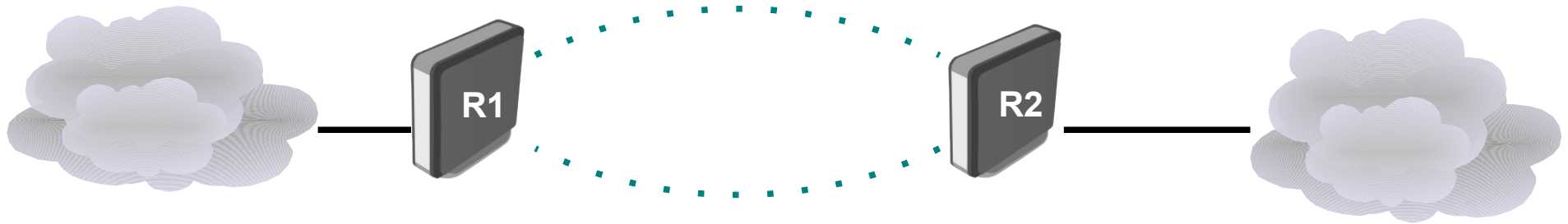


Link Aggregation with VPLS

Maris Bulans
MUM 2010, USA

Workshop setup



- Two links that cannot be aggregated directly (wireless)
- Needs L2 connectivity between LANs behind router

Link aggregation with EoIP

- Pros:
 - Fairly easy to set up
- Cons:
 - Bigger overhead
 - Needs more CPU resources

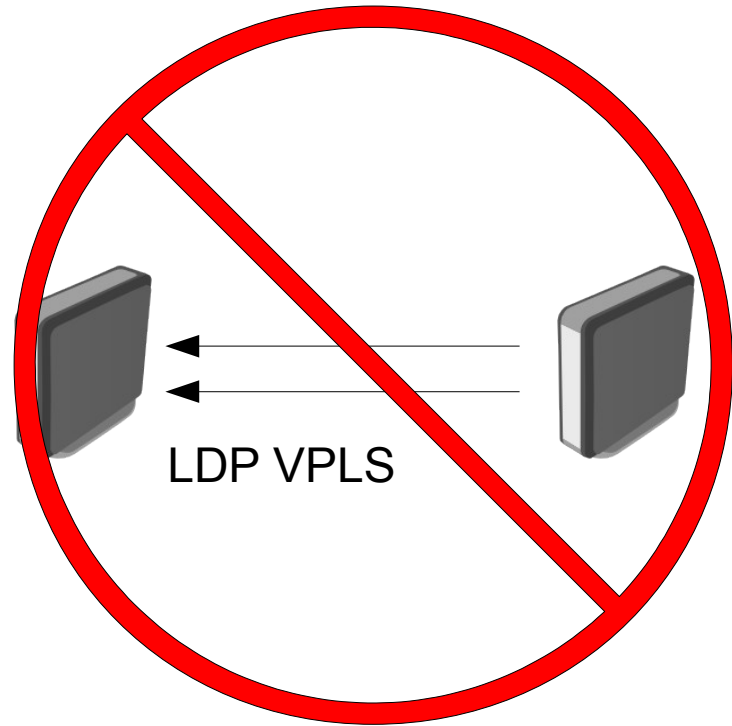
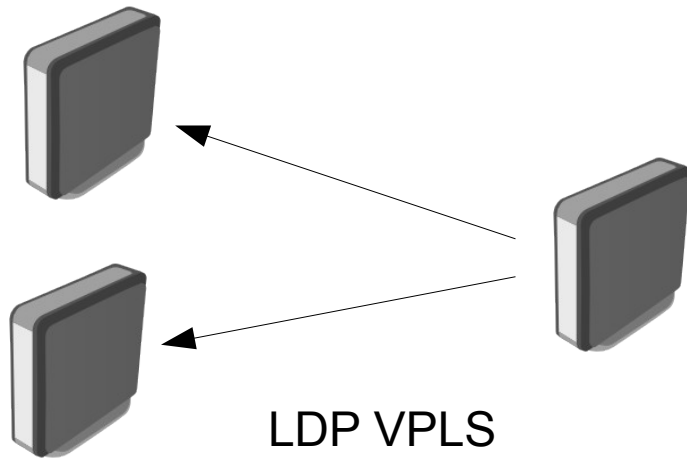
Link aggregation with VPLS

