MUM

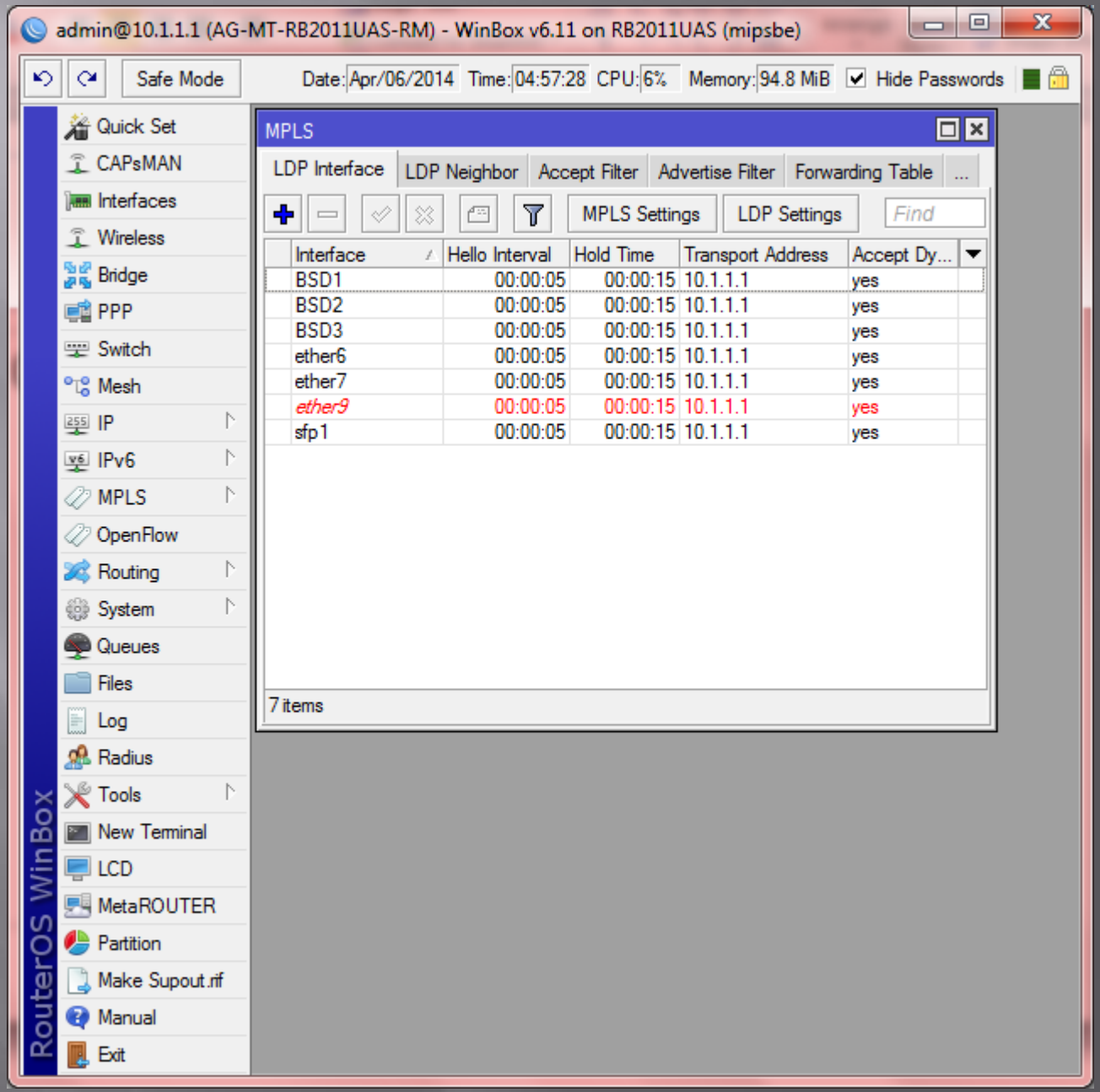
Mikrotik User Meeting

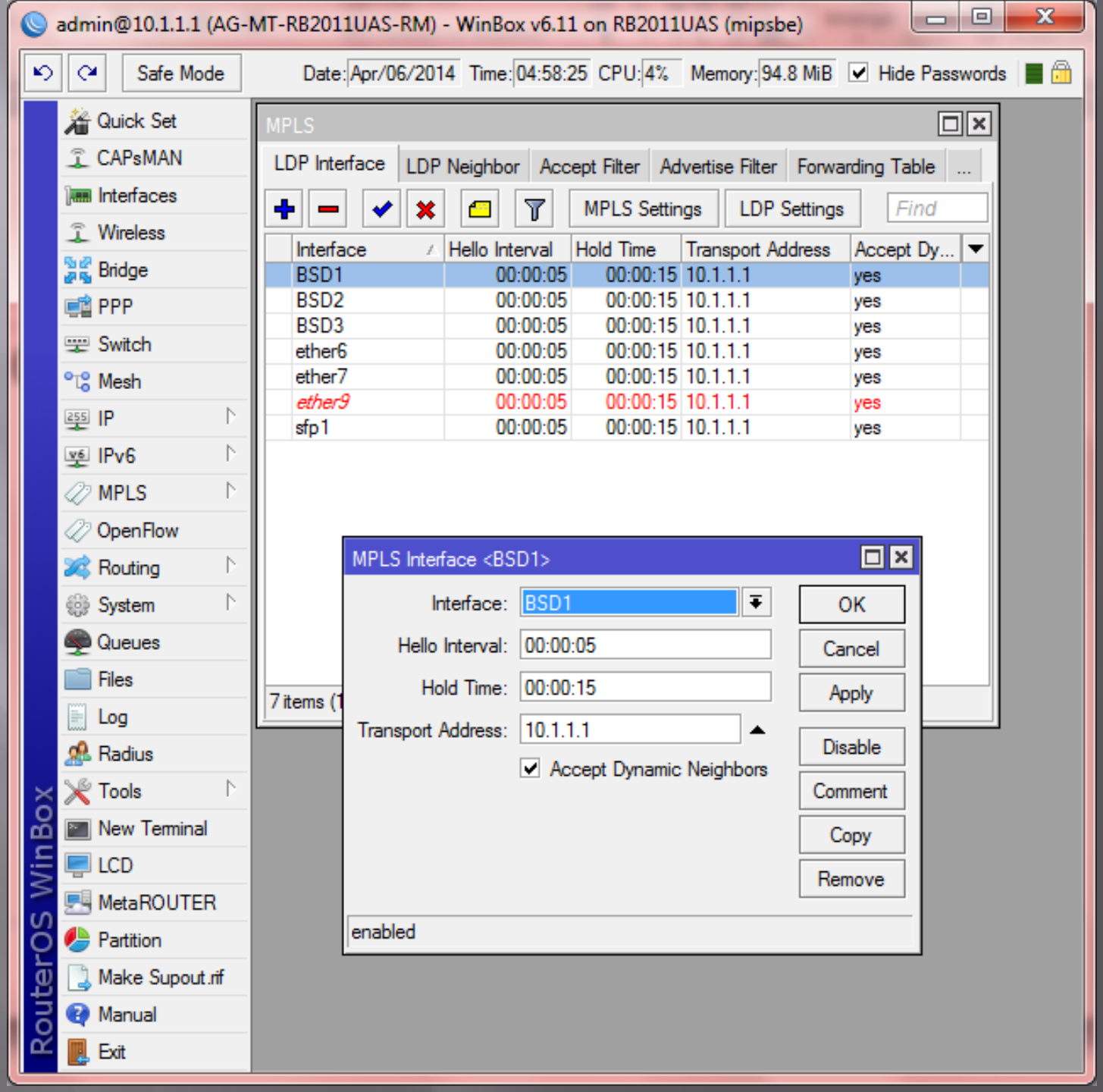
MP BGP WITH MIKROTIK & OPENBSD

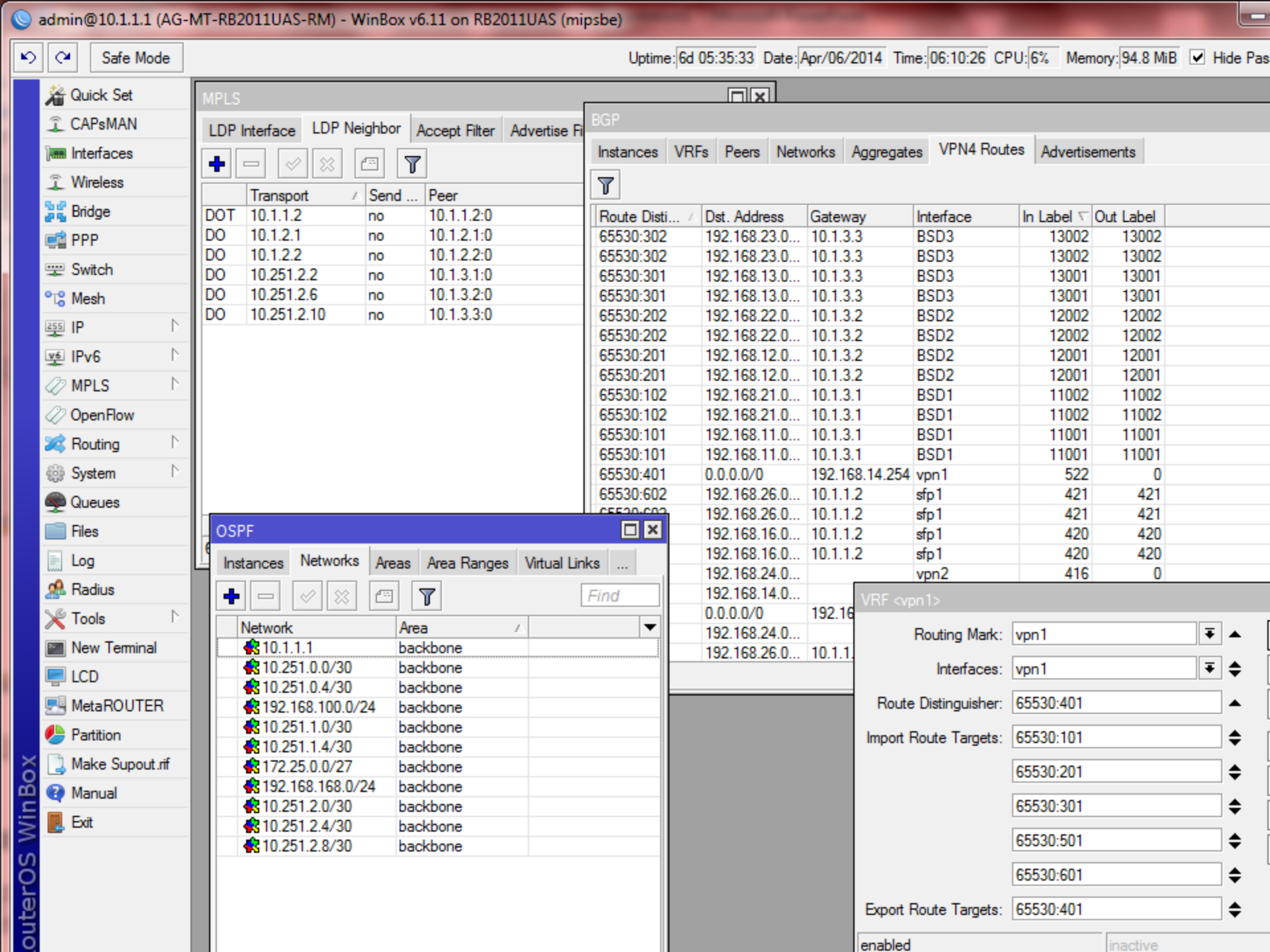
MPLS with Mikrotik

- LDP
- OSPF
- BGP

LDP interface




admin@10.1.1.1 (AG-MT-RB2011UAS-RM) - WinBox v6.11 on RB2011UAS (mipsbe)
Safe Mode
Date: Apr/06/2014 Time: 04:58:25 CPU: 4% Memory: 94.8 MiB
Hide Passwords
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
IPv6
MPLS
OpenFlow
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
LCD
MetaROUTER
Partition
Make Supout.rif
Manual
Exit
RouterOS WinBox
MPLS
LDP Interface
LDP Neighbor
Accept Filter
Advertise Filter
Forwarding Table
MPLS Settings
LDP Settings
Find
Interface
Hello Interval
Hold Time
Transport Address
Accept Dy...
BSD1 00:00:05 00:00:15 10.1.1.1 yes
BSD2 00:00:05 00:00:15 10.1.1.1 yes
BSD3 00:00:05 00:00:15 10.1.1.1 yes
ether6 00:00:05 00:00:15 10.1.1.1 yes
ether7 00:00:05 00:00:15 10.1.1.1 yes
ether9 00:00:05 00:00:15 10.1.1.1 yes
sfp1 00:00:05 00:00:15 10.1.1.1 yes
7 items
MPLS Interface <BSD1>
Interface: BSD1
Hello Interval: 00:00:05
Hold Time: 00:00:15
Transport Address: 10.1.1.1
Accept Dynamic Neighbors
OK
Cancel
Apply
Disable
Comment
Copy
Remove
enabled

