Load Balancing Using iBGP Routing

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About Presenter

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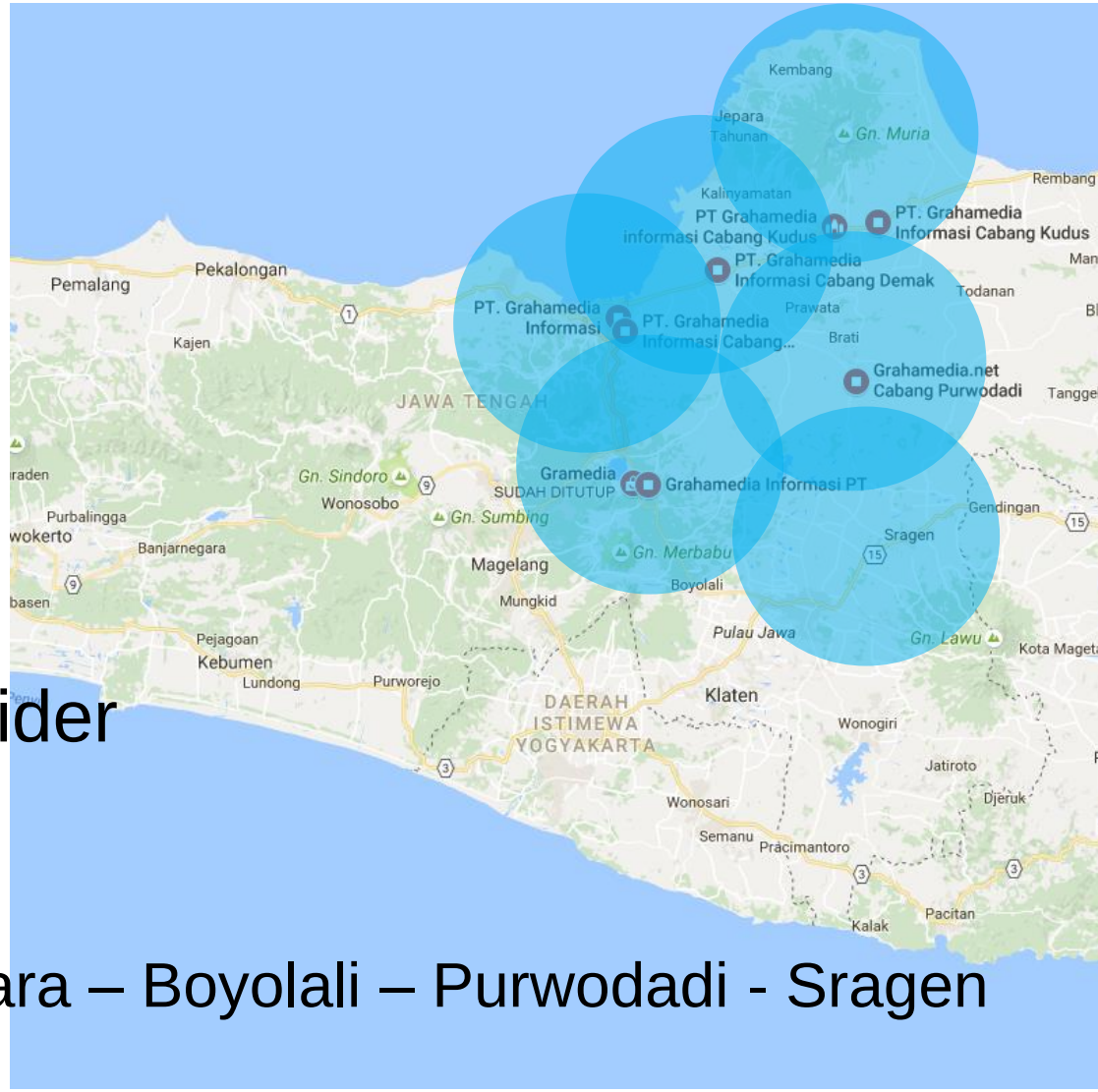

Salatiga – Semarang – Demak – Kudus – Jepara – Boyolali – Purwodadi - Sragen

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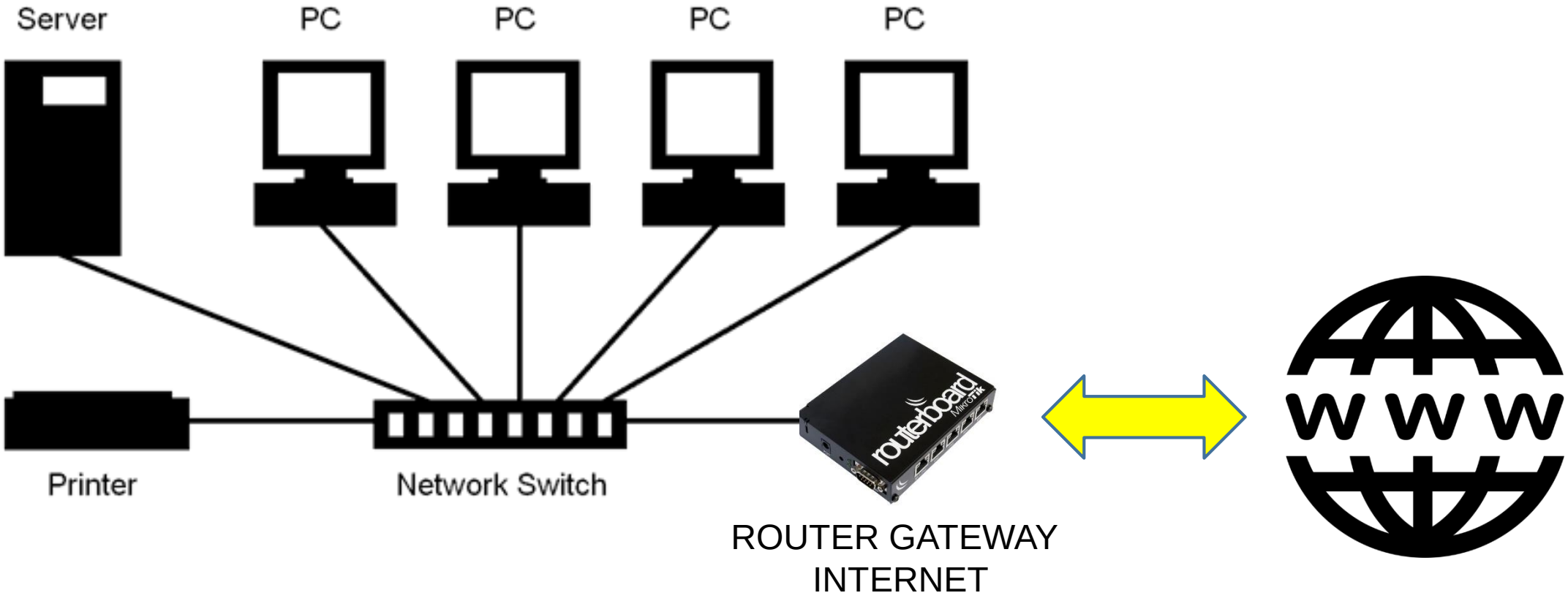
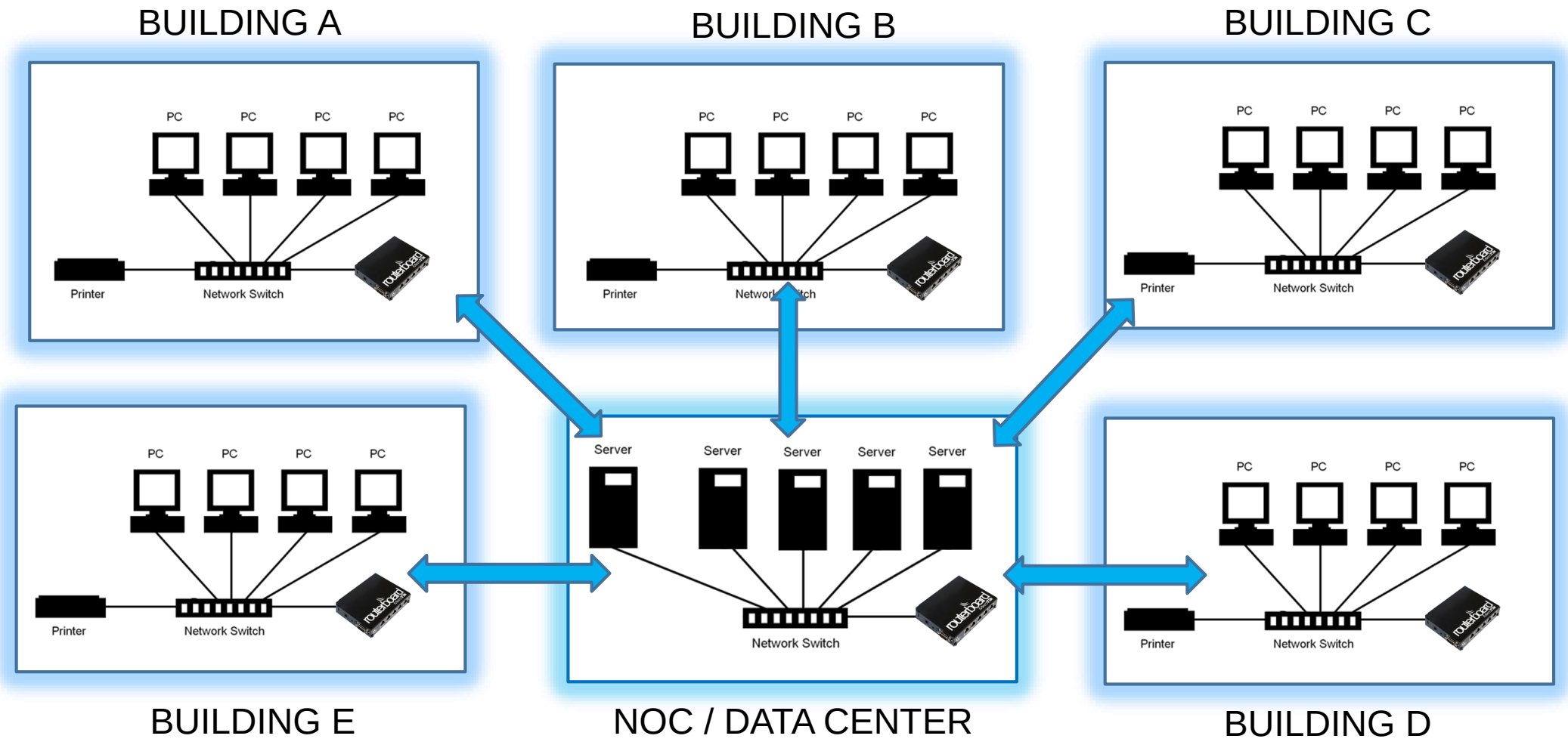
LOAD BALANCING

