

MPLS saved money for Swedish Municipality

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Wroclaw

Old solution

- Multiple VLAN to each site with leased line
- No freedom on amount of VLAN ids
- No freedom on VLAN ids
- Only provider tos = fixed
- Only ADSL to a lot of the locations 2m/512k

New solution

- RB1000 as router in main server room.
- RB450 and RB750G client routers.
- RIC/522T if no connectivity
- MPLS on all Link interfaces.
- VPLS to all sites.

Benefit's

- Full freedom on VLAN ids.
- No extra fee for configuration of VLAN only Ethernet needed on leased lines.
- QoS with RouterOS.
- Not only ADSL.
- Possibility to get more speed up to 100M/100M.

Problems in rollout

- CMTS filtering MPLS in bridge mode “Arris C3” solution using PPPoE client on sub office router.
- MTU on PPPoE clients.
- Mixed mode in routing OSPF and MPLS. Filtering needed.

Configuration in HQ

RouterOS WinBox

WinBox v4.0 on RB1000 (powerpc)

137d 11:45:24 Memory: 487.9 MB CPU: 0% Hide Passwords

Interfaces

- Wireless
- Bridge
- PPP
- Mesh
- IP
- MPLS
- VPLS
- Routing
- System
- Queues
- Files
- Log
- Radius
- Tools
- New Terminal
- MetaROUTER
- Make Supout.rif
- Manual
- Exit

Bridge

Bridge Ports Filters NAT Hosts Settings Find

Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	Rx Drops	Tx Errors	Rx Errors	MAC Address	Prot
Loopback_Bridge												
R bridge1	Bridge	65535	0 bps	0 bps	0	0	0	0	0	0		none
R VPLS-Bridge (SHL) bridge2	Bridge	1500	0 bps	4.6 kbps	0	7	0	0	0	0	00:0C:42:43:68:2D	rstp

Address List

Address is 10.9.9.5 Filter

Address	Network	Broadcast	Interface
10.9.9.5	10.9.9.5	10.9.9.5	bridge1

1 item out of 3

2 items out of 14

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Configuration in HQ

WinBox v4.0 on RB1000 (powerpc)

137d 11:32:24 Memory: 487.9 MiB CPU: 0% ☒ Hide Passwords

RouterOS WinBox

Interfaces
Wireless
Bridge
PPP
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Route List

Routes Nexthops Rules VRF

Find all

	Dist.	Address	Gateway	Distance	Routing Mark	Pref.	Source
AS	▶ 10.9.9.1		reachable ether1	1			
AS	▶ 10.9.9.2		reachable ether1	1			
AS	▶ 10.9.9.3		reachable ether1	1			
AS	▶ 10.9.9.4		reachable ether1	1			
DAC	▶ 10.9.9.5	bridge1		0		10.9.9.5	
AS	▶ 10.9.9.6		reachable ether1	1			
AS	▶ 10.9.9.7		reachable ether1	1			
AS	▶ 10.9.9.8		reachable ether1	1			
AS	▶ 10.9.9.9		reachable ether1	1			
AS	▶ 10.9.9.10		reachable ether1	1			
AS	▶ 10.9.9.11		reachable ether1	1			
AS	▶ 10.105.0.0/24		reachable ether1	1			
DAC	▶ 91.213.179.0/...	ether1		0			
DAC	▶ 192.168.12.0/...	vlan50		0			
AS	▶ 192.168.12.0/...		reachable vlan50	1			

15 items

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Configuration in HQ

RouterOS WinBox

- WinBox v4.0 on RB1000 (powerpc)

137d 11:34:42 Memory:487.9 MiB CPU:0% ☒ Hide Passwords

Interfaces

- Wireless
- Bridge
- PPP
- Mesh
- IP
- MPLS**
- VPLS
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MPLS

LDP Interface LDP Neighbor Accept Filter Advertise Filter Forwarding Table MPLS Interface Local Bindings Remote Bindings