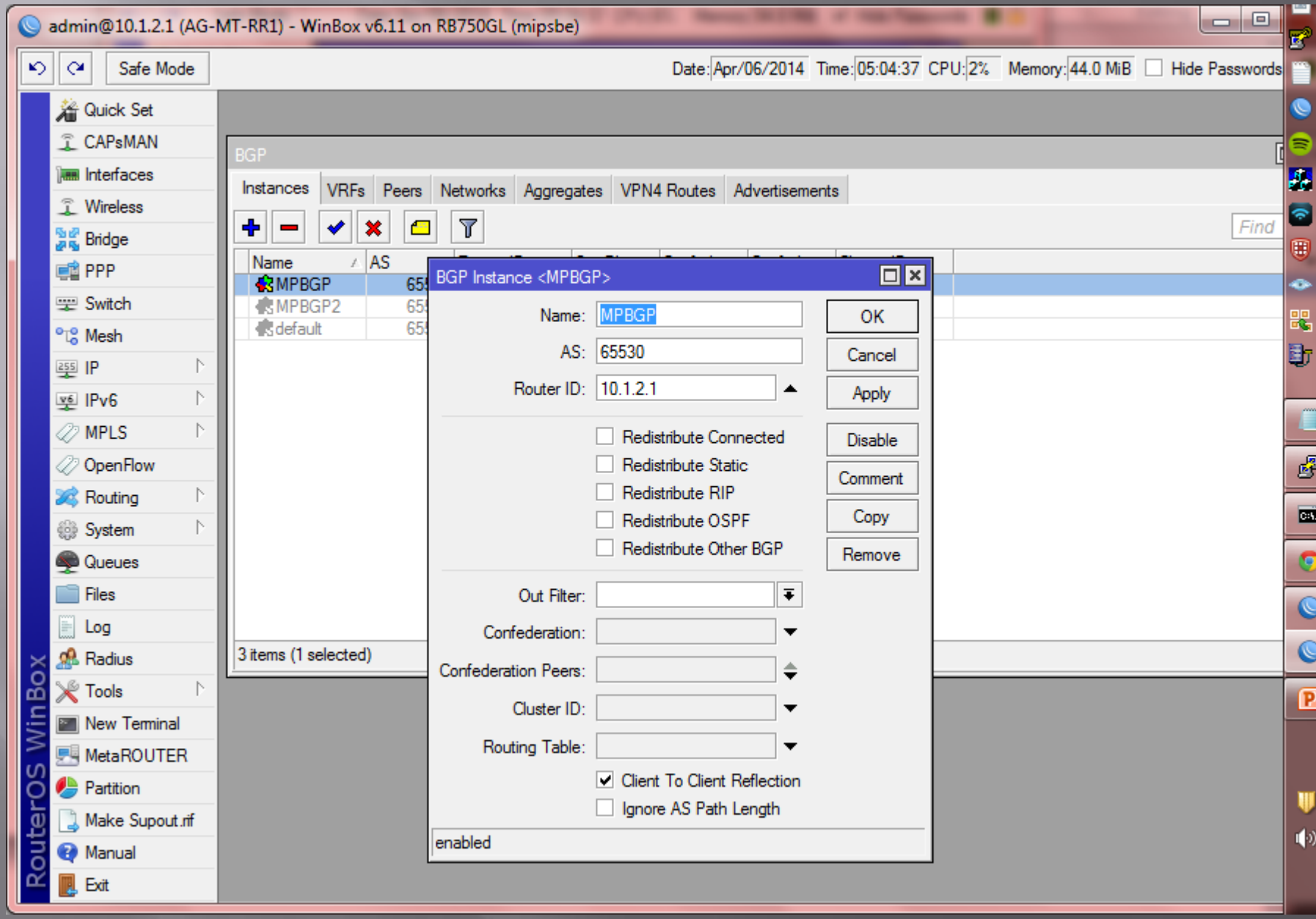

admin@10.1.1.1 (AG-MT-RB2011UAS-RM) - WinBox v6.11 on RB2011UAS (mipsbe)
Safe Mode
Uptime: 6d 05:35:33 Date: Apr/06/2014 Time: 06:10:26 CPU: 6% Memory: 94.8 MiB Hide Pas
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
IPv6
MPLS
OpenFlow
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
LCD
MetaROUTER
Partition
Make Supout.rif
Manual
Exit
RouterOS WinBox
MPLS
LDP Interface
LDP Neighbor
Accept Filter
Advertise Fi
Transport
Send ...
Peer
DOT 10.1.1.2 no 10.1.1.2:0
DO 10.1.2.1 no 10.1.2.1:0
DO 10.1.2.2 no 10.1.2.2:0
DO 10.251.2.2 no 10.1.3.1:0
DO 10.251.2.6 no 10.1.3.2:0
DO 10.251.2.10 no 10.1.3.3:0
BGP
Instances
VRFs
Peers
Networks
Aggregates
VPN4 Routes
Advertisements
Route Disti...
Dst. Address
Gateway
Interface
In Label
Out Label
65530:302 192.168.23.0... 10.1.3.3 BSD3 13002 13002
65530:302 192.168.23.0... 10.1.3.3 BSD3 13002 13002
65530:301 192.168.13.0... 10.1.3.3 BSD3 13001 13001
65530:301 192.168.13.0... 10.1.3.3 BSD3 13001 13001
65530:202 192.168.22.0... 10.1.3.2 BSD2 12002 12002
65530:202 192.168.22.0... 10.1.3.2 BSD2 12002 12002
65530:201 192.168.12.0... 10.1.3.2 BSD2 12001 12001
65530:201 192.168.12.0... 10.1.3.2 BSD2 12001 12001
65530:102 192.168.21.0... 10.1.3.1 BSD1 11002 11002
65530:102 192.168.21.0... 10.1.3.1 BSD1 11002 11002
65530:101 192.168.11.0... 10.1.3.1 BSD1 11001 11001
