

## **IT Technology 2. sem**

### **Loop avoidance with RSTP**



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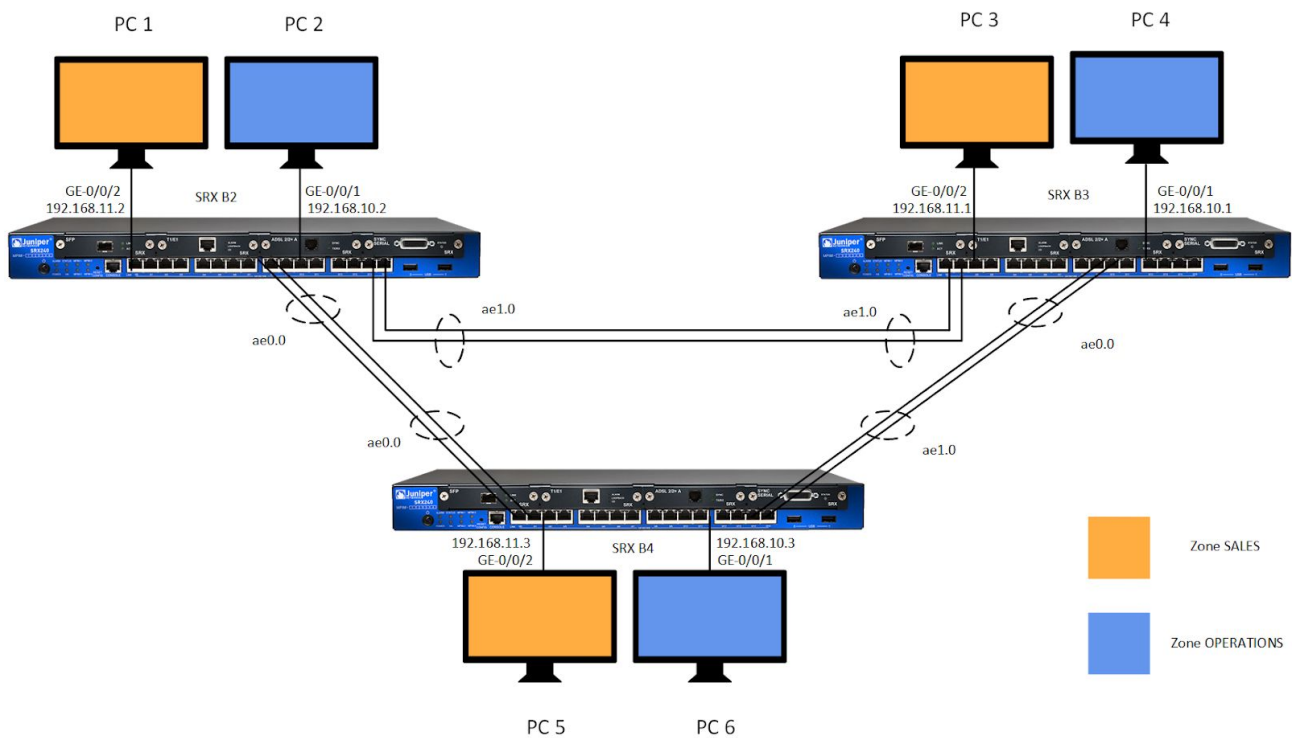
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## Table of Contents

A HLD with explanation	2
<b>An inventory of used devices.</b>	<b>3</b>
A Low Level Design	4
<b>Show and comment on Interfaces and routing tables in/on the SRX</b>	<b>5</b>
A filled out test plan	6
<b>Test “connection” from e.g. PC3 to web server 1 without and with STP.</b>	<b>7</b>
<b>Explain what “convergence time” means when using STP</b>	<b>8</b>
<b>Put the router configuration and the topology diagram in GitHub</b>	<b>9</b>

## A HLD with explanation



In the topology above, 3 SRX routers are connected together, each with multiple redundant connections or aggregated links (802.3ad).

There are 2 parallel networks that simultaneously use this network hardware which are separated using tagged traffic (802.1q).

There are 6 PC's that are connected in total, with 2 on each SRX router (one PC operates on zone OPERATIONS and the other on zone SALES).

**An inventory of used devices.**

- SRX-B2
  - SRX240 Router
- SRX-B3
  - SRX240 Router
- SRX-B4
  - SRX240 Router
- Bunch of straight through ethernet cables with RJ45 connectors
- 1 Cisco Hub
- 3 PCs
- 3 x USB to RJ45 converter cable