MPLS Settings LDP Settings Find

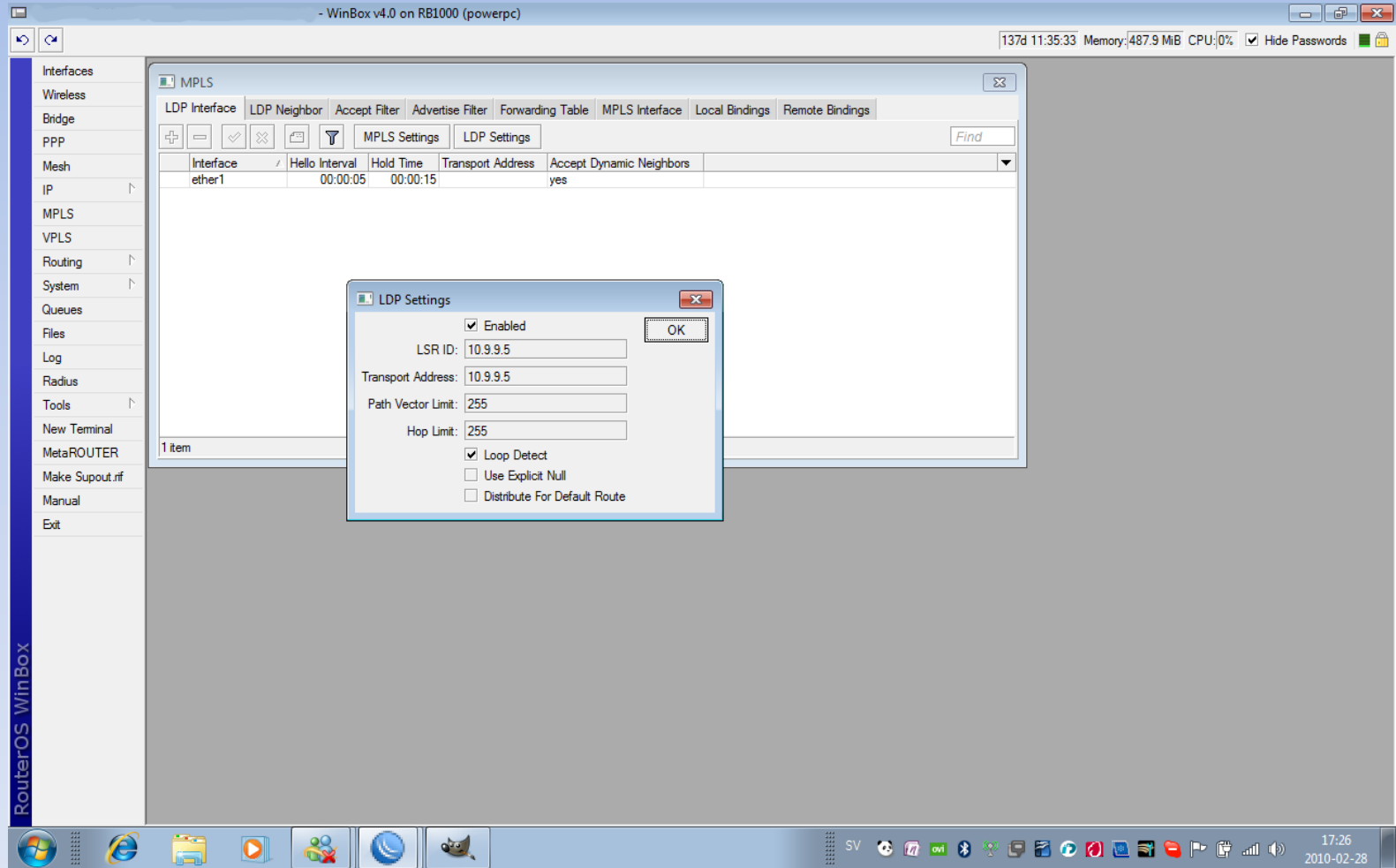
Interface	Hello Interval	Hold Time	Transport Address	Accept Dynamic Neighbors
ether1	00:00:05	00:00:15		yes