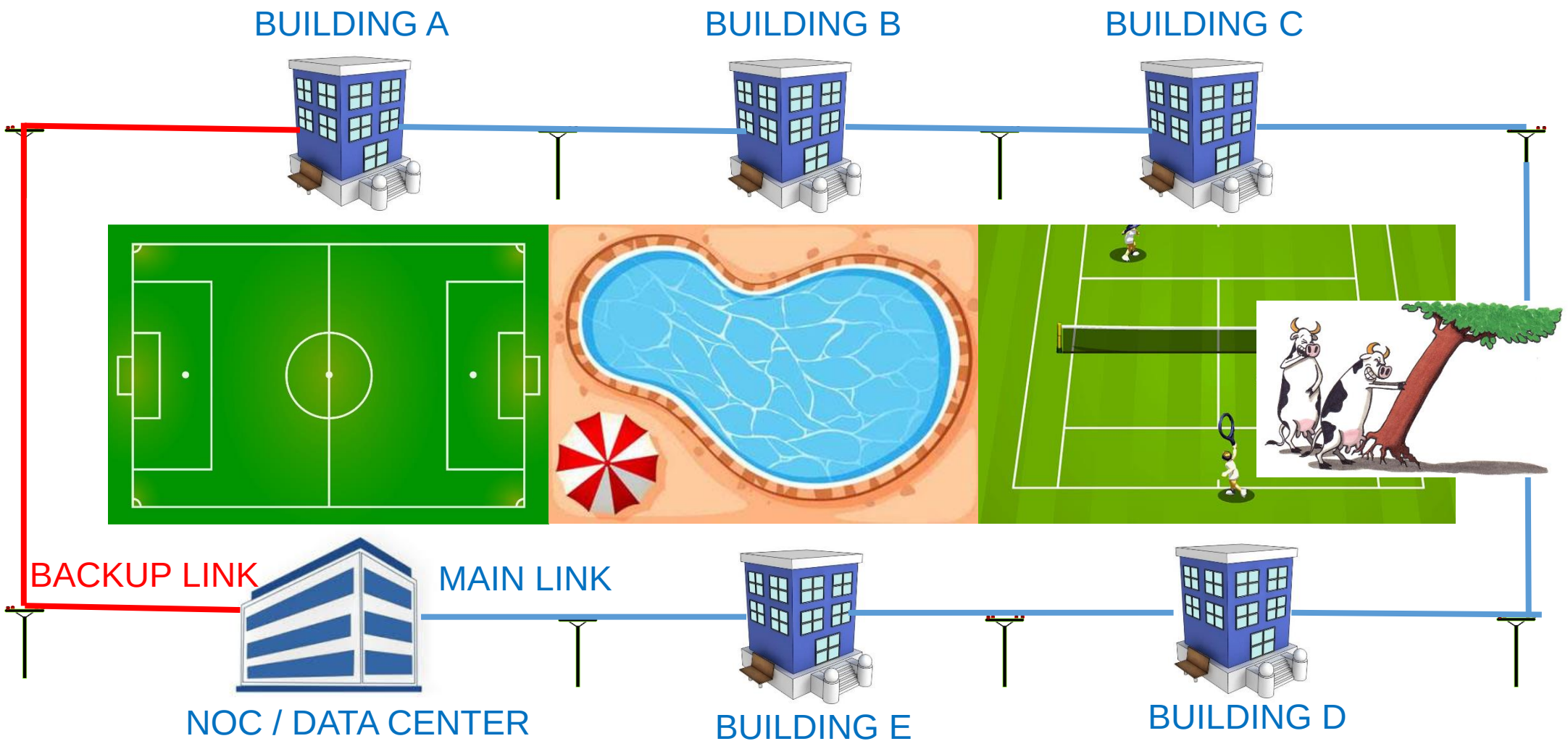
SIMPLE NETWORK LAN



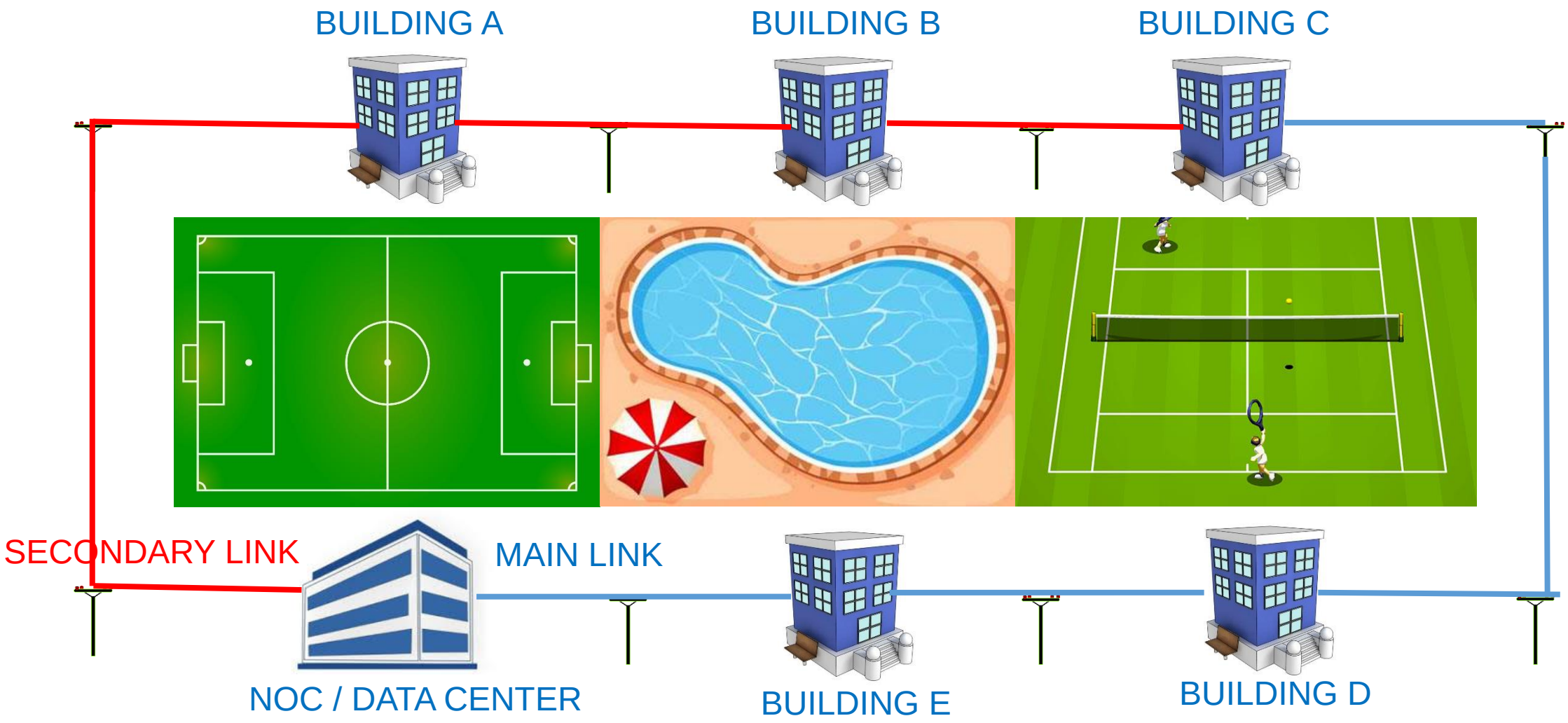
MULTIPLE LAN CONNECTION - STAR



BUS NETWORK

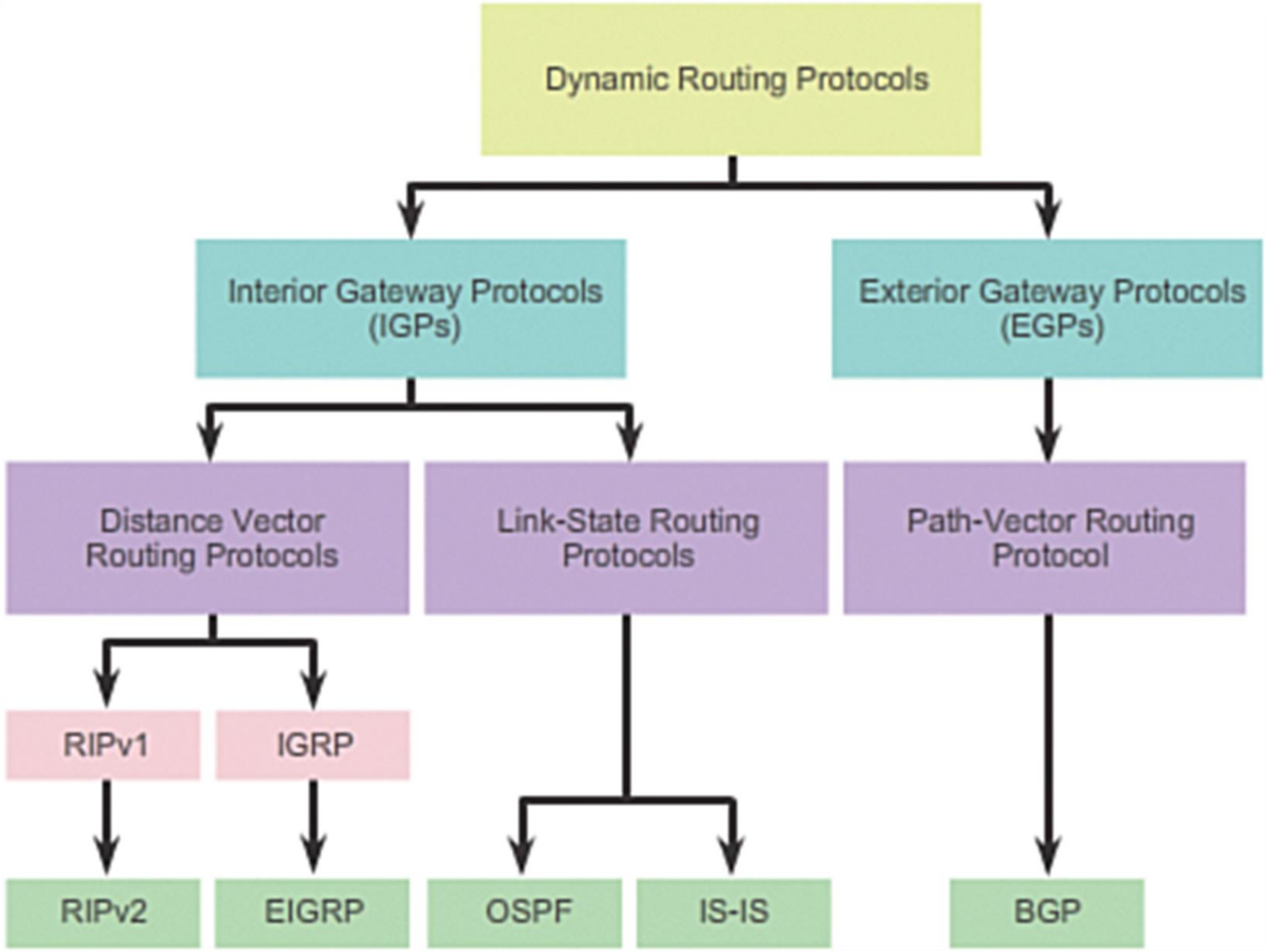

BUILDING A
BUILDING B
BUILDING C
BACKUP LINK
MAIN LINK
