26:00:07:e6	192.168.1.2	STP	55	RST. Root = 32768/0/00:a2:26:00:06:d7 Cost = 2000...
4	0.996606276	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=7/1792, ttl=64...
5	0.996631643	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=7/1792, ttl=64...
6	1.998400016	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=8/2048, ttl=64...
7	1.998439691	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=8/2048, ttl=64...
8	2.693619758	00:a2:26:00:07:e6	192.168.1.2	STP	55	RST. Root = 32768/0/00:a2:26:00:06:d7 Cost = 2000...
9	3.000164910	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=9/2304, ttl=64...
10	3.000356184	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=9/2304, ttl=64...
11	4.002101337	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=10/2560, ttl=6...
12	4.002156248	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=10/2560, ttl=6...
13	4.690567515	00:a2:26:00:07:e6	192.168.1.2	STP	55	RST. Root = 32768/0/00:a2:26:00:06:d7 Cost = 2000...
14	5.003169796	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=11/2816, ttl=6...
15	5.003202480	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=11/2816, ttl=6...
16	6.004892393	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=12/3072, ttl=6...
17	6.004921203	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=12/3072, ttl=6...
18	6.687194572	00:a2:26:00:07:e6	192.168.1.2	STP	55	RST. Root = 32768/0/00:a2:26:00:06:d7 Cost = 2000...
19	7.006907816	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=13/3328, ttl=6...

Cut one of the links.



Wireshark Output

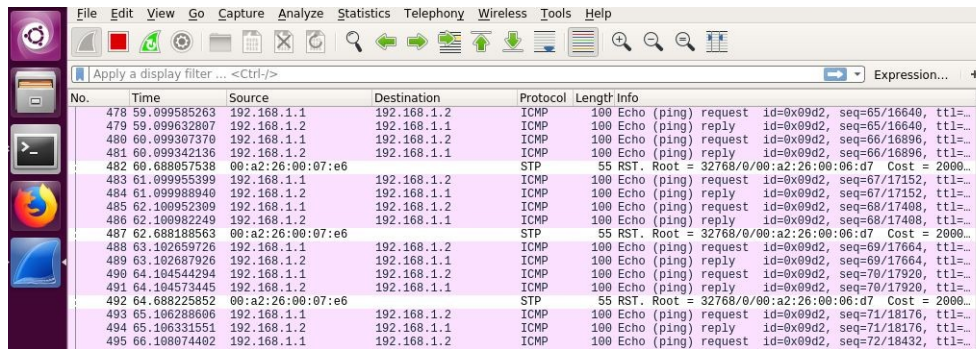
We can see that the packets are dropped since one of the links are cut.



The screenshot shows a Wireshark packet capture with a display filter of <Ctrl-/>. The packet list shows a series of DNS queries from 127.0.0.1 to 127.0.0.1. Each query is followed by an ICMP 'Destination unreachable (Port unreachable)' message. The packet details pane shows the structure of these packets, including the DNS Standard query and the ICMP header and payload.

No.	Time	Source	Destination	Protocol	Length	Info
373	58.211399118	127.0.0.1	127.0.0.1	DNS	76	Standard query 0x0429 AAAA ntp.ubuntu.com
374	58.211402806	127.0.0.1	127.0.0.1	ICMP	104	Destination unreachable (Port unreachable)
375	58.211425724	127.0.0.1	127.0.0.1	DNS	76	Standard query 0xc013 A ntp.ubuntu.com
376	58.211428857	127.0.0.1	127.0.0.1	ICMP	104	Destination unreachable (Port unreachable)
377	58.211437270	127.0.0.1	127.0.0.1	DNS	76	Standard query 0x0429 AAAA ntp.ubuntu.com
378	58.211440253	127.0.0.1	127.0.0.1	ICMP	104	Destination unreachable (Port unreachable)
379	58.211606451	127.0.0.1	127.0.0.1	DNS	76	Standard query 0x2cfd A ntp.ubuntu.com
380	58.211610807	127.0.0.1	127.0.0.1	ICMP	104	Destination unreachable (Port unreachable)
381	58.211620322	127.0.0.1	127.0.0.1	DNS	76	Standard query 0xb6d3 AAAA ntp.ubuntu.com
382	58.211623337	127.0.0.1	127.0.0.1	ICMP	104	Destination unreachable (Port unreachable)
383	58.211650845	127.0.0.1	127.0.0.1	DNS	76	Standard query 0x2cfd A ntp.ubuntu.com
384	58.211654284	127.0.0.1	127.0.0.1	ICMP	104	Destination unreachable (Port unreachable)
385	58.211665523	127.0.0.1	127.0.0.1	DNS	76	Standard query 0xb6d3 AAAA ntp.ubuntu.com
386	58.211669754	127.0.0.1	127.0.0.1	ICMP	104	Destination unreachable (Port unreachable)
387	58.211704560	127.0.0.1	127.0.0.1	DNS	76	Standard query 0xe090 A ntp.ubuntu.com