65530:101 192.168.11.0... 10.1.3.1 BSD1 11001 11001
65530:401 0.0.0.0/0 192.168.14.254 vpn1 522 0
65530:602 192.168.26.0... 10.1.1.2 sfp1 421 421
192.168.26.0... 10.1.1.2 sfp1 421 421
192.168.16.0... 10.1.1.2 sfp1 420 420
192.168.16.0... 10.1.1.2 sfp1 420 420
192.168.24.0... vpn2 416 0
192.168.14.0...
0.0.0.0/0 192.16
192.168.24.0...
192.168.26.0... 10.1.1.
OSPF
Instances
Networks
Areas
Area Ranges
Virtual Links
...
Find
Network
Area
10.1.1.1 backbone
10.251.0.0/30 backbone
10.251.0.4/30 backbone
192.168.100.0/24 backbone
10.251.1.0/30 backbone
10.251.1.4/30 backbone
172.25.0.0/27 backbone
192.168.168.0/24 backbone
10.251.2.0/30 backbone
10.251.2.4/30 backbone
10.251.2.8/30 backbone
VRF <vpn1>
Routing Mark: vpn1
Interfaces: vpn1
Route Distinguisher: 65530:401
Import Route Targets: 65530:101
65530:201
65530:301
65530:501
65530:601
Export Route Targets: 65530:401
enabled
inactive

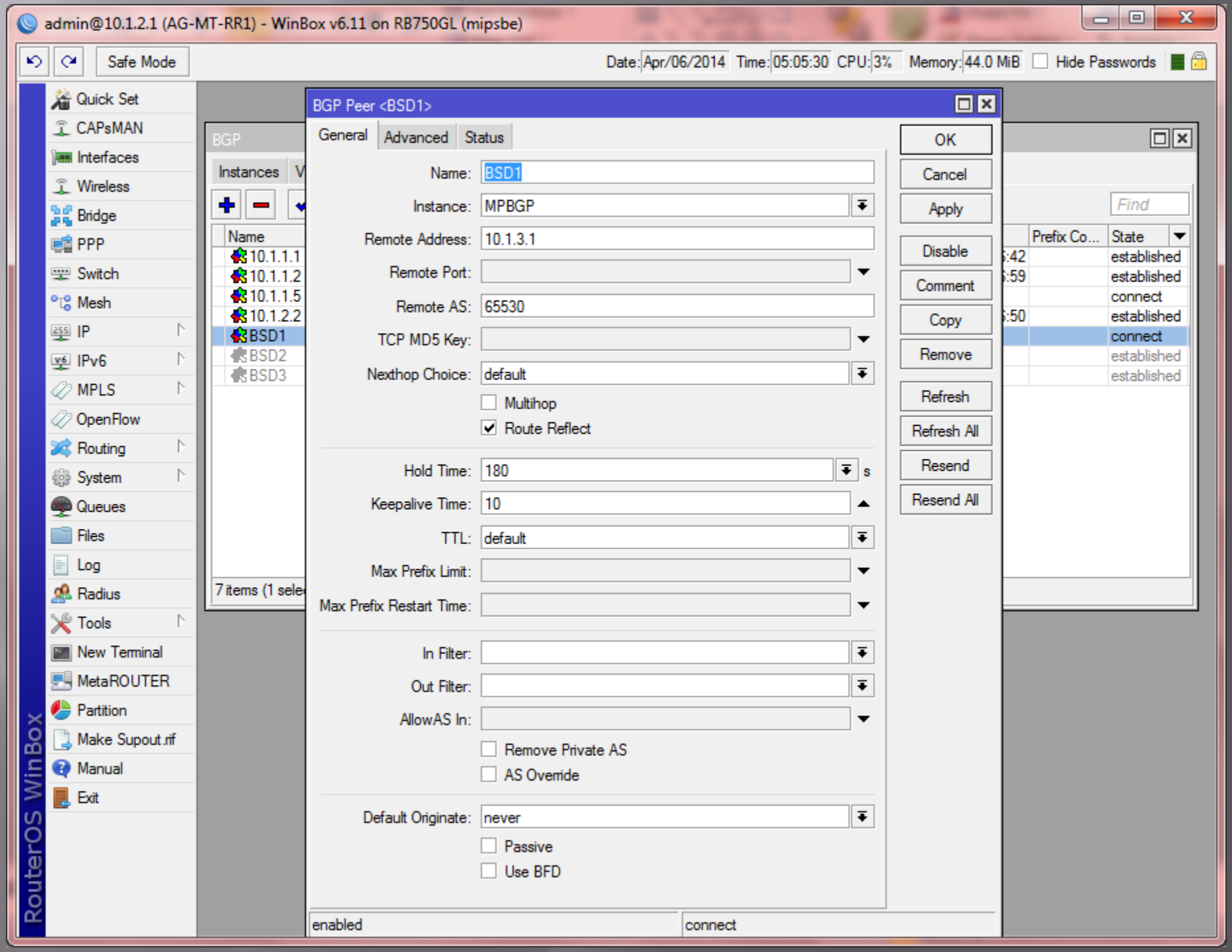
OSPF

- We must find a way between BGP peers, so we will use an IGP .Mikrotik and OpenBSD both supports OSPF.
- Easy to deploy and manage, small convergence time.

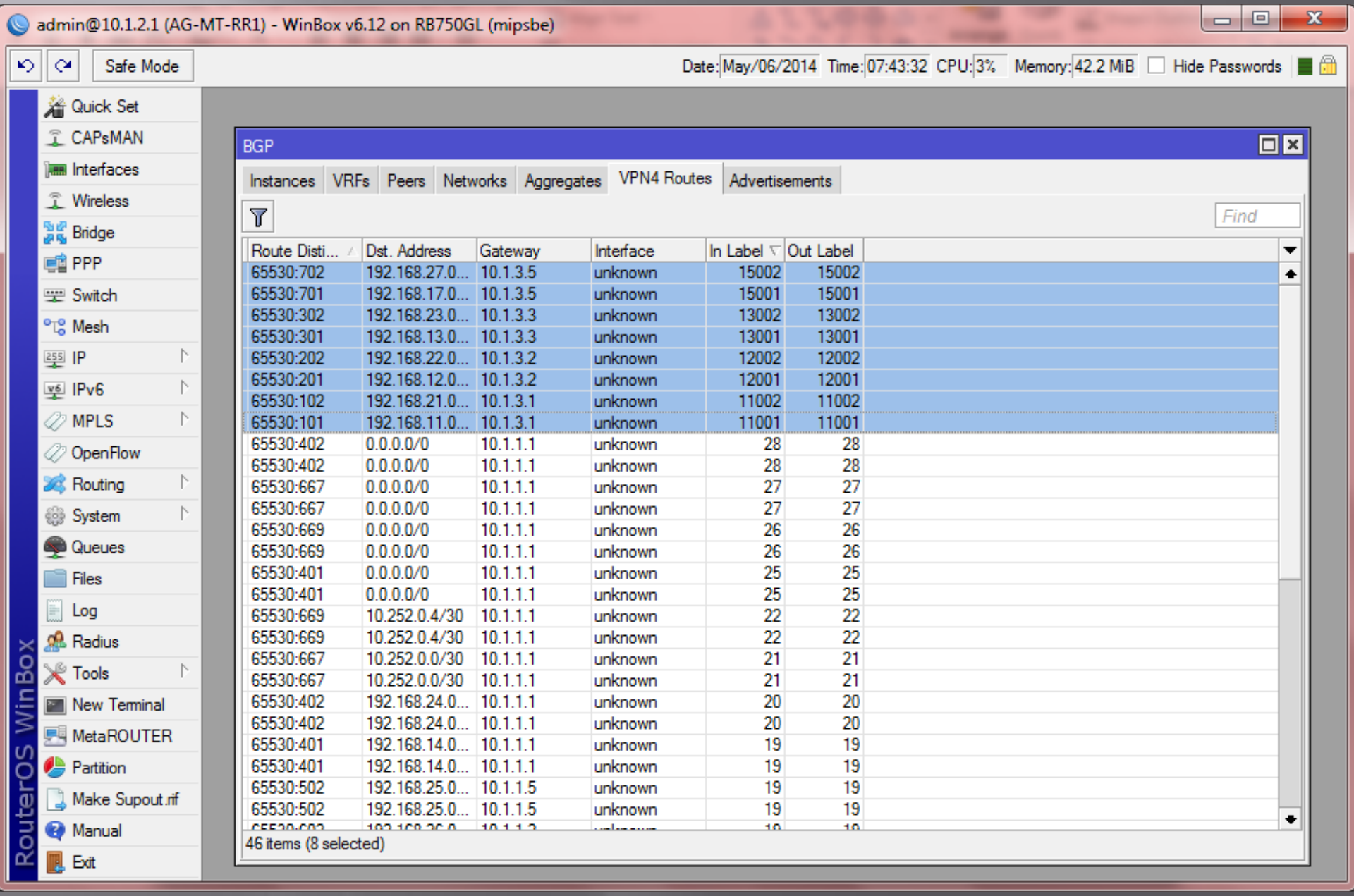
BGP

- We can make a full mesh network by connecting all BGP peers or we can use Route reflectors.
- We are using client-to-client reflection on instance & route reflect on peer configuration