## A Low Level Design

LOW LEVEL DESIGN ass11						
INSTANCE TYPE	INTERFACE	IP ADDRESS	VLAN ID	MASK	CONNECTS TO	Comments
SRX240-B2	ge-0/0/1	192.168.10.2	VLAN-10	/24	PC1	OPERATIONS vlan
	ge-0/0/2	192.168.11.2	VLAN-20	/24	PC2	SALES vlan
	ge-0/0/3				SRX240-B3	ae0
	ge-0/0/4				SRX240-B3	ae0
	ge-0/0/7				SRX240-B4	ae1
	ge-0/0/8				SRX240-B4	ae1
SRX240-B3	ge-0/0/1	192.168.10.1	VLAN-10	/24	PC3	OPERATIONS vlan
	ge-0/0/2	192.168.11.1	VLAN-20	/24	PC4	SALES vlan
	ge-0/0/3				SRX240-B2	ae0
	ge-0/0/4				SRX240-B2	ae0
	ge-0/0/7				SRX240-B4	ae1
	ge-0/0/8				SRX240-B4	ae1
SRX240-B4	ge-0/0/1	192.168.10.3	VLAN-10	/24	PC5	OPERATIONS vlan
	ge-0/0/2	192.168.11.3	VLAN-20	/24	PC6	SALES vlan
	ge-0/0/3				SRX240-B3	ae0
	ge-0/0/4				SRX240-B3	ae0
	ge-0/0/7				SRX240-B2	ae1
	ge-0/0/8				SRX240-B2	ae1
PC1	eth0	192.168.10.100		/24	SRX240-B2	
PC2	eth0	192.168.11.100		/24	SRX240-B2	
PC3	eth0	192.168.10.20		/24	SRX240-B3	
PC4	eth0	192.168.11.20		/24	SRX240-B3	
PC5	eth0	192.168.10.88		/24	SRX240-B4	
PC6	eth0	192.168.11.88		/24	SRX240-B4	

## Show and comment on Interfaces and routing tables in/on the SRX

Below is the routing table and interface list for SRXB-3.

```
root@SRXB-3> show route terse
```

```
inet.0: 4 destinations, 4 routes (4 active, 0 holddown, 0 hidden)
```

```
+ = Active Route, - = Last Active, * = Both
```

A	Destination	P	Prf	Metric 1	Metric 2	Next hop	AS path
*	192.168.10.0/24	D	0			>vlan.10	
*	192.168.10.1/32	L	0			Local	
*	192.168.11.0/24	D	0			>vlan.11	
*	192.168.11.1/32	L	0			Local	

As shown above, the router knows what interfaces to forward traffic out on.

```
root@SRXB-3> show interfaces terse
```

Interface	Admin	Link	Proto	Local	Remote
ge-0/0/1	up	down			
ge-0/0/1.0	up	down	eth-switch		
ge-0/0/2	up	down			
ge-0/0/2.0	up	down	eth-switch		

Interface ge-0/0/1 and ge-0/0/2 connect from the routers to the PCs.

ge-0/0/3	up	up			
ge-0/0/3.0	up	up	aenet	--> ae0.0	
ge-0/0/4	up	down			
ge-0/0/4.0	up	down	aenet	--> ae0.0	

Interface ge-0/0/3 through 0/0/6 are aggregated, although only 3 and 4 are used currently.

ge-0/0/7	up	up			
ge-0/0/7.0	up	up	aenet	--> ae1.0	
ge-0/0/8	up	down			
ge-0/0/8.0	up	down	aenet	--> ae1.0	

Interface ge-0/0/7 through 0/0/10 are aggregated, although only 7 and 8 are used currently.

ae0	up	up			
ae0.0	up	up	eth-switch		
ae1	up	up			
ae1.0	up	up	eth-switch		

The aggregated interfaces are used to connect the three routers in a loop.

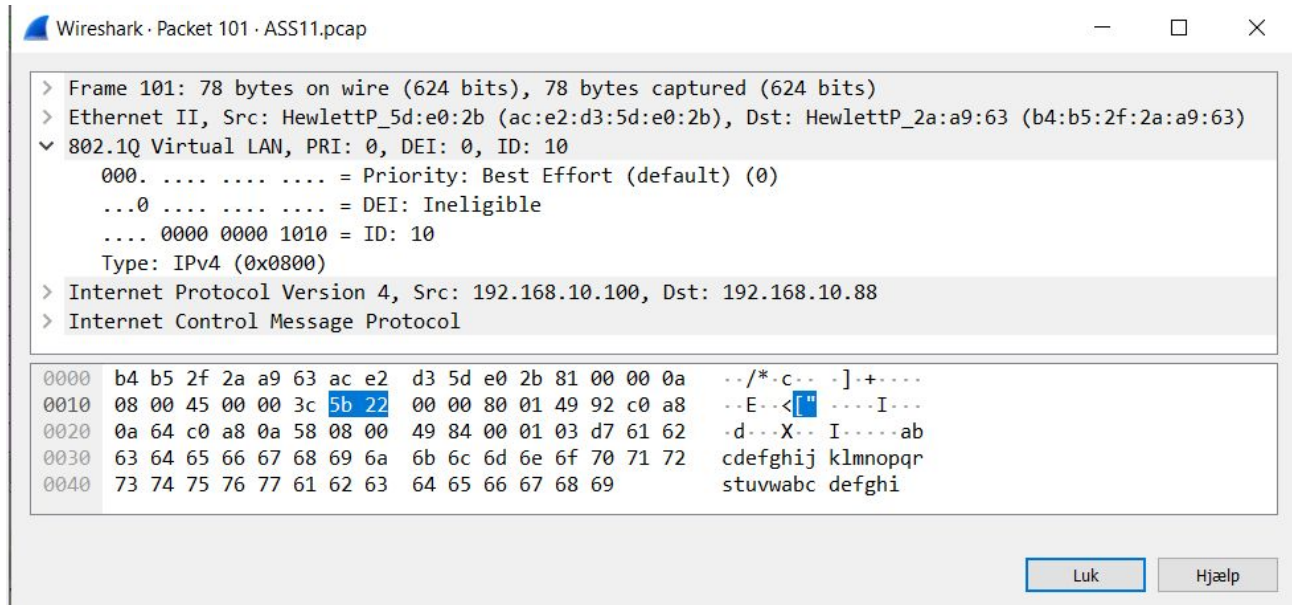
vlan	up	up			
vlan.10	up	up	inet	192.168.10.1/24	
vlan.11	up	up	inet	192.168.11.1/24	