NOC / DATA CENTER
BUILDING E
BUILDING D

LOAD BALANCING – BUS NETWORK



DYNAMIC ROUTING

DYNAMIC ROUTING



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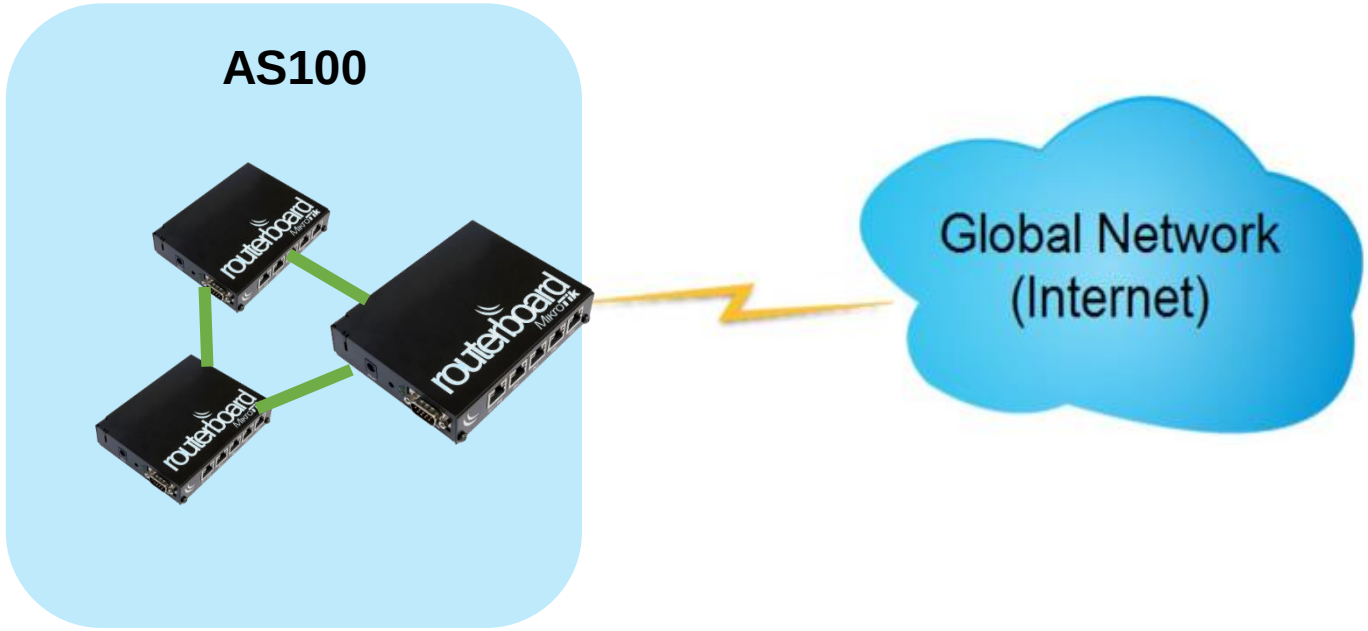
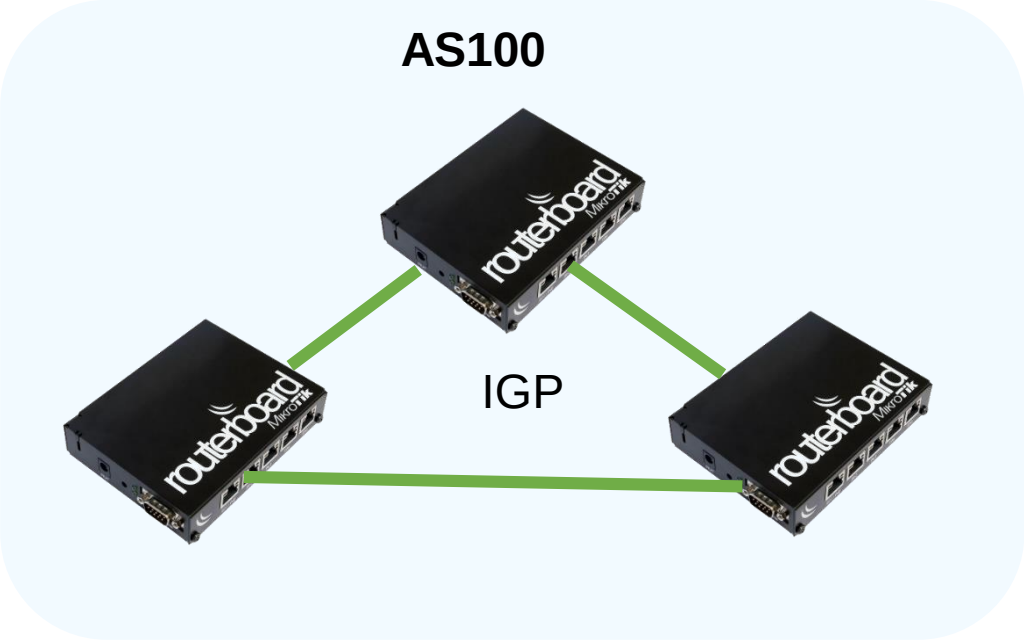
AUTONOMOUS SYSTEM