admin@10.1.2.1 (AG-MT-RR1) - WinBox v6.11 on RB750GL (mipsbe)
Safe Mode
Date: Apr/06/2014 Time: 05:04:37 CPU: 2% Memory: 44.0 MiB Hide Passwords
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
IPv6
MPLS
OpenFlow
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
Exit
RouterOS WinBox
BGP
Instances
VRFs
Peers
Networks
Aggregates
VPN4 Routes
Advertisements
Find
Name
AS
MPBGP
MPBGP2
default
3 items (1 selected)
BGP Instance <MPBGP>
Name: MPBGP
AS: 65530
Router ID: 10.1.2.1
Redistribute Connected
Redistribute Static
Redistribute RIP
Redistribute OSPF
Redistribute Other BGP
Out Filter:
Confederation:
Confederation Peers:
Cluster ID:
Routing Table:
Client To Client Reflection
Ignore AS Path Length
enabled
OK
Cancel
Apply
Disable
Comment
Copy
Remove


admin@10.1.2.1 (AG-MT-RR1) - WinBox v6.11 on RB750GL (mipsbe)
Safe Mode
Date: Apr/06/2014 Time: 05:05:30 CPU: 3% Memory: 44.0 MiB Hide Passwords
Quick Set
CAPsMAN
Interfaces
Wireless
Bridge
PPP
Switch
Mesh
IP
IPv6
MPLS
OpenFlow
Routing
System
Queues
Files
Log
Radius
Tools
New Terminal
MetaROUTER
Partition
Make Supout.rif
Manual
Exit
RouterOS WinBox
BGP
Instances
Name
10.1.1.1
10.1.1.2
10.1.1.5
10.1.2.2
BSD1
BSD2
BSD3
7 items (1 sele
Find
Prefix Co...
State
established
established
connect
established
connect
established
established
BGP Peer <BSD1>
General
Advanced
Status
Name: BSD1
Instance: MPBGP
Remote Address: 10.1.3.1
Remote Port:
Remote AS: 65530
TCP MD5 Key:
Nexthop Choice: default
Multihop
Route Reflect
Hold Time: 180 s
Keepalive Time: 10
TTL: default
Max Prefix Limit:
Max Prefix Restart Time:
In Filter:
Out Filter:
AllowAS In:
Remove Private AS
AS Override
Default Originate: never
Passive
Use BFD
OK
Cancel
Apply
Disable
Comment
Copy
Remove
Refresh
Refresh All
Resend
Resend All
enabled
connect

View from Route Reflector



OpenBSD

- Its done lets look at OpenBSD side

Initial Config & lo & Management(OAM) interface

- AG-OBSD-PE(p)/sh running-config
- !
- hostname AG-OBSD-PE
- !
- dns rules
- search dmz.gozubuyukoglu.com
- nameserver 192.168.100.53
- lookup file bind
- !
- dns local-control
- !

- !
- interface lo0
- group lo
- ip ::1/128
- ip 127.0.0.1/8
- !

- !
- interface nfe0
- rdomain 10
- ip 192.168.100.205/24
- no inet6
- !

Lo & MPLS Provider Edge (mpe) & MPLS Physical interfaces

- interface lo1
- group lo
- ip 10.1.3.5/32
- !
- interface lo2
- group lo
- ip 10.1.4.5/32
- !

- interface mpe1
- rdomain 1
- group mpe
- ip 10.1.3.5 0.0.0.0
- no inet6
- label 15001
- !
- interface mpe2
- rdomain 2
- group mpe
- ip 10.1.4.5 0.0.0.0
- no inet6
- label 15002
- !

- interface re0
- group egress
- ip 10.251.2.14/30
- mpls
- !
- interface re1
- ip 10.251.2.18/30
- mpls
- !

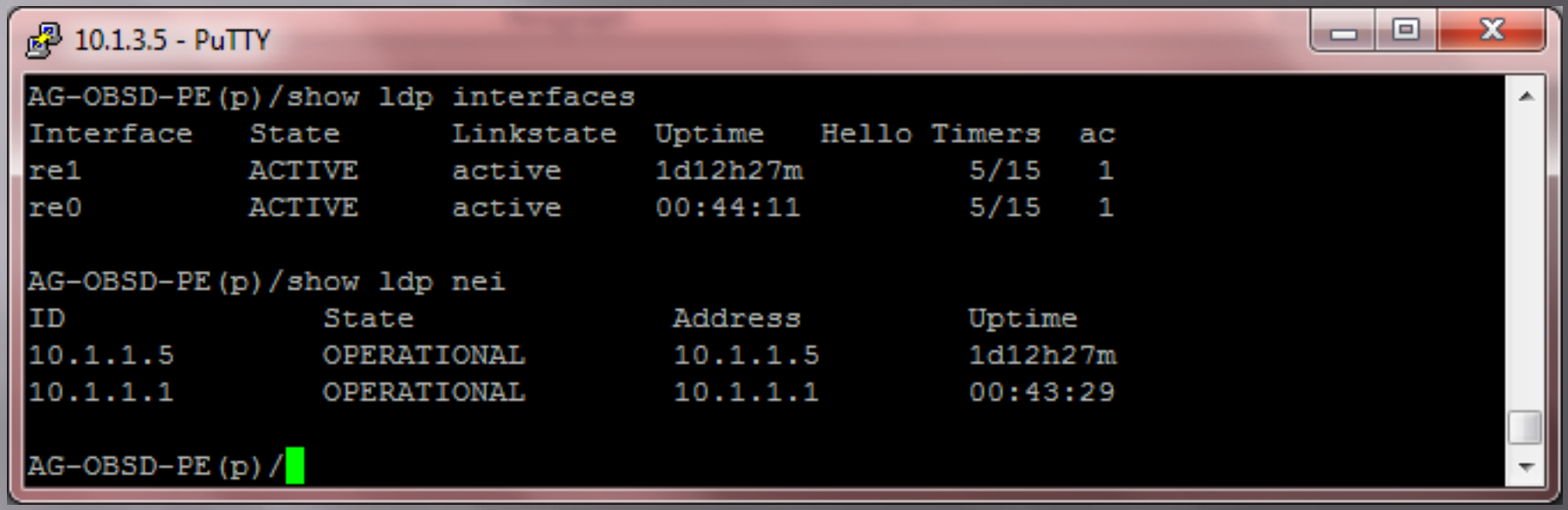
VPN1 & VPN2 interfaces

- interface vlan2009
- vlan 2009 parent bge1
- rdomain 1
- group vlan
- ip 192.168.17.1/24
- no inet6
- !
- interface vlan2010
- vlan 2010 parent bge1
- rdomain 2
- group vlan
- ip 192.168.27.1/24
- no inet6
- !

- bridge bridge1
- group bridge
- member vlan2009 bge0 athn0
- no shutdown
- !

- interface athn0
- description athn wireless interface
- rdomain 1
- group wlan
- media OFDM54
- mediaopt hostap
- nwid AG-OBSD
- no inet6
- no shutdown
- !

ldp


10.1.3.5 - PuTTY
AG-OBSD-PE(p)/show ldp interfaces
Interface State Linkstate Uptime Hello Timers ac
re1 ACTIVE active 1d12h27m 5/15 1
re0 ACTIVE active 00:44:11 5/15 1
AG-OBSD-PE(p)/show ldp nei
ID State Address Uptime
10.1.1.5 OPERATIONAL 10.1.1.5 1d12h27m
10.1.1.1 OPERATIONAL 10.1.1.1 00:43:29
AG-OBSD-PE(p)/

Ldp & OSPF rules

- ldp rules
- router-id 10.1.3.5
- fib-update yes
- keepalive 180
- distribution independent
- retention liberal
- targeted-hello-accept yes
- advertisement unsolicited
- interface re0
- interface re1
- !
- ldp enable
- !

- ospf rules
- router-id 10.1.3.5
- area 0.0.0.0 {
- interface lo1
- interface lo2
- interface re0
- interface re1
- }
- !
- ospf enable
- !