1 item

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2010-02-28

Configuration in HQ



Configuration in HQ

RouterOS WinBox

- WinBox v4.0 on RB1000 (powerpc)

137d 11:37:20 Memory: 487.9 MiB CPU: 0% ☒ Hide Passwords

Interfaces
Wireless
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VPLS

VPLS BGP VPLS Cisco BGP VPLS

Find

	Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	Rx Drops	Tx Errors	Rx Errors	Remote Peer	VPLS ID
R	VPLS-Storgatan_57	VPLS	1500	3.7 kbps	0 bps	6	0	0	0	3	0	10.9.9.3	0.0.0.1:1
R	VPLS-Grasstigen_2	VPLS	1500	1465 bps	3.7 kbps	3	4	0	0	1	0	10.9.9.6	0.0.0.1:2
R	VPLS-Grasstigen_9	VPLS	1500	5.1 kbps	0 bps	7	0	0	0	0	0	10.9.9.7	0.0.0.1:3
R	VPLS-Parkgatan_7	VPLS	1500	5.1 kbps	0 bps	7	0	0	0	0	0	10.9.9.8	0.0.0.1:4
R	VPLS-Storgatan_42	VPLS	1500	0 bps	0 bps	0	0	0	0	0	0	10.9.9.9	0.0.0.1:5
R	VPLS-Havrestigen_1	VPLS	1500	5.1 kbps	0 bps	7	0	0	0	1	0	10.9.9.10	0.0.0.1:6
R	VPLS-V-Jamsvågsgatan_14	VPLS	1500	5.1 kbps	0 bps	7	0	0	0	1	0	10.9.9.11	0.0.0.1:7

7 items out of 14 (1 selected)

SV 17:27
2010-02-28



Configuration in HQ

RouterOS WinBox

WinBox v4.0 on RB1000 (powerpc)

137d 11:46:38 Memory: 487.9 MiB CPU: 1% Hide Passwords

Interfaces

- Wireless
- Bridge
- PPP
- Mesh
- IP
- MPLS
- VPLS
- Routing
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Bridge

Bridge Ports Filters NAT Hosts

Find

Interface	Bridge	Priority (h...)	Path Cost	Horizon	Role	Root Pat...
ether2	bridge2	80	10		designated port	
vpls1	bridge2	80	10		designated port	
vpls2	bridge2	80	10		designated port	
vpls3	bridge2	80	10		designated port	
vpls4	bridge2	80	10		designated port	
vpls5	bridge2	80	10		disabled port	
vpls6	bridge2	80	10		designated port	
vpls7	bridge2	80	10		designated port	

8 items

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2010-02-28

Configuration in ISP routers

- LDP settings only on the interfaces facing sub offices and HQ
- Local loop setting as all routers in the MPLS cloud
- No VPLS settings
- Only setup if a new office are added to the cloud

Configuration in sub office

- All routers same config except local loop IP
- Saves time in rollout
- All VPLS settings pointing at the HQ local loop address

RouterOS WinBox

- WinBox v4.2 on RB750 (mipsbe)

97d 11:29:12 Memory: 19.6 MiB CPU: 3% Hide Passwords

Interfaces

- Bridge
- PPP
- Switch
- Mesh
- IP
- MPLS
- VPLS
- Routing
- System
- Queues
- Files
- Log
- Radius
- Tools
- New Terminal
- MetaROUTER
- Make Supout.nf
- Manual
- Exit

VPLS

VPLS BGP VPLS Cisco BGP VPLS

Find

Name	Type	L2 MTU	Tx	Rx	Tx Pac...	Rx Pac...	Tx Drops	Rx Drops	Tx Errors	Rx Errors	Remote Peer	VPLS ID
... VPLS-V-Jamsvagsgatan_14												
R vpls1	VPLS	1500	0 bps	1465 bps	0	3	0	0	0	0	10.9.9.5	0.0.0.1:7

Interface <vpls1>

General Status Traffic OK Torch

Name: vpls1

Type: VPLS

MTU: 1500

L2 MTU: 1500

MAC Address: 02:64:8C:75:3F:D1

ARP: enabled

Remote Peer: 10.9.9.5

VPLS ID: 0.0.0.1:7

☐ Cisco Style

Cisco Style ID: 0

Advertised L2MTU: 1500

PW Type: raw ethernet

disabled running slave BGP signaled Cisco BGP Si...