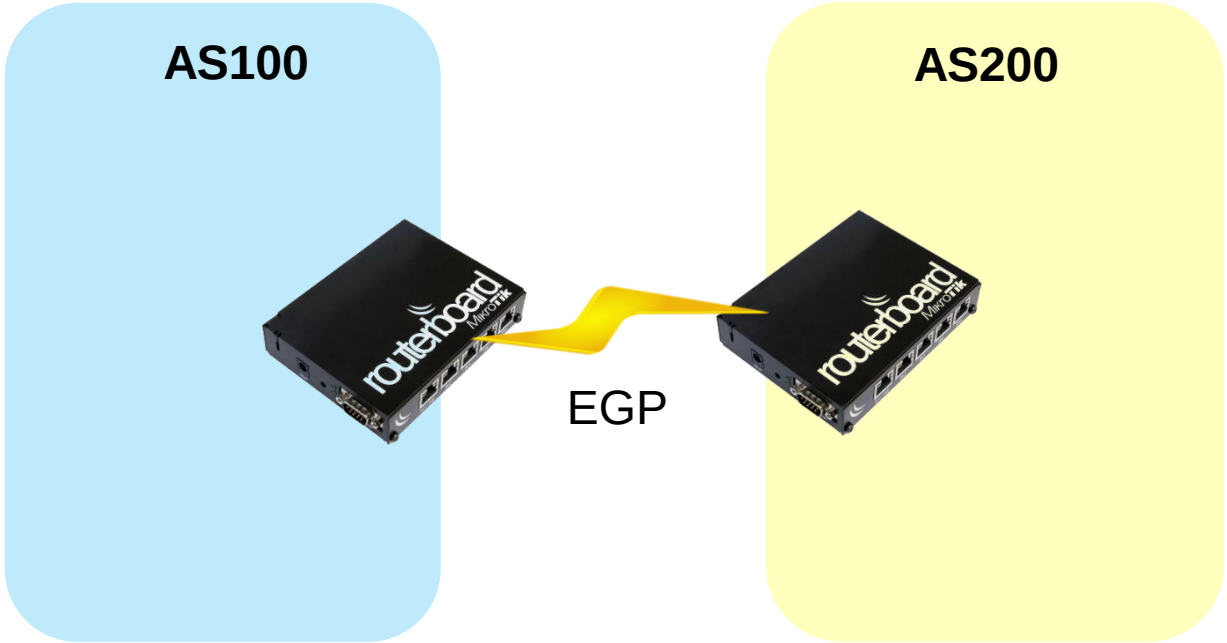
DYNAMIC ROUTING

- INTERIOR GATEWAY PROTOCOL



- RIP, OSPF

- EXTERIOR GATEWAY PROTOCOL



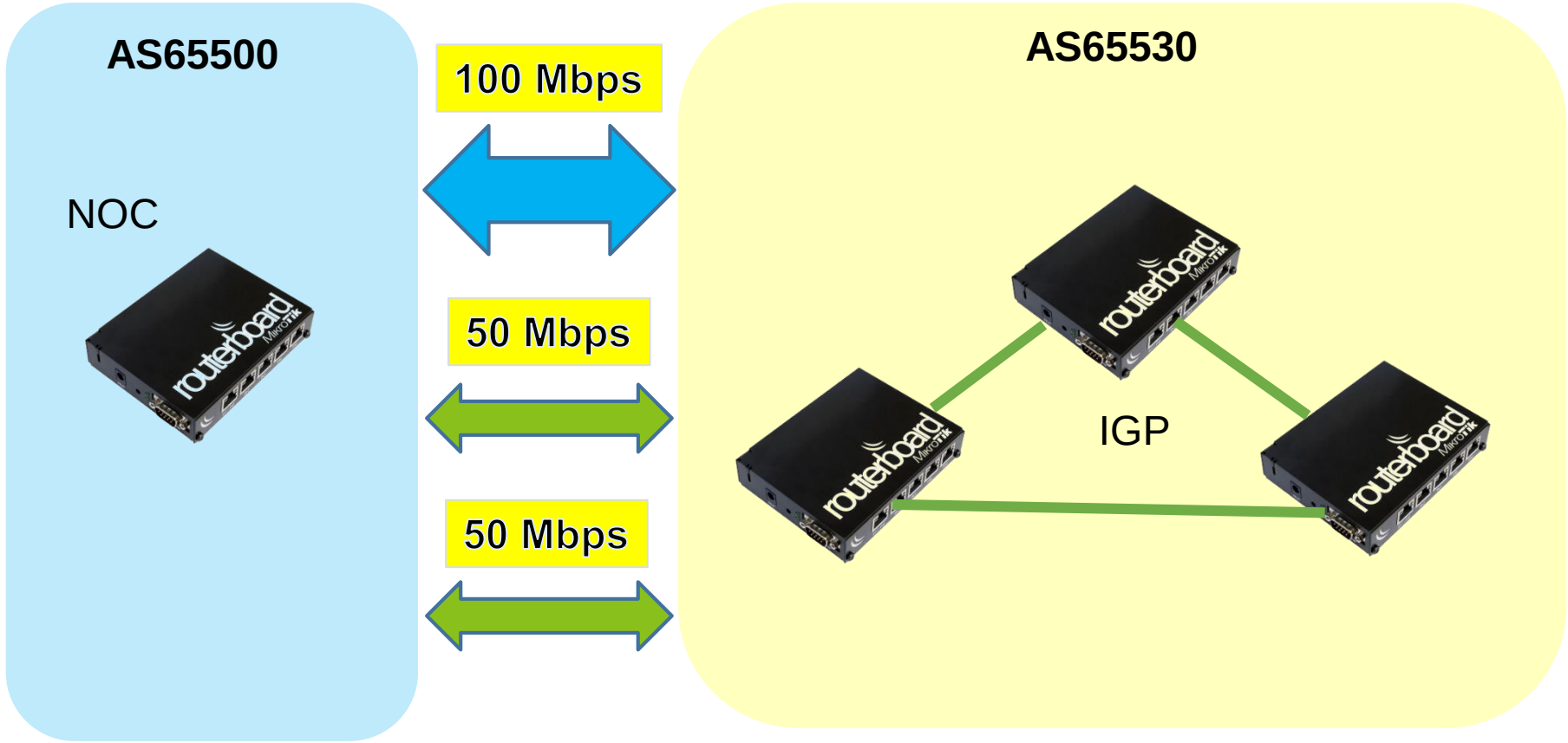
- BGP

Default Administrative Distance

Route Source	Distance
Connected Interface	0
Static Route	1
Enhanced IGRP Summary Route	5
External BGP	20
Internal Enhanced IGRP	90
IGRP	100
OSPF	110
IS-IS	115
RIP	120
EGP	140
External Enhanced IGRP	170
Internal BGP	200
Unknown	255

Why iBGP ?

MAIN CAPACITY ≠ SECONDARY CAPACITY



INTERNAL BGP (iBGP)

- Antar Router tidak perlu terkoneksi langsung
  (Directly Connected)
- **iBGP harus terkoneksi Full Mesh** :
  - Membantu Remote Network menggunakan Best Path
  - Redundant koneksi diantara peer Internal
- iBGP peer tidak meng Advertise kembali Network yang dipelajari dari peer internal lainnya.
  (harus menggunakan eBGP peer)
- **iBGP akan menjadi penentu keputusan external peer mana yang digunakan untuk mencapai remote network**

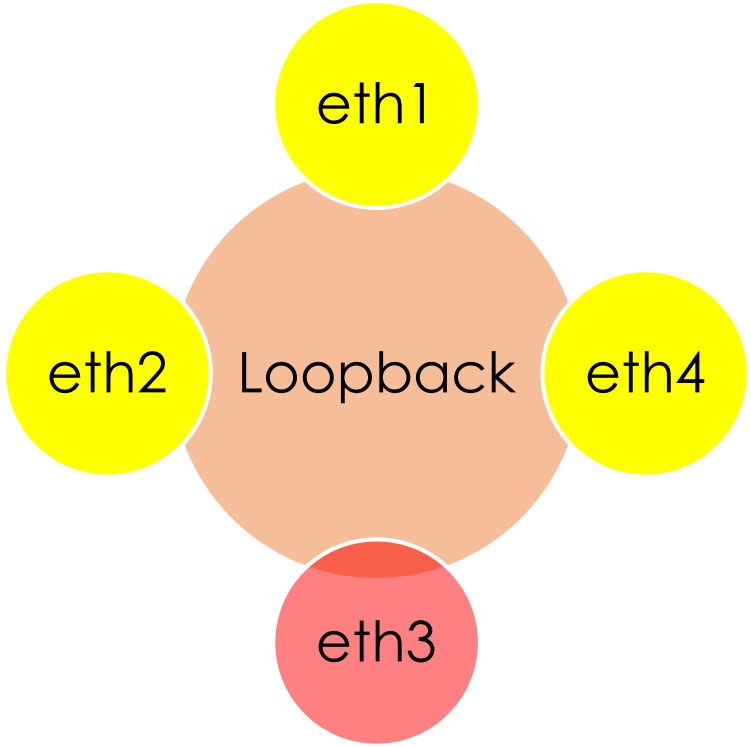
IP iBGP Peering

- Peering dengan menggunakan IP Address disalah satu interface, menyebabkan ketergantungan terhadap salah satu link fisik.
- Jika link tersebut putus, Peer iBGP akan down, IP akan tidak teradvertise.
- Untuk fail over peering antar router iBGP, harus menggunakan IP Loopback

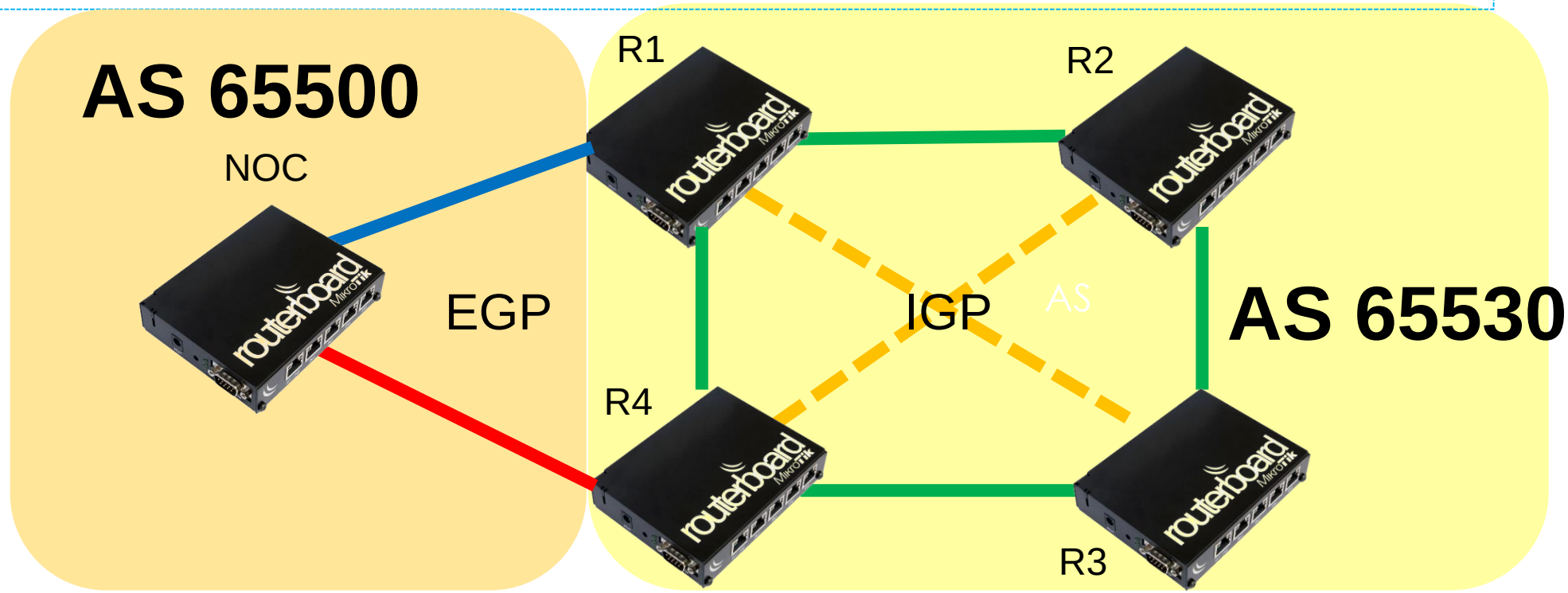
LOOP BACK

- iBGP dan OSPF menggunakan Alamat IP loopback untuk interkoneksi antar peer, mengapa ?