Reconfigure STP



The screenshot shows a Wireshark packet capture with a display filter of <Ctrl-/>. The packet list shows a series of STP RST messages from 192.168.1.1 to 192.168.1.2. Each RST message is followed by an ICMP Echo request and its corresponding reply. The packet details pane shows the structure of these packets, including the STP RST message and the ICMP Echo request and reply.

No.	Time	Source	Destination	Protocol	Length	Info
478	59.099585263	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=65/16640, ttl=...
479	59.099632807	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=65/16640, ttl=...
480	60.099307370	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=66/16896, ttl=...
481	60.099342136	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=66/16896, ttl=...
482	60.688057538	00:a2:26:00:07:e6	192.168.1.2	STP	55	RST. Root = 32768/0/00:a2:26:00:06:d7 Cost = 2000...
483	61.099955399	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=67/17152, ttl=...
484	61.099988940	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=67/17152, ttl=...
485	62.100952309	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=68/17488, ttl=...
486	62.100982249	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=68/17488, ttl=...
487	62.608188563	00:a2:26:00:07:e6	192.168.1.2	STP	55	RST. Root = 32768/0/00:a2:26:00:06:d7 Cost = 2000...
488	63.102659726	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=69/17664, ttl=...
489	63.102687926	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=69/17664, ttl=...
490	64.104544294	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=70/17920, ttl=...
491	64.104573445	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=70/17920, ttl=...
492	64.688225852	00:a2:26:00:07:e6	192.168.1.2	STP	55	RST. Root = 32768/0/00:a2:26:00:06:d7 Cost = 2000...
493	65.106288806	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=71/18176, ttl=...
494	65.106331551	192.168.1.2	192.168.1.1	ICMP	100	Echo (ping) reply id=0x09d2, seq=71/18176, ttl=...
495	66.108074402	192.168.1.1	192.168.1.2	ICMP	100	Echo (ping) request id=0x09d2, seq=72/18432, ttl=...

Update Root Bridge to a new value

- > modify parameter-group bridge system
- > set spanning-tree rstp priority 4096
- > save

Root bridge before and after update

```
Switch-operational> show spanning-tree summary

> Bridge : system

Mode                : rstp
Bridge role         : Non-root bridge
Bridge priority     : 32768
Bridge identifier    : 32768:0:00:a2:26:00:09:e7
Root bridge identifier : 32768:0:00:a2:26:00:06:f5
Root path cost      : 2000000
Root port type      : fast-ethernet
Root port location  : { shelf-1 { active-controller base-slot } port-2 }

Total number of stp bridges displayed : 1
```

```
Switch-operational> show spanning-tree summary

> Bridge : system

Mode                : rstp
Bridge role         : Root bridge
Bridge priority     : 4096
Bridge identifier    : 4096:0:00:a2:26:00:09:e7
Root bridge identifier : 4096:0:00:a2:26:00:09:e7
Root path cost      : 0

Total number of stp bridges displayed : 1

Switch-operational> show spanning-tree member summary system

> Bridge : system
>> Port-type : fast-ethernet



| Location                                           | State      | Role       |
|----------------------------------------------------|------------|------------|
| { shelf-1 { active-controller base-slot } port-1 } | forwarding | designated |
| { shelf-1 { active-controller base-slot } port-2 } | forwarding | designated |



Number of STP member(s) displayed : 2
Total number of STP member(s) displayed : 2
```