BGP Configurations 1

- bgp rules
- router-id 10.1.3.5
- AS 65530

- rdomain 1 {
- descr "vpn1"
- rd 65530:701
- import-target rt 65530:101
- import-target rt 65530:201
- import-target rt 65530:301
- import-target rt 65530:401
- import-target rt 65530:501
- import-target rt 65530:601
- import-target rt 65530:600
- export-target rt 65530:701
- depend on mpe1
- network inet connected
- network inet static
- }

- rdomain 2 {
- descr "vpn2"
- rd 65530:702
- import-target rt 65530:102
- import-target rt 65530:202
- import-target rt 65530:302
- import-target rt 65530:402
- import-target rt 65530:502
- import-target rt 65530:602
- import-target rt 65530:600
- export-target rt 65530:702
- depend on mpe2
- network inet connected
- network inet static
- }

BGP Configurations 2

- group bgp {
- announce IPv4 unicast
- announce IPv4 vpn
- holdtime 180
- announce refresh yes
- announce restart yes
- announce capabilities yes
- remote-as 65530
- local-address 10.1.3.5

- neighbor 10.1.2.1 {
- descr "AG-MT-RR1"
- remote-as 65530
- local-address 10.1.3.5
- passive
- holdtime 180
- holdtime min 3
- announce self
- tcp md5sig password medusa
- }

- neighbor 10.1.2.2 {
- descr "AG-MT-RR2"
- remote-as 65530
- local-address 10.1.3.5
- passive
- holdtime 180
- holdtime min 3
- announce self
- tcp md5sig password medusa
- }
- }

BGP Status

- AG-OBSD-PE(p)/sh bg su
- Neighbor AS MsgRcvd MsgSent OutQ Up/Down State/PrfRcvd
- AG-MT-RR2 65530 0 0 0 Never Active
- AG-MT-RR1 65530 15208 2203 0 01:06:17 25

BGP Neighbor Status

- AG-OBSD-PE(p)/show bgp neighbor 10.1.2.1
- BGP neighbor is 10.1.2.1, remote AS 65530, Passive
- Description: AG-MT-RR1
- BGP version 4, remote router-id 10.1.2.1
- BGP state = Established, up for 01:10:46
- Last read 00:00:04, holdtime 180s, keepalive interval 60s
- Neighbor capabilities:
- Multiprotocol extensions: IPv4 vpn
- Route Refresh
- 4-byte AS numbers

- Message statistics:
- Sent Received
- Opens 2 2
- Notifications 0 0
- Updates 4 167
- Keepalives 2201 15070
- Route Refresh 0 0
- Total 2207 15239

- Update statistics:
- Sent Received
- Updates 8 93
- Withdraws 0 49
- End-of-Rib 0 0

- Local host: 10.1.3.5, Local port: 179
- Remote host: 10.1.2.1, Remote port: 36934

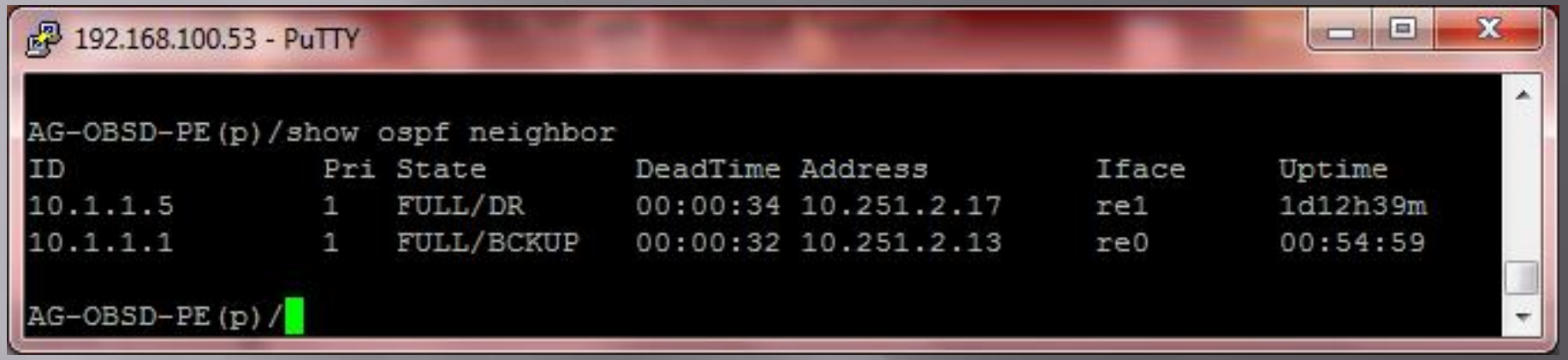
- AG-OBSD-PE(p)/

BGP Routing Information

AG-OBSD-PE(p)/sh bg rib
flags: * = Valid, > = Selected, I = via IBGP, A = Announced, S = Stale
origin: i = IGP, e = EGP, ? = Incomplete

flags destination gateway lpref med aspath origin
I*> rd 65530:401 0.0.0.0/0 10.1.1.1 100 0 ?
I*> rd 65530:402 0.0.0.0/0 10.1.1.1 100 0 ?
I*> rd 65530:667 0.0.0.0/0 10.1.1.1 100 0 ?
I*> rd 65530:669 0.0.0.0/0 10.1.1.1 100 0 ?
I*> rd 65530:667 10.252.0.0/30 10.1.1.1 100 0 ?
I*> rd 65530:669 10.252.0.4/30 10.1.1.1 100 0 ?
I*> rd 65530:667 172.30.1.0/24 10.1.1.1 100 0 ?
I*> rd 65530:667 172.30.2.0/24 10.1.1.2 100 0 ?
I*> rd 65530:667 172.30.3.0/24 10.1.1.5 100 0 ?
I*> rd 65530:669 172.30.4.0/24 10.1.1.1 100 0 ?
I*> rd 65530:669 172.30.5.0/24 10.1.1.2 100 0 ?
I*> rd 65530:669 172.30.6.0/24 10.1.1.5 100 0 ?
I*> rd 65530:600 192.168.1.0/24 10.1.1.1 100 0 ?
I*> rd 65530:101 192.168.11.0/24 10.1.3.1 100 0 i
I*> rd 65530:201 192.168.12.0/24 10.1.3.2 100 0 i
I*> rd 65530:301 192.168.13.0/24 10.1.3.3 100 0 i
I*> rd 65530:401 192.168.14.0/24 10.1.1.1 100 0 ?
I*> rd 65530:501 192.168.15.0/24 10.1.1.5 100 0 ?
I*> rd 65530:601 192.168.16.0/24 10.1.1.2 100 0 ?
AI*> rd 65530:701 192.168.17.0/24 rd 0:0 0.0.0.0 100 0 i
I*> rd 65530:102 192.168.21.0/24 10.1.3.1 100 0 i
I*> rd 65530:202 192.168.22.0/24 10.1.3.2 100 0 i
I*> rd 65530:302 192.168.23.0/24 10.1.3.3 100 0 i
I*> rd 65530:402 192.168.24.0/24 10.1.1.1 100 0 ?
I*> rd 65530:502 192.168.25.0/24 10.1.1.5 100 0 ?
I*> rd 65530:602 192.168.26.0/24 10.1.1.2 100 0 ?
AI*> rd 65530:702 192.168.27.0/24 rd 0:0 0.0.0.0 100 0 i
AG-OBSD-PE(p)/

OSPF Status


192.168.100.53 - PuTTY
AG-OBSD-PE(p)/show ospf neighbor
ID Pri State DeadTime Address Iface Uptime
10.1.1.5 1 FULL/DR 00:00:34 10.251.2.17 re1 1d12h39m
10.1.1.1 1 FULL/BCKUP 00:00:32 10.251.2.13 re0 00:54:59
AG-OBSD-PE(p)/

Routing Domain 1 (VPN)

```
AG-OBSD-PE(p)/rtable 1
AG-OBSD-PE(p-rtable 1)/show route
Flags: U - up, G - gateway, H - host, L - link layer, R - reject (unreachable),
       D - dynamic, S - static, T - MPLS

% IPv4:
Destination        Gateway           Flags    Refs     Use    Mtu  Interface
0.0.0.0/0          10.1.1.1          UGT         2   82307      -  mpe1
192.168.1.0/24     10.1.1.1            UGT       0      40      -  mpe1
192.168.11.0/24    10.1.3.1            UGT       0       0      -  mpe1
192.168.12.0/24    10.1.3.2            UGT       0       0      -  mpe1
192.168.13.0/24    10.1.3.3            UGT       0       0      -  mpe1
192.168.14.0/24    10.1.1.1            UGT       0       9      -  mpe1
192.168.15.0/24    10.1.1.5            UGT       0       0      -  mpe1
192.168.16.0/24    10.1.1.2            UGT       0       0      -  mpe1
192.168.17.0/24                      U           1       0      -  vlan2009
192.168.17.100     00:01:2e:2d:92:ed  UHL         0   59913      -  vlan2009
AG-OBSD-PE(p-rtable 1)/
```

OpenBSD Kernel Routing Table

MPLS:

In label	Out label	Op	Gateway	Flags	Refs	Use	Mtu	Prio	Interface
16	-	LOCAL	10.251.2.13	UGT	0	0	-	32	re0
17	-	POP	10.251.2.13	UGT	0	0	-	32	re0
18	23	SWAP	10.251.2.13	UGT	0	0	-	32	re0
19	-	POP	10.251.2.17	UGT	0	684	-	32	re1
20	41	SWAP	10.251.2.13	UGT	0	0	-	32	re0
21	42	SWAP	10.251.2.13	UGT	0	0	-	32	re0
22	29	SWAP	10.251.2.13	UGT	0	0	-	32	re0
23	30	SWAP	10.251.2.13	UGT	0	0	-	32	re0
24	188	SWAP	10.251.2.17	UGT	0	0	-	32	re1
25	31	SWAP	10.251.2.13	UGT	0	0	-	32	re0
26	32	SWAP	10.251.2.13	UGT	0	0	-	32	re0
27	187	SWAP	10.251.2.17	UGT	0	0	-	32	re1
28	-	POP	10.251.2.13	UGT	0	0	-	32	re0
29	-	POP	10.251.2.17	UGPT	0	0	-	32	re1
29	-	POP	10.251.2.13	UGPT	0	0	-	32	re0
30	-	POP	10.251.2.13	UGT	0	0	-	32	re0
31	-	POP	10.251.2.13	UGT	0	0	-	32	re0
32	-	POP	10.251.2.13	UGT	0	0	-	32	re0
33	-	POP	10.251.2.13	UGT	0	0	-	32	re0
34	-	POP	10.251.2.17	UGT	0	0	-	32	re1
35	43	SWAP	10.251.2.13	UGT	0	0	-	32	re0
36	-	POP	10.251.2.13	UGT	0	0	-	32	re0
37	24	SWAP	10.251.2.13	UGT	0	0	-	32	re0
38	-	POP	10.251.2.17	UGT	0	0	-	32	re1
39	44	SWAP	10.251.2.13	UGT	0	0	-	32	re0
40	45	SWAP	10.251.2.13	UGT	0	0	-	32	re0
41	-	POP	10.251.2.13	UGT	0	0	-	32	re0
15001	-	POP	mpe1	UT	0	105990	-	4	mpe1
15002	-	POP	mpe2	UT	0	888	-	4	mpe2