Karena Interface Loopback tidak akan down

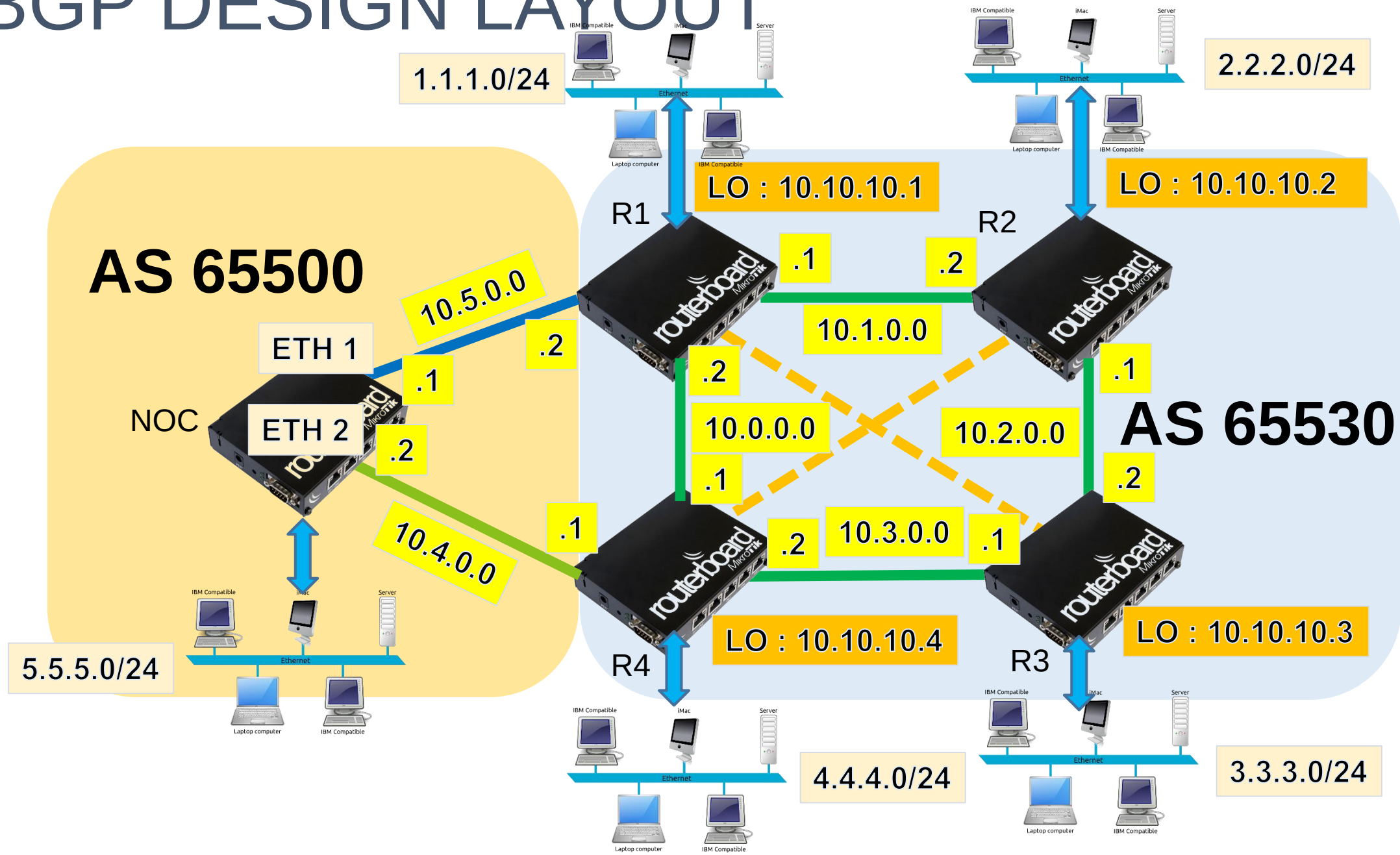


iBGP Design Plan



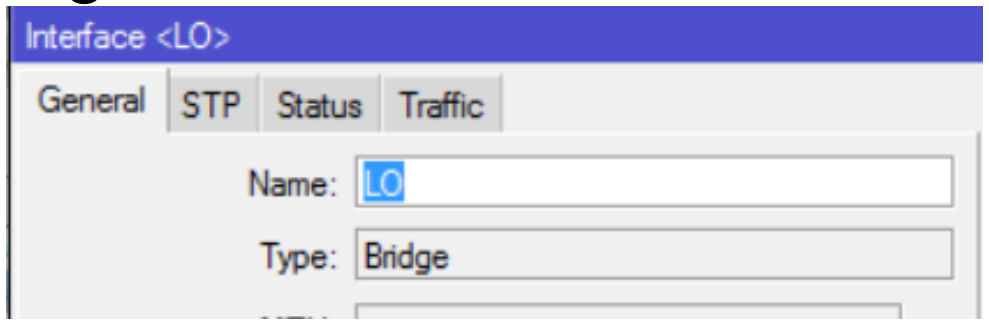
- Full Mesh Peer dalam 1 ASN
- Menggunakan OSPF sebagai IGP
- iBGP untuk memilih Best Path untuk akses ke Internet / Data Center

iBGP DESIGN LAYOUT

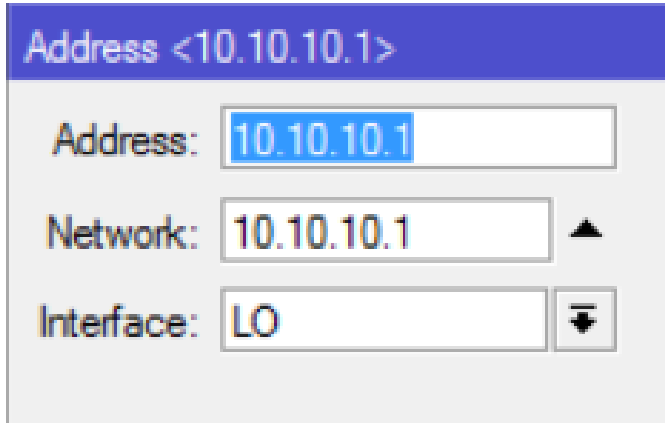


SETUP LOOPBACK INTERFACE

- Buat interface “bridge-LO”

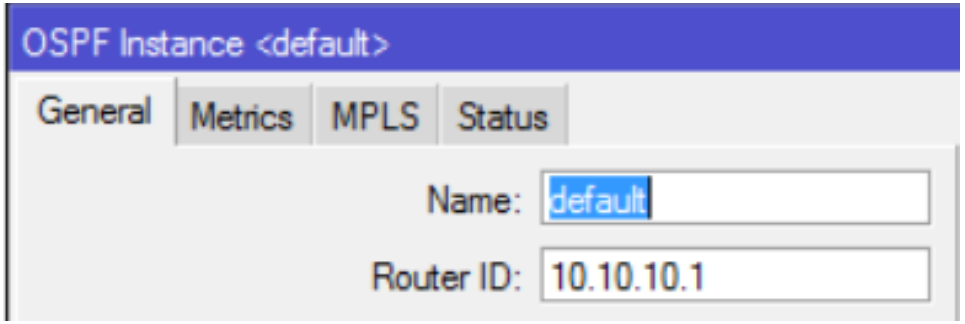


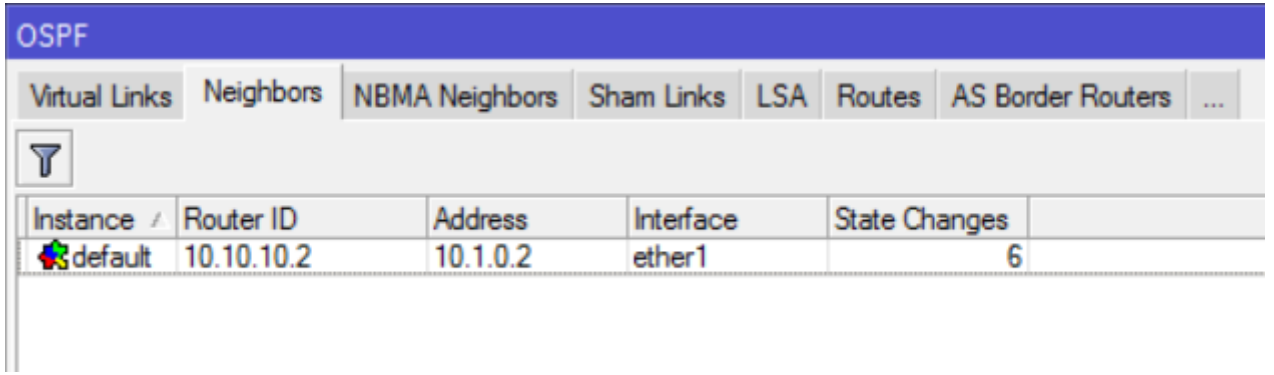
- Tambahkan IP Loopback di “bridge-LO”

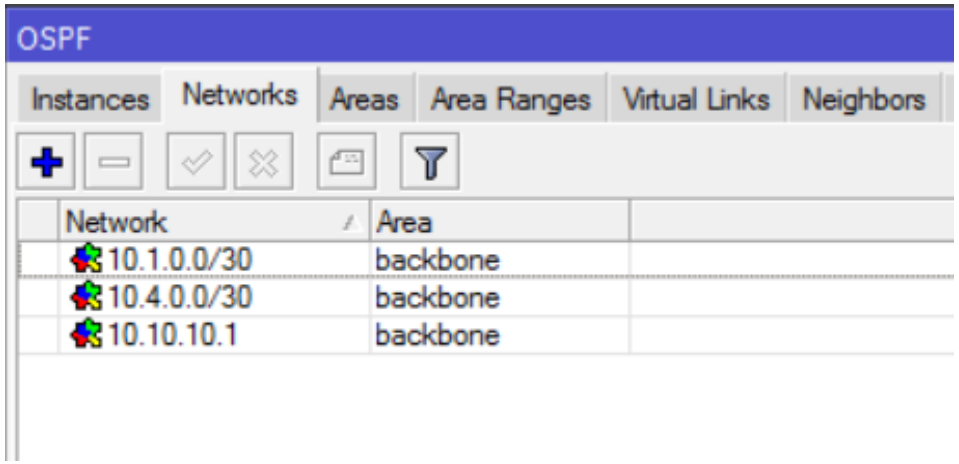


R1

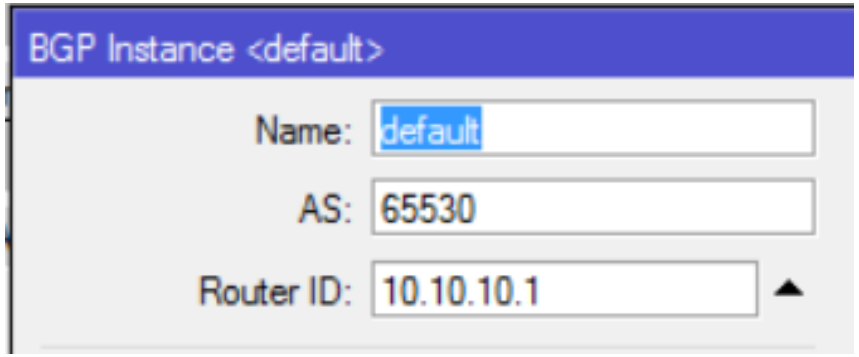
INSTALL OSPF (IGP)



