

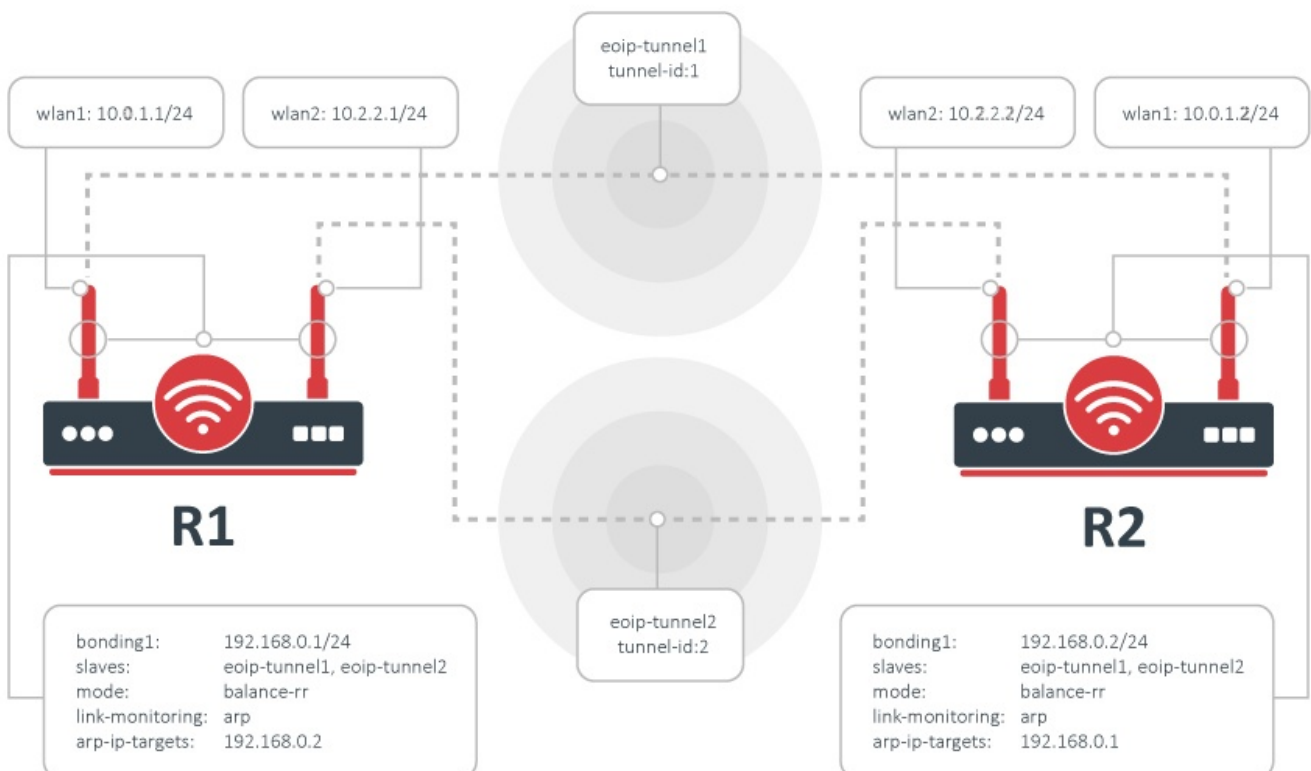
# Bonding Examples

## Bonding EoIP tunnels over two wireless links

This is an example of aggregating multiple network interfaces into a single pipe. In particular, it is shown how to aggregate multiple virtual (EoIP) interfaces to get maximum throughput (MT) with emphasis on availability.

## Network Diagram

Two routers R1 and R2 are interconnected via wireless links. Wireless interfaces on both sides have assigned IP addresses.



# Configuration

Bonding could be used only on OSI layer 2 (Ethernet level) connections. Thus we need to create EoIP interfaces on each of the wireless links. This is done as follows:

on router R1:

```
/interface eoip add remote-address=10.0.1.1/24 tunnel-id=1
/interface eoip add remote-address=10.2.2.1/24 tunnel-id=2
```

and on router R2:

```
/interface eoip add remote-address=10.0.1.2/24 tunnel-id=1
/interface eoip add remote-address=10.2.2.2/24 tunnel-id=2
```

The second step is to add a bonding interface and specify EoIP interfaces as slaves:

R1:

```
/interface bonding add slaves=eoip-tunnel1,eoip-tunnel2 mode=balance-rr
```

R2:

```
/interface bonding add slaves=eoip-tunnel1,eoip-tunnel2 mode=balance-rr
```

The last step is to add IP addresses to the bonding interfaces:

R1:

```
/ip address add address 192.168.0.1/24 interface=bonding1
```

R2:

```
/ip address add address 192.168.0.2/24 interface=bonding1
```

## Test the configuration

Now two routers are able to reach each other using addresses from the 192.168.0.0/24 network. To verify bonding interface functionality, do the following:

R1:

```
/interface monitor-traffic eoip-tunnel1,eoip-tunnel2
```

R2:

```
/tool bandwidth-test 192.168.0.1 direction=transmit
```

You should see that traffic is distributed equally across both EoIP interfaces:

```
/int monitor-traffic eoip-tunnel1,eoip-tunnel2
received-packets-per-second: 685    685
```

```
received-bits-per-second: 8.0Mbps 8.0Mbps
sent-packets-per-second: 21 20
sent-bits-per-second: 11.9kbps 11.0kbps
received-packets-per-second: 898 899
received-bits-per-second: 10.6Mbps 10.6Mbps
sent-packets-per-second: 20 21
sent-bits-per-second: 11.0kbps 11.9kbps
received-packets-per-second: 975 975
received-bits-per-second: 11.5Mbps 11.5Mbps
sent-packets-per-second: 22 22
sent-bits-per-second: 12.4kbps 12.3kbps
received-packets-per-second: 980 980
received-bits-per-second: 11.6Mbps 11.6Mbps
sent-packets-per-second: 21 21
sent-bits-per-second: 11.9kbps 11.8kbps
received-packets-per-second: 977 977
received-bits-per-second: 11.6Mbps 11.5Mbps
sent-packets-per-second: 21 21
sent-bits-per-second: 11.9kbps 11.8kbps
-- [Q quit|D dump|C-z pause]
```

## Link Monitoring

It is easy to notice that with the configuration above as soon as any individual link fails, the bonding interface throughput collapses. That's because no link monitoring is performed, consequently, the bonding driver is unaware of problems with the underlying links. Enabling link monitoring is a must in most bonding configurations. To enable ARP link monitoring, do the following:

R1:

```
/interface bonding set bonding1 link-monitoring=arp arp-ip-targets=192.168.0.2
```

R2:

```
/interface bonding set bonding1 link-monitoring=arp arp-ip-targets=192.168.0.1
```

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