01:14
2010-03-01

What's new in 4.6 Multicast!!

- *) remove limit on number of multicast enabled interfaces, maximum was 32;

Router running 299!! interfaces

WinBox v4.6 on RB1000 (powerpc)

Memory: 444.4 MiB | 4d 06:14:28 | CPU: 25% | Hide Passwords

RouterOS WinBox

Interfaces

Wireless

Bridge

PPP

Mesh

IP

MPLS

VPLS

Routing

System

Queues

Files

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Radius

Tools

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Manual

Exit

PIM

Interface RP BSR Candidates RP Candidates Neighbors BSR MRIB MFC Joins IGMP Groups

Settings

Find

Interface	RP	BSR Candidates	RP Candidates	Neighbors	BSR	MRIB	MFC	Joins	IGMP Groups
DR <2p-950122168...									
DR <2p-950466048...									
DR <2p-950466167...									
DR <2p-950467807...									
DR <2p-950478689...									
DR <2p-950563077...									
DR <2p-950563225...									
DR <2p-951272522...									
DR <2p-951272915...									
DR <2p-951274197...									
DR <2p-951276082...									
DR <2p-951276370...									
DR <2p-951278272...									
DR <2p-952298457...									
DR <2p-952373836...									
DR <2p-952384993...									
DR <2p-952440575...									
DR <2p-952452014...									
DR <2p-952453458...									
DR <2p-952455170...									
DR <2p-952487034...									
DR <2p-952493532...									
DR <2p-952497532...									
DR <2p-952498012...									
DR <2p-952510551...									
DR <2p-952517186...									
DR <2p-952522508...									
DR <2p-952523541...									
DR <2p-952531575...									
DR <2p-952532665...									
DR <2p-952534088...									
DR <2p-952535295...									
DR <2p-952581003...									
DR <2p-952668949...									
DR <2p-95276349...									
DR <2p-9528...									
DR <2p-95...									
DR <2p-952888309...									
DR <2p-95...									

299 items out of 1

299 items out of 1

17:17
2010-02-28

5 Different streams to clients

WinBox v4.6 on RB1000 (powerpc)

Memory: 450.8 MiB | 4d 06:17:47 CPU: 18% | Hide Passwords

RouterOS WinBox

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Wireless
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PIM

Interface	RP	BSR Candidates	RP Candidates	Neighbors	BSR	MRIB	MFC	Joins	IGMP Groups
Group	Source	RP	Incoming Interface	Outgoing Interface					
234.4.90.63	10.10.10.50	10.111.0.3	ether4	<2p-965756341@adsl.adslservice>					
234.5.90.101	10.10.10.21	10.111.0.3	ether4	<2p-966774785@adsl.adslservice>					
234.5.90.106	10.10.10.26	10.111.0.3	ether4	<2p-965795356@adsl.adslservice>					
234.5.90.109	10.10.10.33	10.111.0.3	ether4	<2p-966495788@adsl.adslservice>					
234.5.90.112	10.10.10.32	10.111.0.3	ether4	<2p-testrb750-2>, <2p-965744450@adsl.adslservice>, <2p-965704999@adsl.adslservice>					
239.192.152.1...	192.168.1.10	0.0.0.0	<2p-966873881...						
239.192.152.1...	192.168.1.2	0.0.0.0	<2p-966720273...						
239.255.255.2...	192.168.1.33	0.0.0.0	<2p-966790820...						
239.255.255.2...	192.168.1.112	0.0.0.0	<2p-965369531...						
239.255.255.2...	192.168.1.3	0.0.0.0	<2p-965325920...						

10 items

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That's All

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