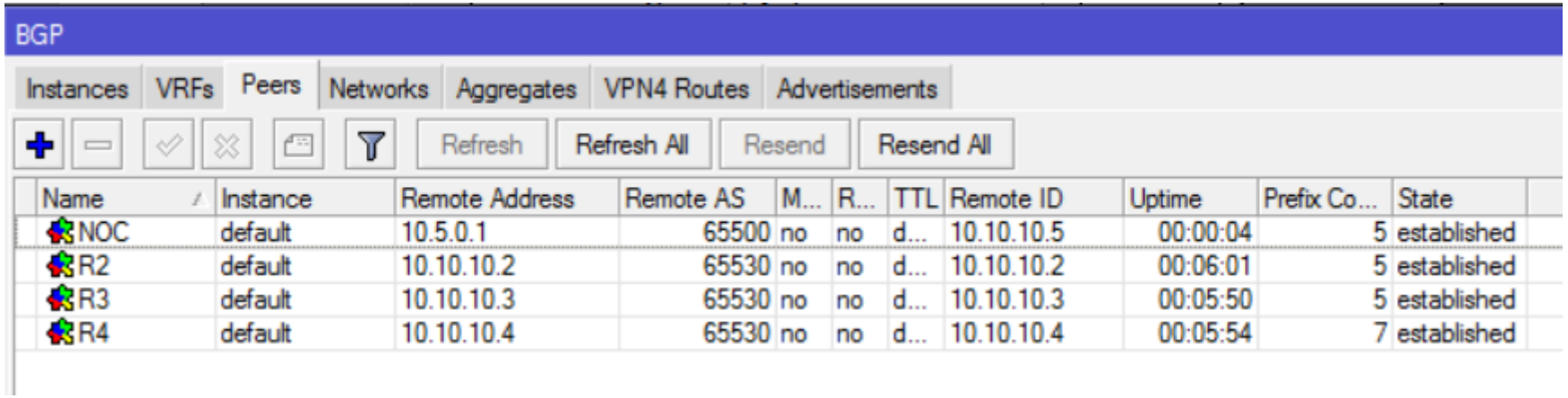




INSTALL iBGP



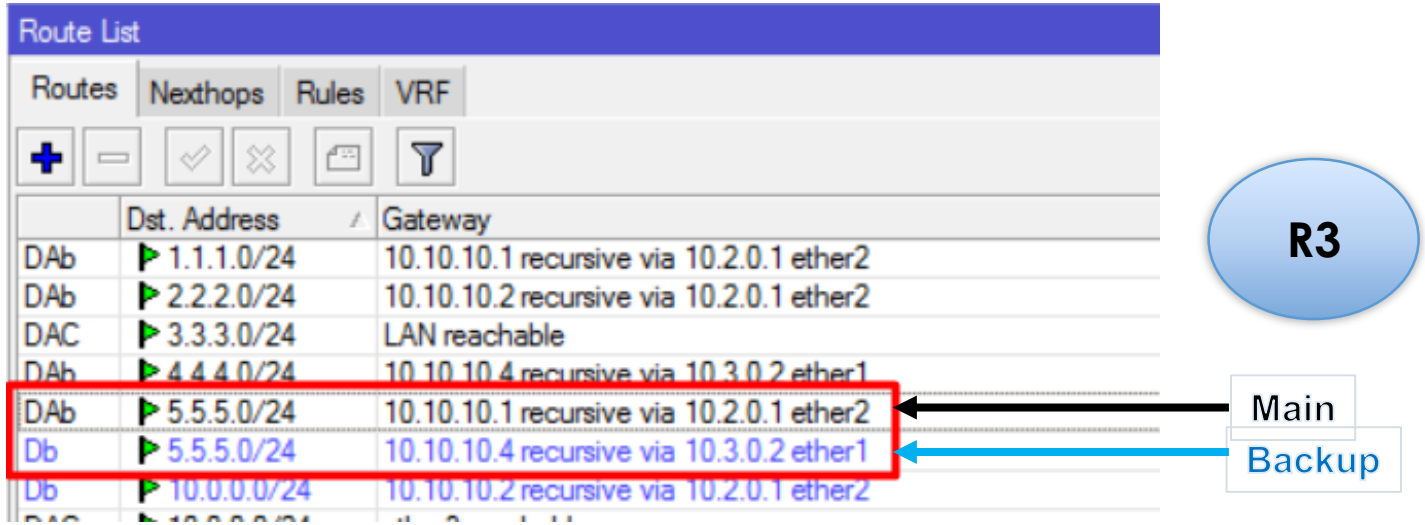
R1

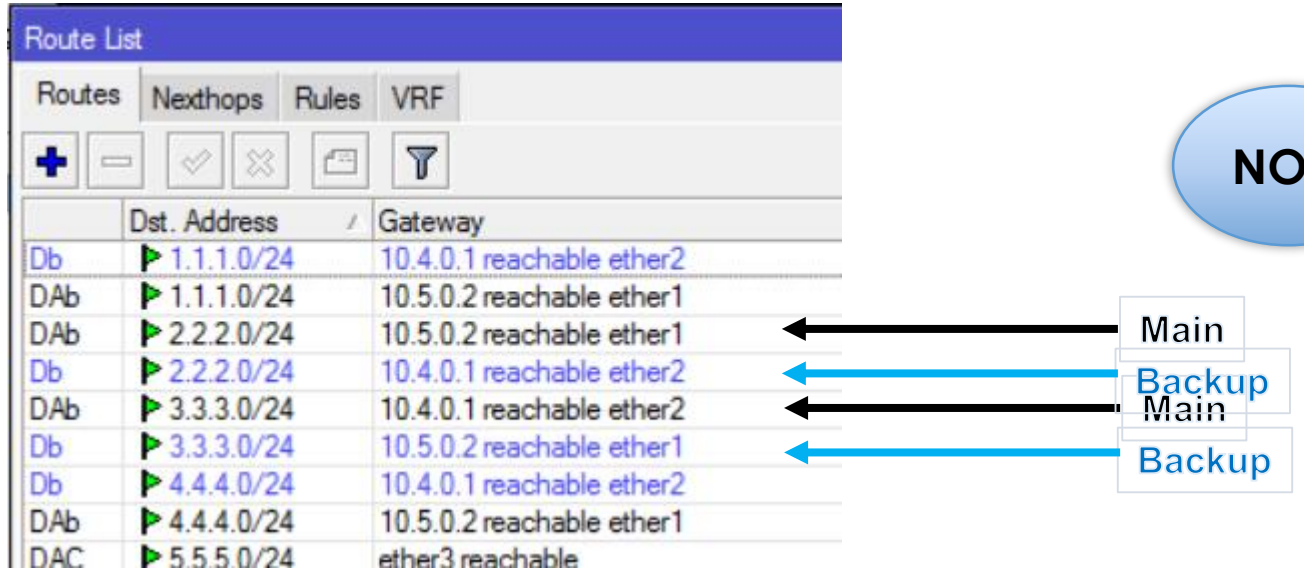


Name	Instance	Remote Address	Remote AS	M...	R...	TTL	Remote ID	Uptime	Prefix Co...	State
NOC	default	10.5.0.1	65500	no	no	d...	10.10.10.5	00:00:04	5	established
R2	default	10.10.10.2	65530	no	no	d...	10.10.10.2	00:06:01	5	established
R3	default	10.10.10.3	65530	no	no	d...	10.10.10.3	00:05:50	5	established
R4	default	10.10.10.4	65530	no	no	d...	10.10.10.4	00:05:54	7	established