- Pros:
 - Very small overhead
 - Solves WDS limitations with 802.11n
 - Faster forwarding based on labels
- Cons:
 - Quite complex configuration process
 - MPLS/VPLS/BGP knowledge is needed

Setup steps

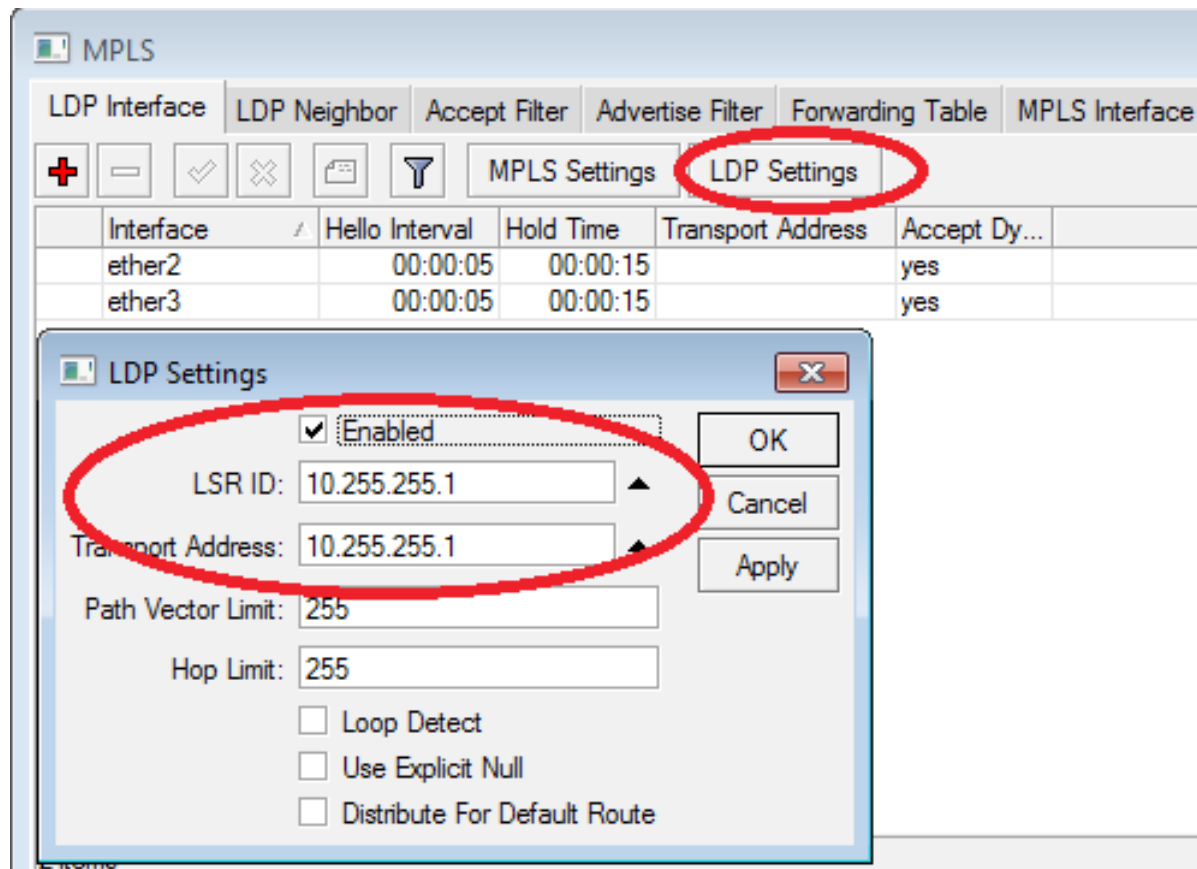
- IP connectivity
- OSPF, LDP
- BGP
- Routing Filters
- Bonding

Why we need BGP?



Step 1: LDP and OSPF

- Enable OSPF on both links and redistribute loopback address
- Enable LDP



Step2: BGP

The image displays two screenshots of a network configuration interface for BGP Peers.