Vlan.10 is used for Operations, and vlan.11 is used for Sales.

## A filled out test plan

TEST PLAN			
ASSERTION	METHOD	EXPECTED RESULT	SUCCESS
VLAN10 (SRX-B2) can ping VLAN10 (SRX-B3) with 2 cables connecting the routers	PING from PC1 to PC3	Ping replies received	✓
VLAN10 (SRX-B2) can ping VLAN10 (SRX-B4) with 2 cables connecting the routers	PING from PC2 to PC4	Ping replies received	✓
VLAN10 (SRX-B3) can ping VLAN10 (SRX-B4) with 2 cables connecting the routers	PING from PC2 to PC4	Ping replies received	✓
VLAN10 (SRX-B2) can ping VLAN10 (SRX-B3) with 1 cable connecting the routers	PING from PC1 to PC3	Ping replies received	✓
VLAN10 (SRX-B2) can ping VLAN10 (SRX-B4) with 1 cable connecting the routers	PING from PC1 to PC3	Ping replies received	✓
VLAN10 (SRX-B3) can ping VLAN10 (SRX-B4) with 1 cable connecting the routers	PING from PC1 to PC3	Ping replies received	✓
VLAN10 (SRX-B2) can't ping VLAN10 (SRX-B3) with 0 cables connecting the routers	PING from PC1 to PC3	Ping replies not received	✓
VLAN10 (SRX-B2) can't ping VLAN10 (SRX-B4) with 0 cables connecting the routers	PING from PC1 to PC3	Ping replies not received	✓
VLAN10 (SRX-B3) can't ping VLAN10 (SRX-B4) with 0 cables connecting the routers	PING from PC1 to PC3	Ping replies not received	✓
The order of the cables connecting the routers doesn't matter	Swap the cables and PING from PC2 to PC4	Ping replies received	✓
Capturing Tagged packets with Wireshark	PING from PC2 to PC4 through a HUB	802.1Q appears in captured packets	✓

## Test “connection” from e.g. PC3 to web server 1 without and with STP.



When STP is turned on, pinging between the hosts works.

56607	6.055125	192.168.10.88	192.168.10.255	UDP	309 54915 → 54915 Len=263
56608	6.055194	HewlettP_5d:e0:2b	Broadcast	ARP	64 Who has 192.168.10.88? Tell 192.168.10.100
56609	6.055264	HewlettP_2a:a9:63	HewlettP_5d:e0:2b	ARP	64 192.168.10.88 is at b4:b5:2f:2a:a9:63
56610	6.055342	192.168.10.1	192.168.10.88	ICMP	74 Destination unreachable (Network unreachable)
56611	6.055421	192.168.10.1	192.168.10.88	ICMP	74 Destination unreachable (Network unreachable)
56612	6.055501	192.168.10.1	192.168.10.88	ICMP	74 Destination unreachable (Network unreachable)

When STP is turned off, the network is flooded with traffic, and pinging fails.



## **Explain what “convergence time” means when using STP**

While STP can take up to 50 seconds to respond to a topology change, RSTP is typically able to respond to changes within 6 seconds. This response time is called convergence time.

## Put the router configuration and the topology diagram in GitHub

[Diagram](#)<sup>1</sup>

[Config](#)<sup>2</sup>

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<sup>1</sup> [https://github.com/Sebski123/Network/blob/master/ITT2/ass11LoopAvoidanceWithRSTP/Diagrams/ITT\\_ass11.pdf](https://github.com/Sebski123/Network/blob/master/ITT2/ass11LoopAvoidanceWithRSTP/Diagrams/ITT_ass11.pdf)

<sup>2</sup> [https://github.com/Sebski123/Network/blob/master/ITT2/ass11LoopAvoidanceWithRSTP/Router\\_configs/ass11.json](https://github.com/Sebski123/Network/blob/master/ITT2/ass11LoopAvoidanceWithRSTP/Router_configs/ass11.json)