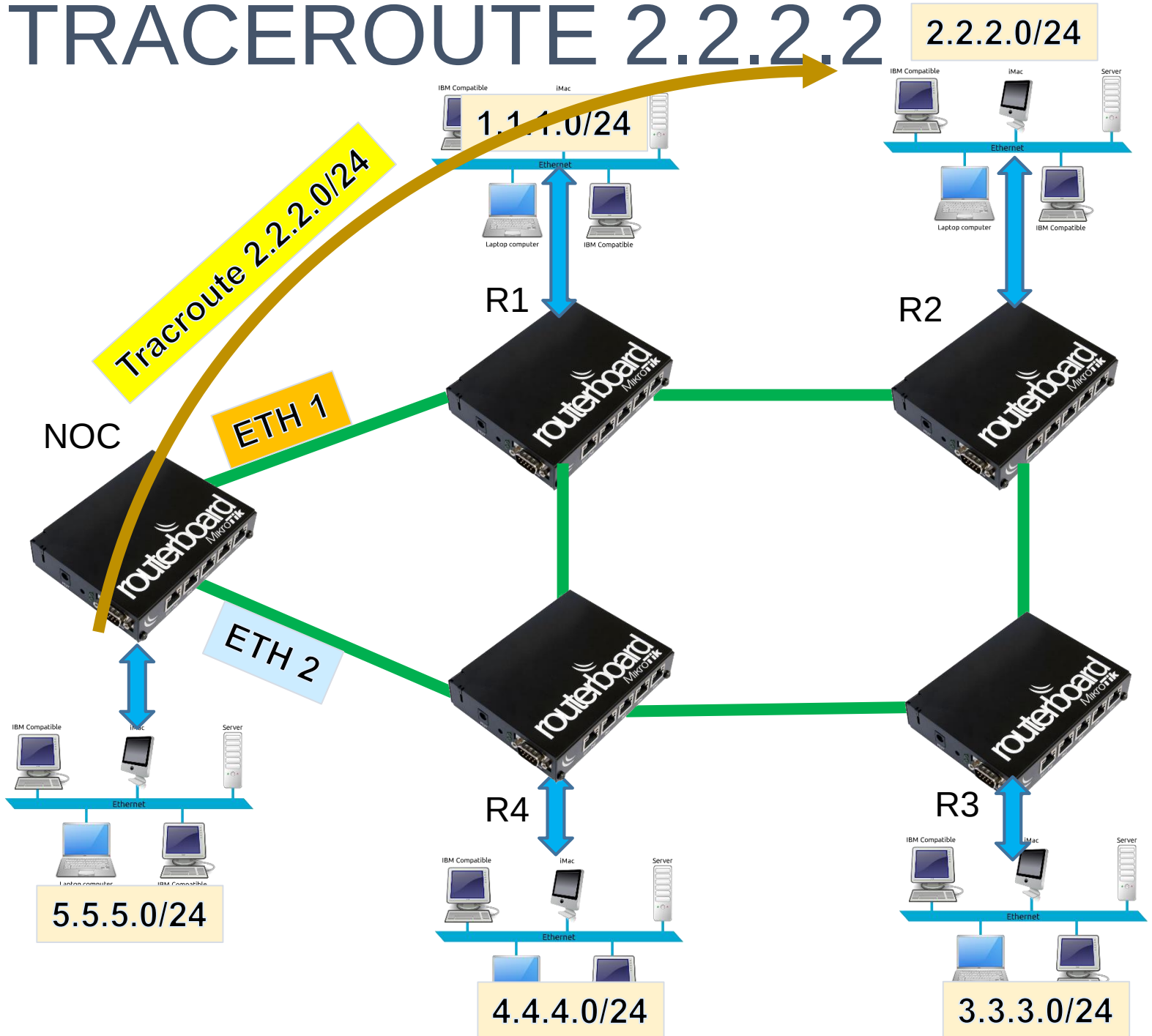
R1

IP ROUTE

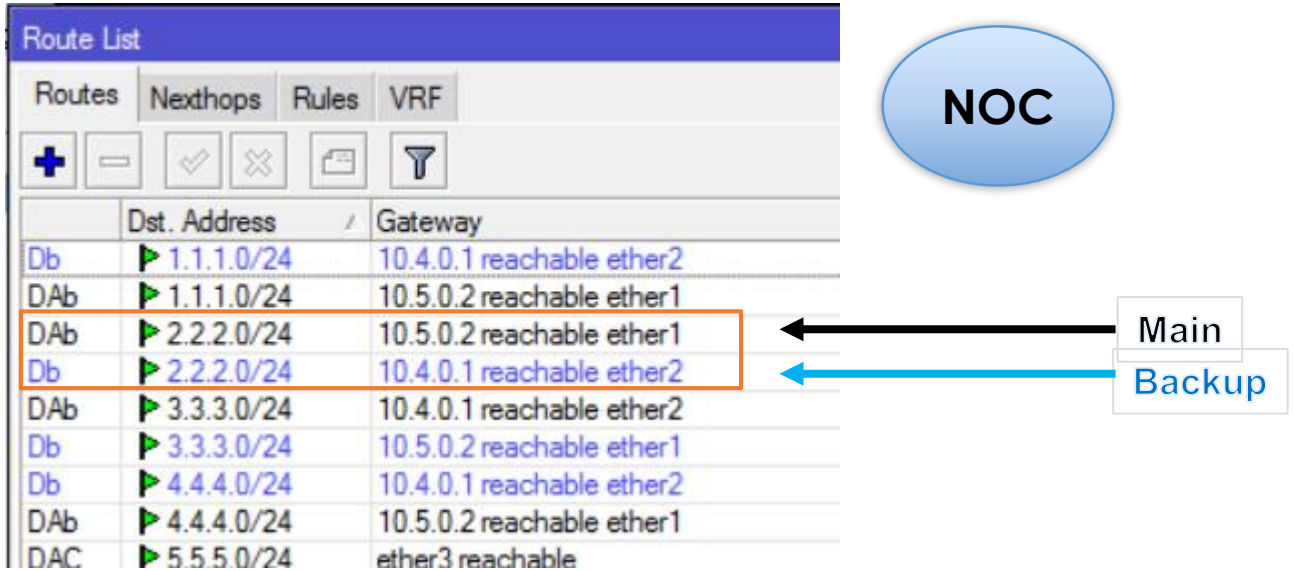

Route List
Routes
Nexthops
Rules
VRF
Dst. Address
Gateway
DAb 1.1.1.0/24 10.10.10.1 recursive via 10.2.0.1 ether2
DAb 2.2.2.0/24 10.10.10.2 recursive via 10.2.0.1 ether2
DAC 3.3.3.0/24 LAN reachable
DAb 4.4.4.0/24 10.10.10.4 recursive via 10.3.0.2 ether1
DAb 5.5.5.0/24 10.10.10.1 recursive via 10.2.0.1 ether2
Db 5.5.5.0/24 10.10.10.4 recursive via 10.3.0.2 ether1
Db 10.0.0.0/24 10.10.10.2 recursive via 10.2.0.1 ether2
R3
Main
Backup


Route List
Routes
Nexthops
Rules
VRF
Dst. Address
Gateway
Db 1.1.1.0/24 10.4.0.1 reachable ether2
DAb 1.1.1.0/24 10.5.0.2 reachable ether1
DAb 2.2.2.0/24 10.5.0.2 reachable ether1
Db 2.2.2.0/24 10.4.0.1 reachable ether2
DAb 3.3.3.0/24 10.4.0.1 reachable ether2
Db 3.3.3.0/24 10.5.0.2 reachable ether1
Db 4.4.4.0/24 10.4.0.1 reachable ether2
DAb 4.4.4.0/24 10.5.0.2 reachable ether1
DAC 5.5.5.0/24 ether3 reachable
NOC
Main
Backup
Main
Backup

TEST TRACEROUTE 2.2.2.2

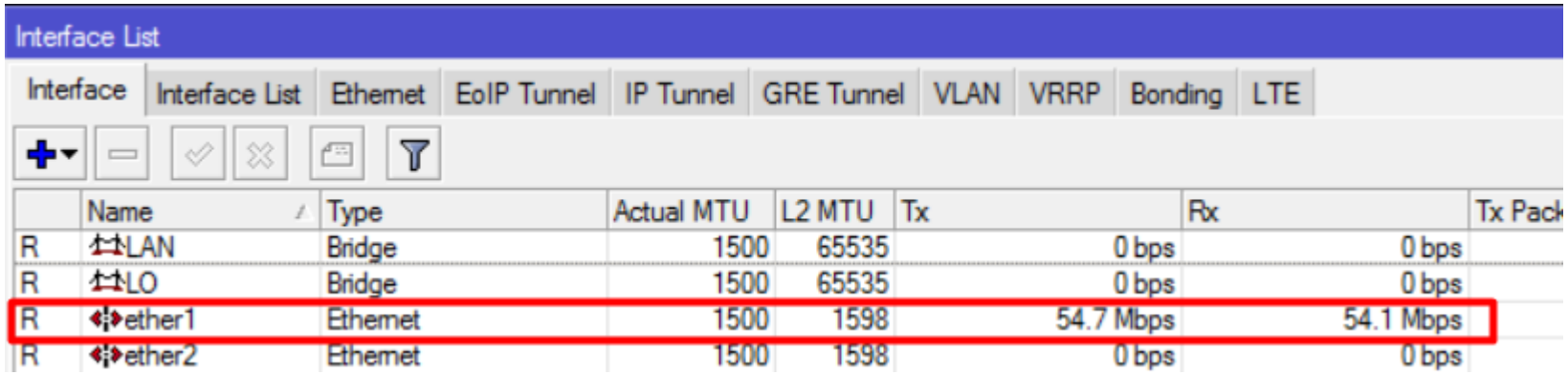


2.2.2.2 via ether1, Cara ubah via ether2 ?