Left Screenshot: BGP Peer <peer2>

- Tab: **Advanced** (highlighted with a red circle)
- Address Families: ip ipv6 l2vpn vpn4 l2vpn-cisco
- Update Source: none
- Interface: [Empty]

Right Screenshot: BGP Peer <peer1>

- Tab: **General**
- Name: peer1
- Instance: default
- Remote Address: 192.168.21.2 (highlighted with a red circle)
- Remote Port: [Empty]
- Remote AS: 65530
- TCP MD5 Key: [Empty]
- Nexthop Choice: default
 - Multihop
 - Route Reflect
- Hold Time: 180 s
- TTL: default
- Max Prefix Limit: [Empty]
- Max Prefix Restart Time: [Empty]
- In Filter: [Empty]
- Out Filter: peer1-out (highlighted with a red circle)
- AllowAS In: [Empty]
 - Remove Private AS
 - AS Override

Buttons on the right side of the right window: OK, Cancel, Apply, Disable, Comment, Copy, Remove, Refresh, Refresh All, Resend, Resend All.

Step3: Routing filters

The screenshot shows the Mikrotik WinBox interface for configuring a Route Filter. The main window is titled "Route Filter <>" and has tabs for "Matchers", "BGP", "Actions", and "BGP Actions". The "Chain" field is set to "peer1-out" and is circled in red. The "Route Targets" field is set to "22:22" and is also circled in red. The "Route Filters" sidebar on the left shows a list of filters:

#	Chain
0	peer1-out
1	peer2-out

Buttons on the right side of the window include OK, Cancel, Apply, Disable, Comment, Copy, and Remove.

Filtering result

Interface <vpls1>

General Status Traffic

Name: vpls1

Type: VPLS

MTU: 1500

L2 MTU: 1500

MAC Address: 02:2E:48:4C:D4:7D

ARP: enabled

Remote Peer: 192.168.21.2

VPLS ID:

Cisco Style

Cisco Style ID: 0

Advertised L2MTU: 1500

PW Type: tagged ethernet raw ethernet

dynamic running slave BGP signaled Cisco BGP Si...

OK

Copy

Remove

Torch

Interface <vpls2>

General Status Traffic

Name: vpls2

Type: VPLS

MTU: 1500

L2 MTU: 1500

MAC Address: 02:9F:C5:E7:31:1E

ARP: enabled

Remote Peer: 192.168.22.2

VPLS ID: 192.168.22.2

Cisco Style

Cisco Style ID: 0

Advertised L2MTU: 1500

PW Type: tagged ethernet raw ethernet

dynamic running slave BGP signaled Cisco BGP Si...

OK

Copy

Remove

Torch

Step4: Bonding

The screenshot displays a network configuration tool with an 'Interface List' window and a detailed configuration dialog for 'Interface <bonding1>'. The 'Interface List' window shows a table with one entry: 'bonding1' of type 'Bonding'. The configuration dialog has several tabs: 'General', 'Bonding', and 'Traffic'. The 'Bonding' tab is active, and the 'Slaves' field is highlighted with a red circle, showing 'vpls1' and 'vpls2'. Other settings include 'Mode: balance rr', 'Primary: none', 'Link Monitoring: none', 'Transmit Hash Policy: layer 2', 'Down Delay: 0 ms', 'Up Delay: 0 ms', and 'LACP Rate: 30 s'. The dialog also features buttons for 'OK', 'Cancel', 'Apply', 'Disable', 'Comment', 'Copy', 'Remove', and 'Torch'. At the bottom, there are status indicators for 'disabled', 'running', and 'slave'.

Interface	Type
R bonding1	Bonding

1 item out of 9 (1 selected)

```
set newS
log info S
/interface
}
}
```

disabled running slave

Problem!
BGP/VPLS interfaces are **dynamic**.
Solution?

Script

- Search for “unknown” entries in bonding slave configuration
- Create a list of existing VPLS tunels
- Reconfigure bonding slaves
- Run the script from scheduler

```
:local bondID [/interface bonding find name="bonding1"];
:local slaves [/interface bonding get $bondID slaves];
:local vplsAid [interface vpls find vpls="aa"];
:local vplsBid [interface vpls find vpls="bb"];
:local newSlaves;

:if ( ([:pick $slaves 0] = "(unknown)") || ([:pick $slaves 1] =
"(unknown)")) do={
    :if ( ($vplsAid = "") || ($vplsBid = "") ) do={
        :log info "at least one of vpls is down";
    } else={

        :set newSlaves "$[/interface vpls get $vplsAid name],$
[/interface vpls get $vplsBid name]";
        :log info $newSlaves;
        /interface bonding set $bondID slaves=$newSlaves;

    }
}
```

The End