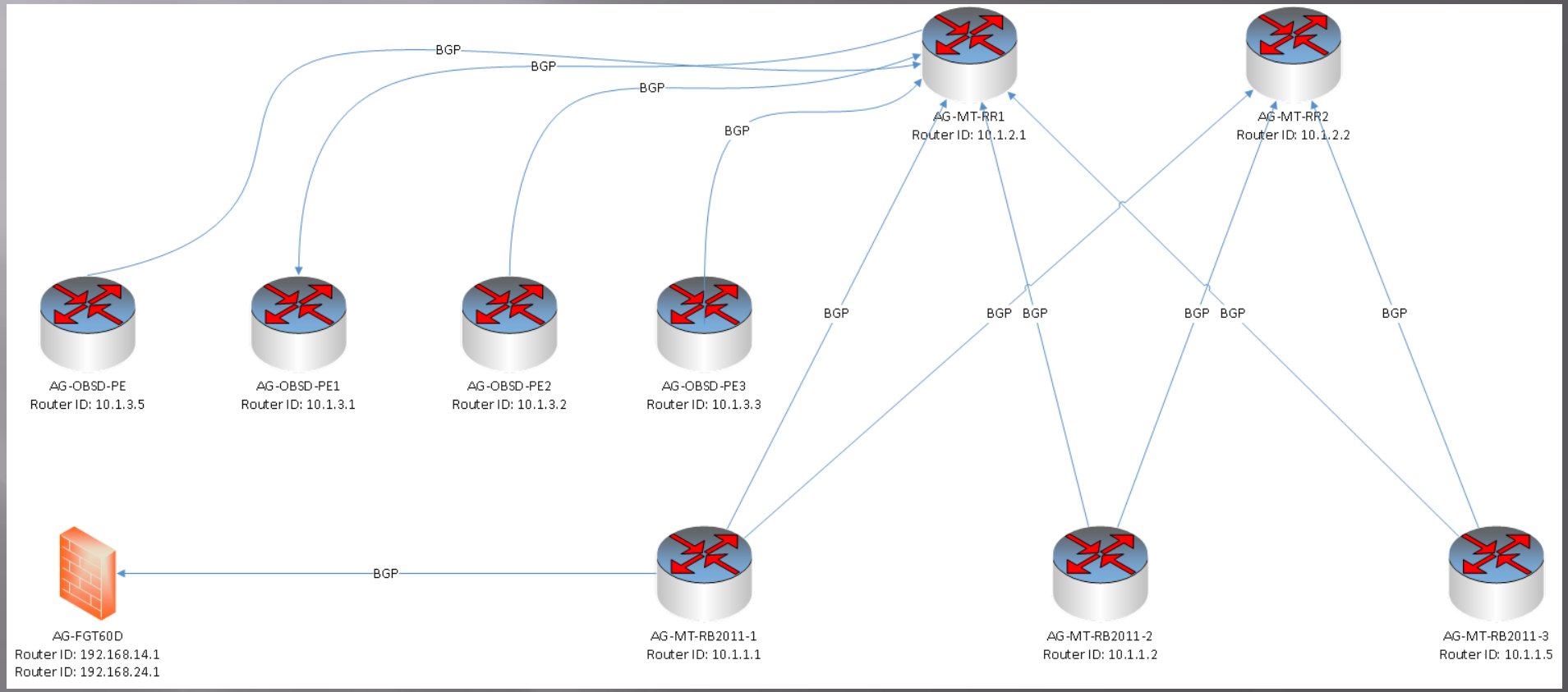
Ping and Traceroute between VPNs

- AG-CINO:~# ping 192.168.12.53 -i 0.01 -c 3
- PING 192.168.12.53 (192.168.12.53) 56(84) bytes of data.
- 64 bytes from 192.168.12.53: icmp_seq=1 ttl=60 time=2.90 ms
- 64 bytes from 192.168.12.53: icmp_seq=2 ttl=60 time=2.91 ms
- 64 bytes from 192.168.12.53: icmp_seq=3 ttl=60 time=2.66 ms

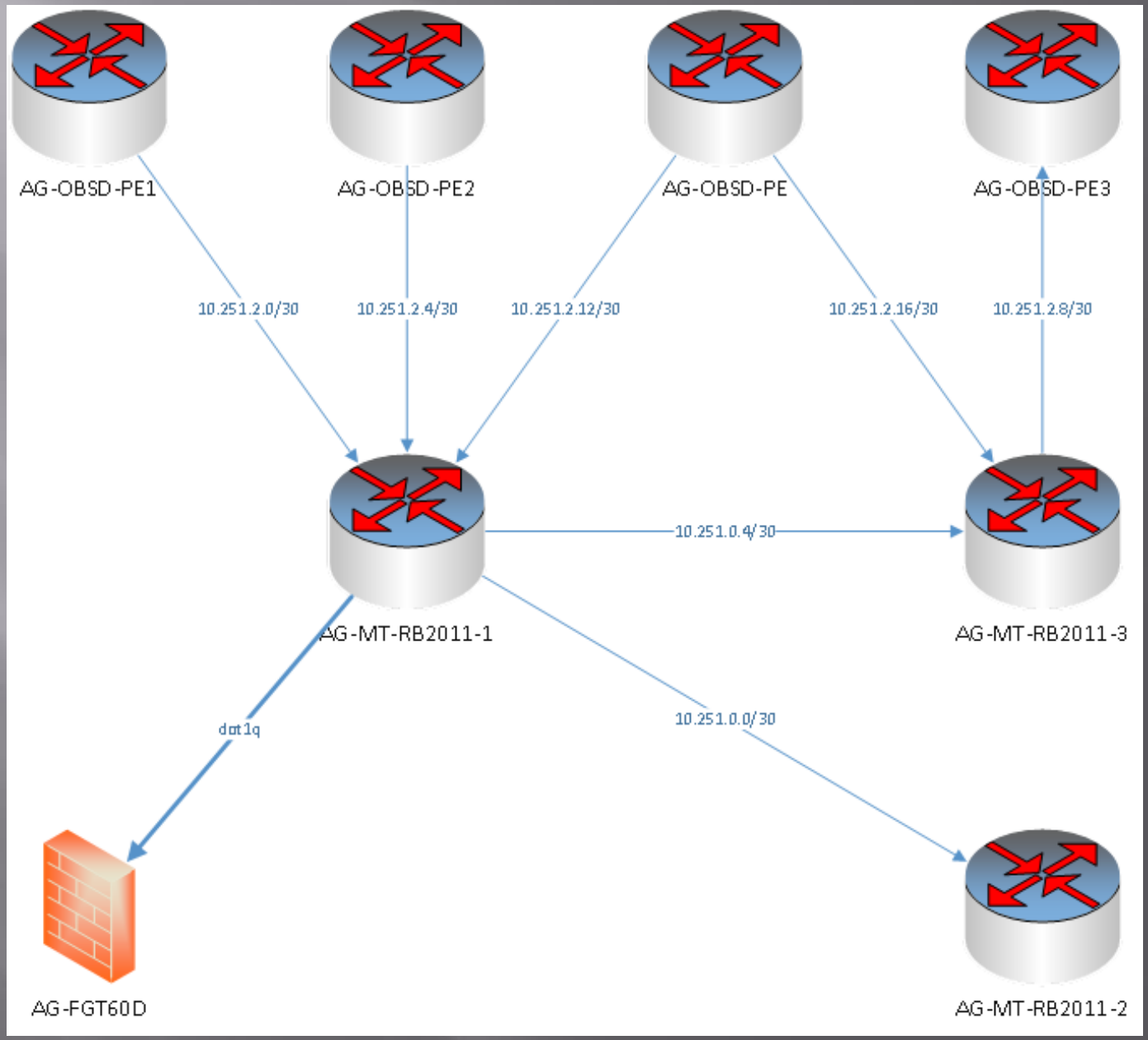
- --- 192.168.12.53 ping statistics ---
- 3 packets transmitted, 3 received, 0% packet loss, time 20ms
- rtt min/avg/max/mdev = 2.666/2.829/2.915/0.123 ms
- AG-CINO:~# traceroute -en 192.168.12.53
- traceroute to 192.168.12.53 (192.168.12.53), 30 hops max, 60 byte packets
- 1 192.168.11.1 1.025 ms 1.135 ms 1.466 ms
- 2 10.251.2.1 9.234 ms 9.291 ms 9.328 ms
- 3 10.1.3.2 <MPLS:L=16,E=0,S=0,T=1/L=12001,E=0,S=1,T=2> 10.400 ms 10.491 ms 11.752 ms
- 4 10.1.3.2 11.855 ms 13.268 ms 13.352 ms
- 5 192.168.12.53 13.540 ms 14.016 ms 14.092 ms
- AG-CINO:~#

Between OpenBSD 5.3 & 5.4
Dropped support for per-interface ldpd(8) labelspaces.
So you can not see MPLS labels on traceroutes, this log is from 5.3

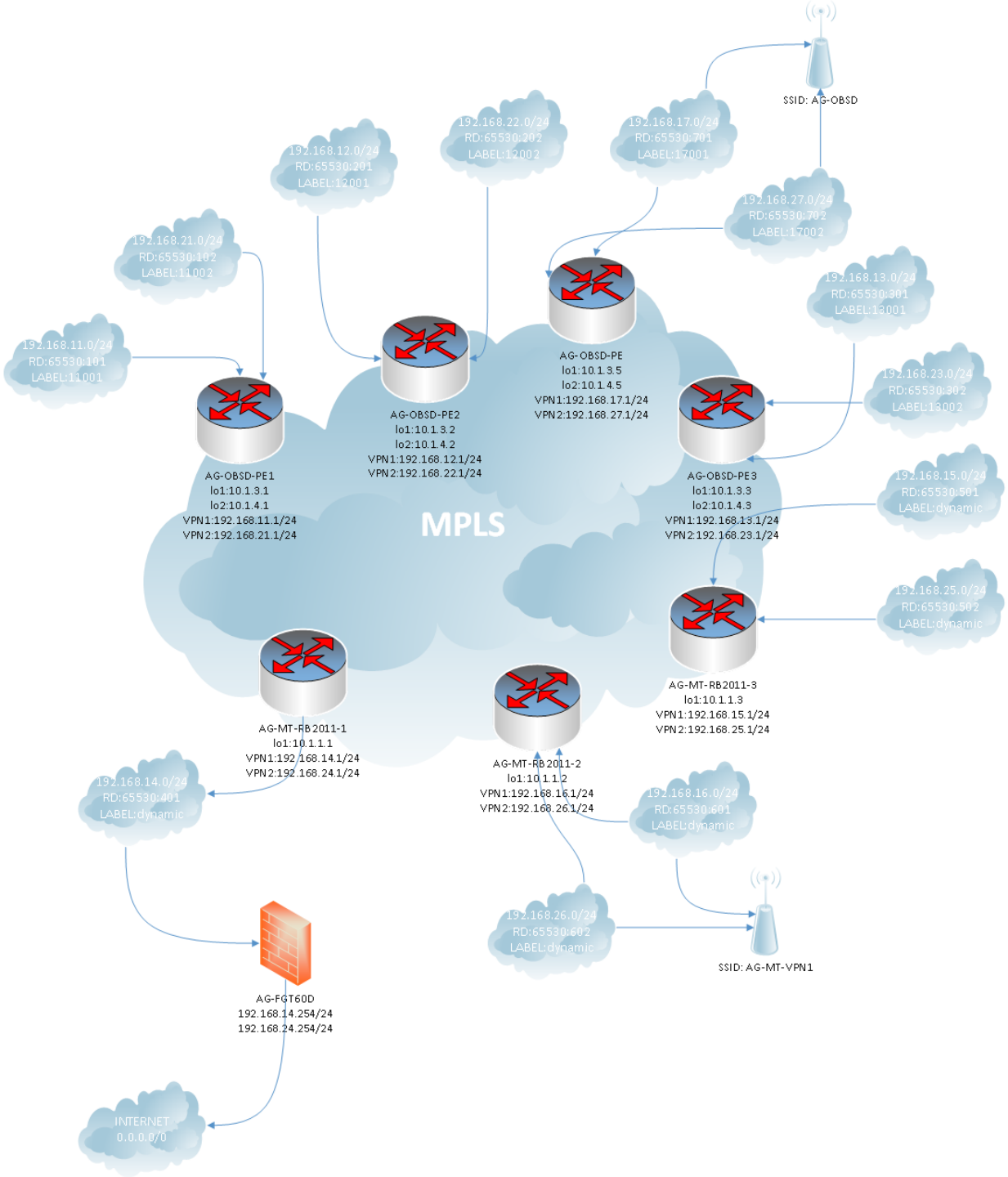
BGP Peers


BGP
BGP
BGP
BGP
AG-MT-RR1
Router ID: 10.1.2.1
AG-MT-RR2
Router ID: 10.1.2.2
AG-OBSD-PE
Router ID: 10.1.3.5
AG-OBSD-PE1
Router ID: 10.1.3.1
AG-OBSD-PE2
Router ID: 10.1.3.2
AG-OBSD-PE3
Router ID: 10.1.3.3
BGP
BGP
BGP
BGP
BGP
BGP
BGP
AG-FGT60D
Router ID: 192.168.14.1
Router ID: 192.168.24.1
AG-MT-RB2011-1
Router ID: 10.1.1.1
AG-MT-RB2011-2
Router ID: 10.1.1.2
AG-MT-RB2011-3
Router ID: 10.1.1.5

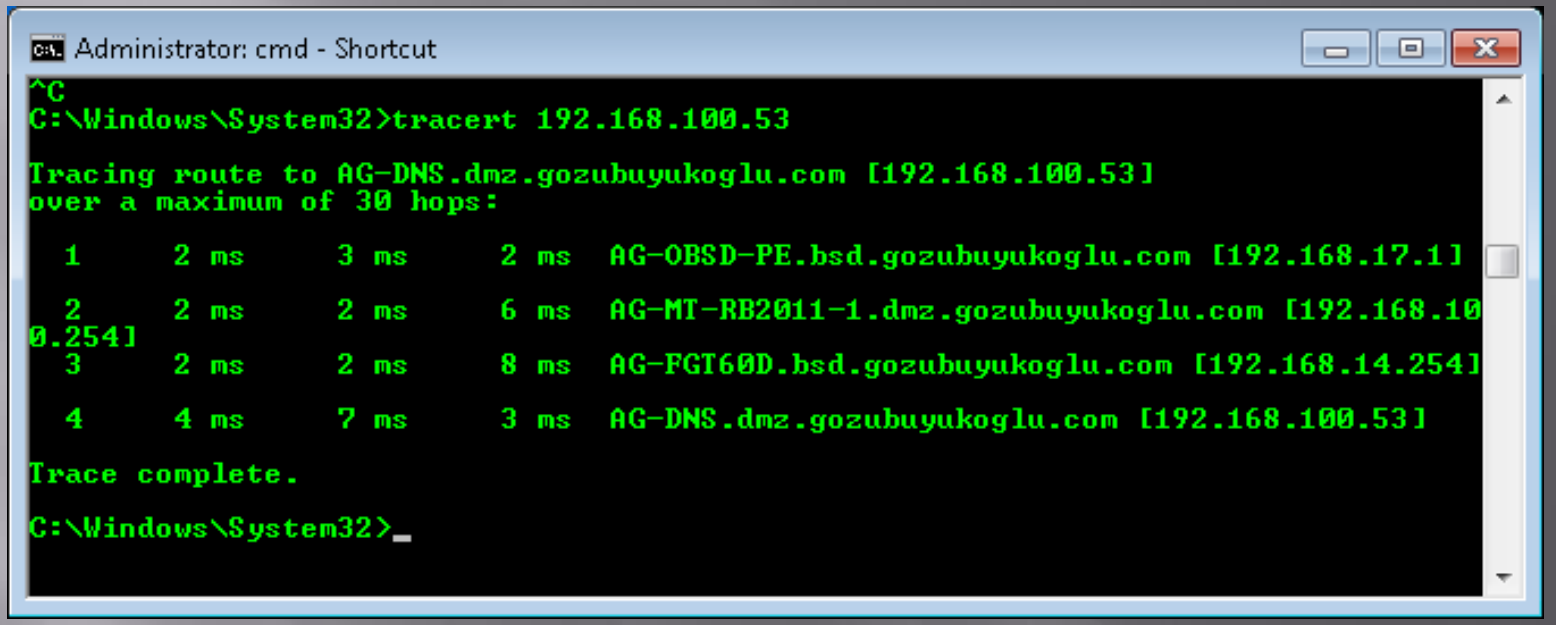
MPLS interfaces

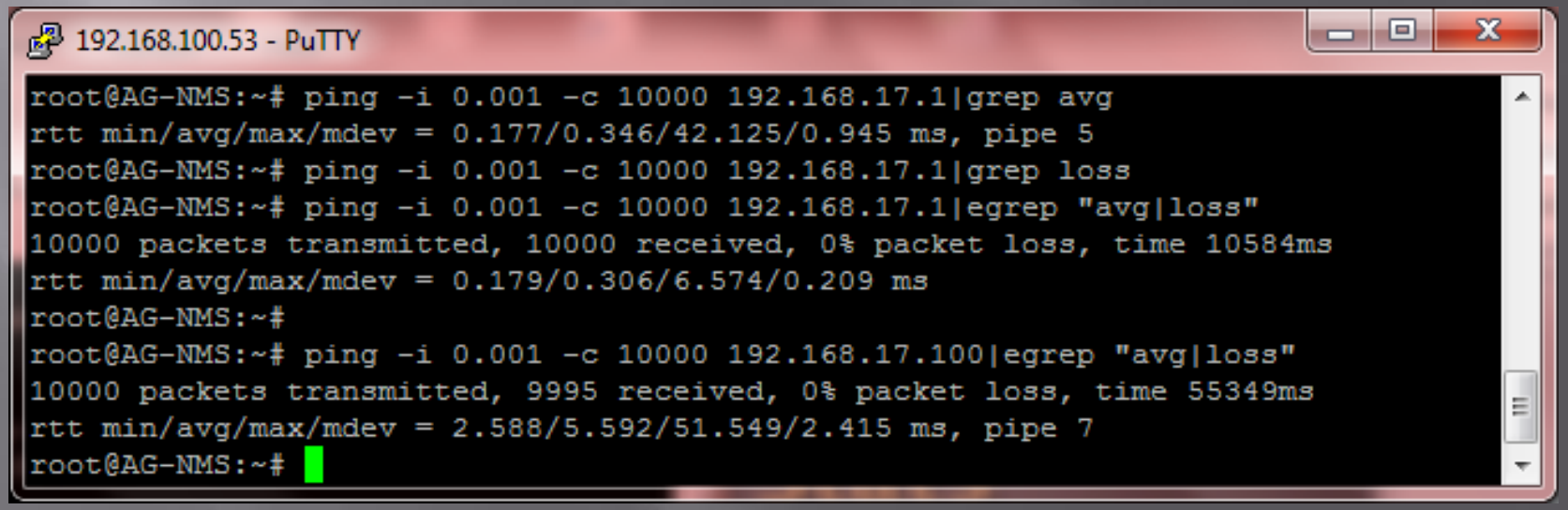


VPNv4

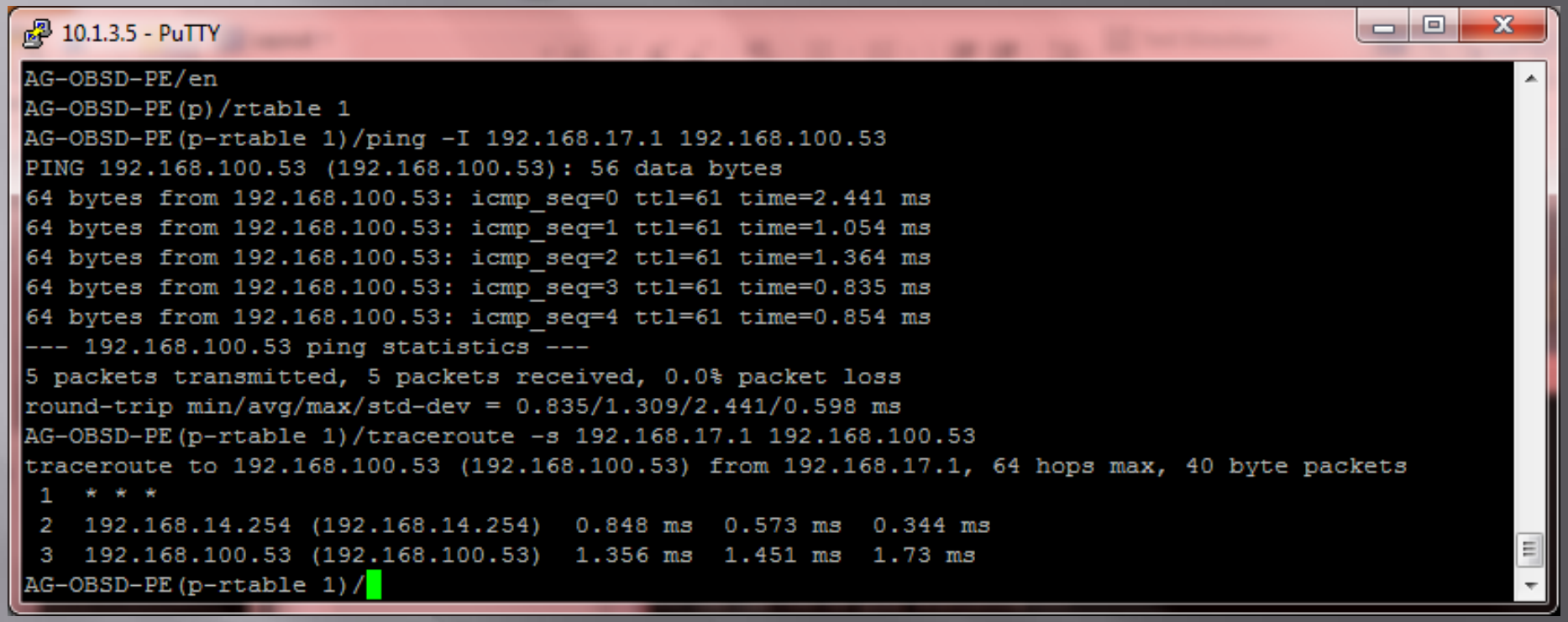

SSID: AG-OBSD
192.168.22.0/24
RD:65530:202
LABEL:12002
192.168.17.0/24
RD:65530:701
LABEL:17001
192.168.12.0/24
RD:65530:201
LABEL:12001
192.168.27.0/24
RD:65530:702
LABEL:17002
192.168.21.0/24
RD:65530:102
LABEL:11002
192.168.13.0/24
RD:65530:301
LABEL:13001
192.168.11.0/24
RD:65530:101
LABEL:11001
AG-OBSD-PE
lo1:10.1.3.5
lo2:10.1.4.5
VPN1:192.168.17.1/24
VPN2:192.168.27.1/24
AG-OBSD-PE2
lo1:10.1.3.2
lo2:10.1.4.2
VPN1:192.168.12.1/24
VPN2:192.168.22.1/24
192.168.23.0/24
RD:65530:302
LABEL:13002
AG-OBSD-PE1
lo1:10.1.3.1
lo2:10.1.4.1
VPN1:192.168.11.1/24
VPN2:192.168.21.1/24
MPLS
AG-OBSD-PE3
lo1:10.1.3.3
lo2:10.1.4.3
VPN1:192.168.13.1/24
VPN2:192.168.23.1/24
192.168.15.0/24
RD:65530:501
LABEL:dynamic
192.168.25.0/24
RD:65530:502
LABEL:dynamic
AG-MT-RB2011-3
lo1:10.1.1.3
VPN1:192.168.15.1/24
VPN2:192.168.25.1/24
AG-MT-RB2011-1
lo1:10.1.1.1
VPN1:192.168.14.1/24
VPN2:192.168.24.1/24
AG-MT-RB2011-2
lo1:10.1.1.2
VPN1:192.168.16.1/24
VPN2:192.168.26.1/24
192.168.14.0/24
RD:65530:401
LABEL:dynamic
192.168.16.0/24
RD:65530:601
LABEL:dynamic
192.168.26.0/24
RD:65530:602
LABEL:dynamic
SSID: AG-MT-VPN1
AG-FGT60D
192.168.14.254/24
192.168.24.254/24
INTERNET
0.0.0.0/0

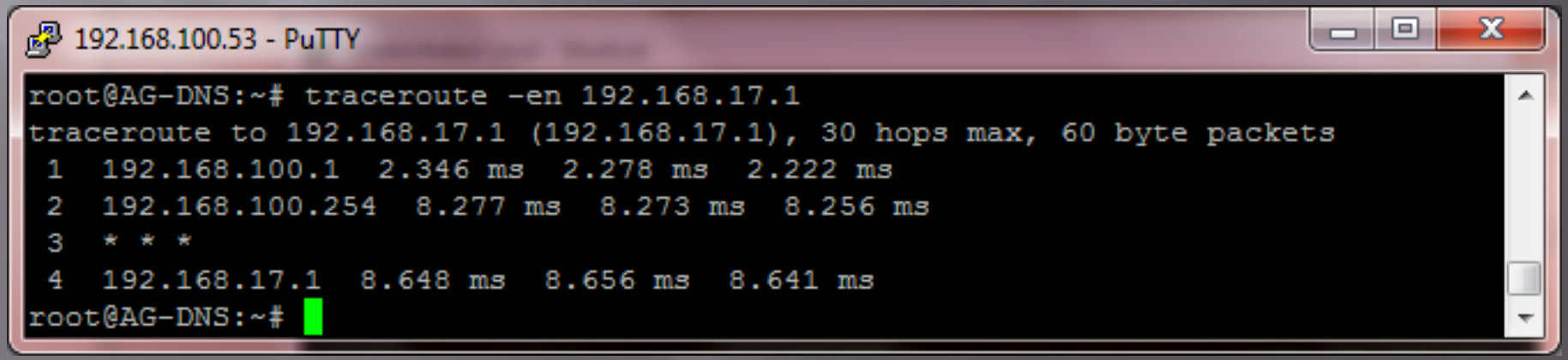
Ping & Trace Stats





Ping & Trace Stats





Q & A

Thank you for listening...

www.gozubuyukoglu.com
www.v6.gozubuyukoglu.com

arda@gozubuyukoglu.com
arda@v6.gozubuyukoglu.com

Arda GÖZÜBÜYÜKOĞLU

References

- http://www.mikrotik.com/
- http://forum.mikrotik.com/
- http://www.openbsd.org/plus54.html
- http://2011.eurobsdcon.org/papers/jeker/MPLS.pdf