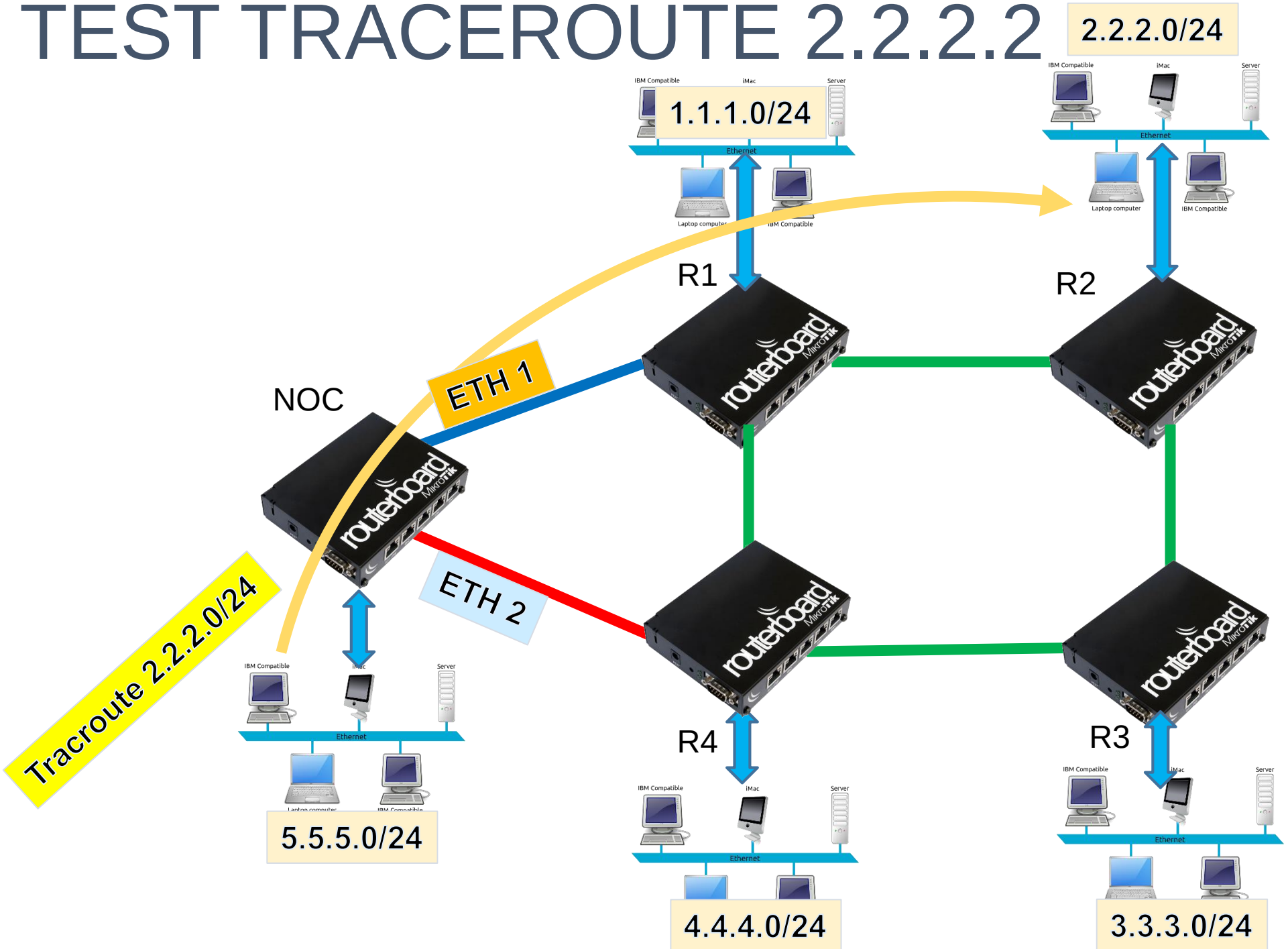


Main

Backup



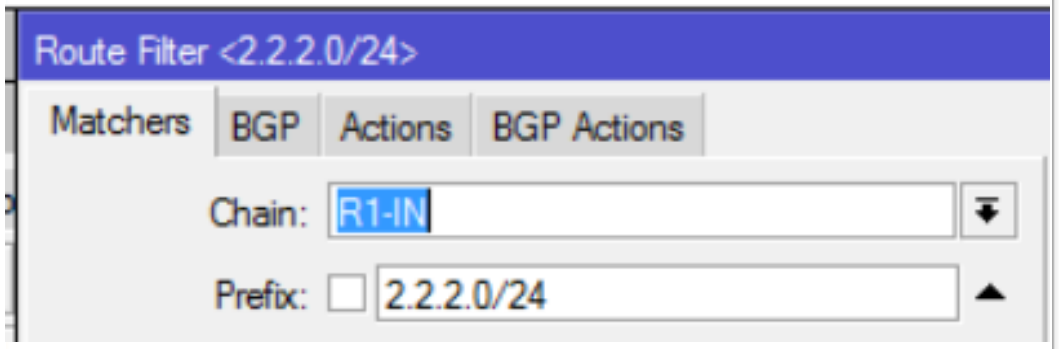
TEST TRACEROUTE 2.2.2.2

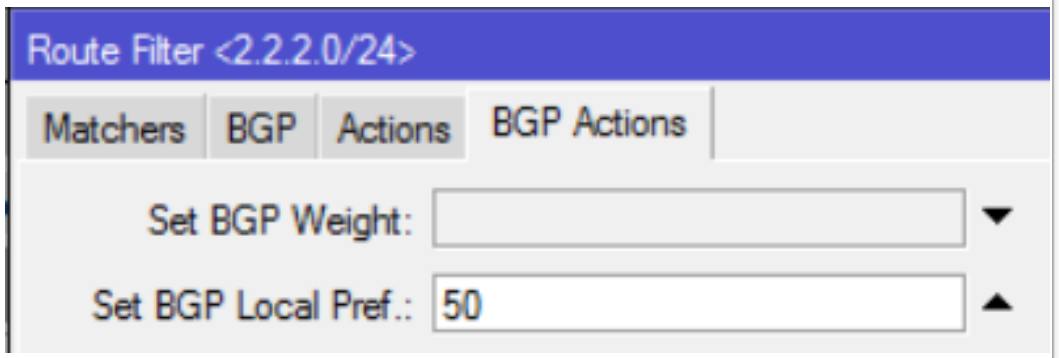


Urutan Prioritas iBGP Parameter

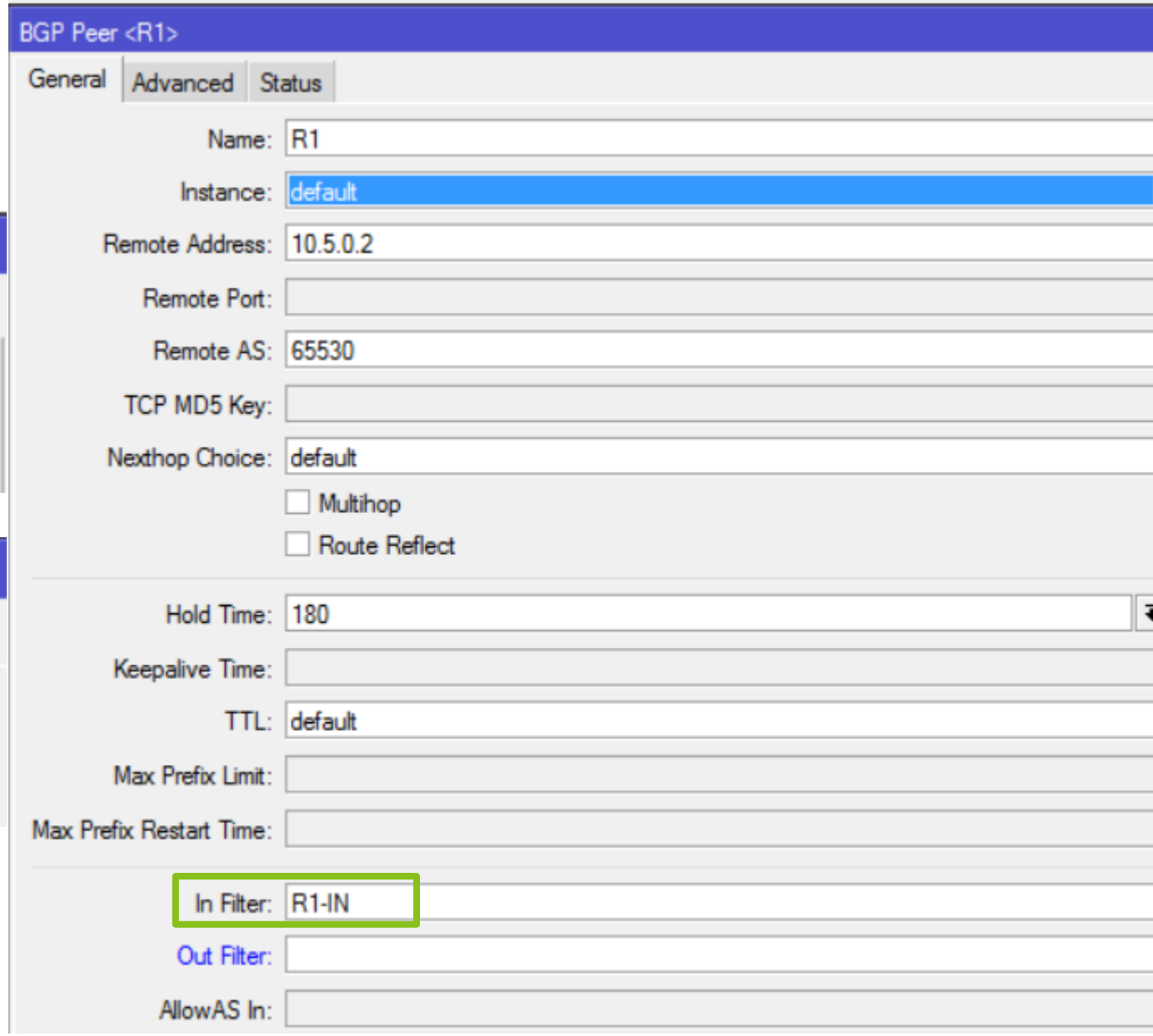
- Next-hop validation
- Highest WEIGHT (default 0)
- **Highest LOCAL-PREF (default 100) ← OUT TRAFFIC**
- Locally originated path (aggregate, BGP network)
- Lowest origin type (IGP,EGP,Incomplete)
- **Lowest MED (default 0) ← IN TRAFFIC**
- Prefer eBGP over iBGP
- Prefer the route with lowest router ID or ORIGINATOR_ID
- Shortest route reflection cluster (default 0)
- Prefer the path that comes from the lowest neighbor address

ROUTE FILTER

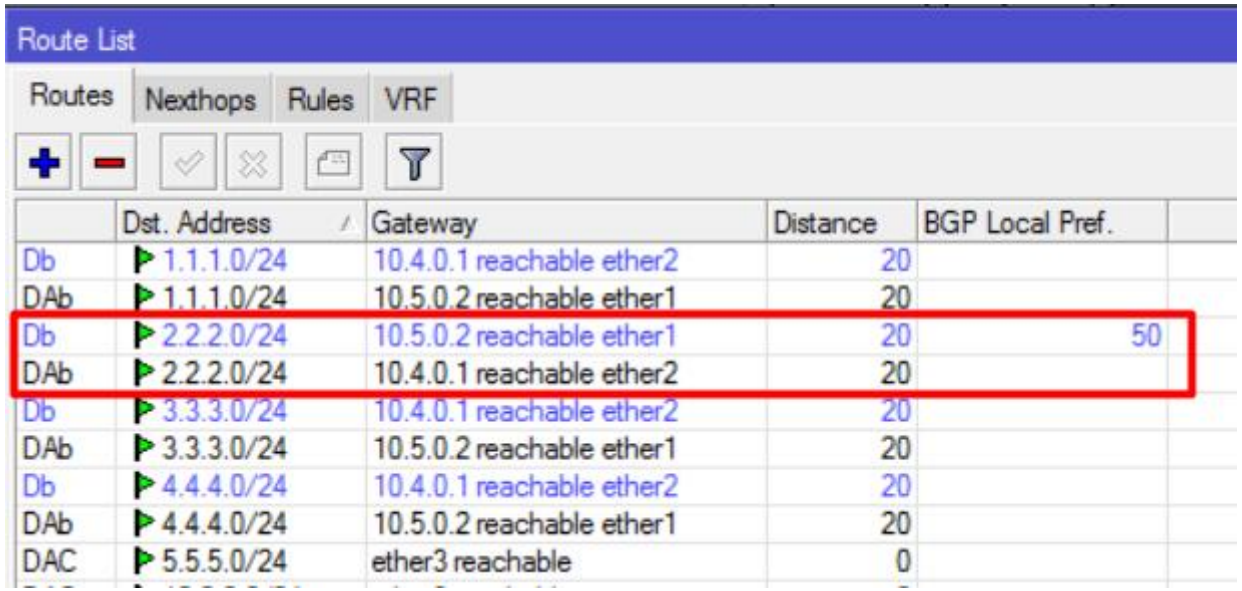




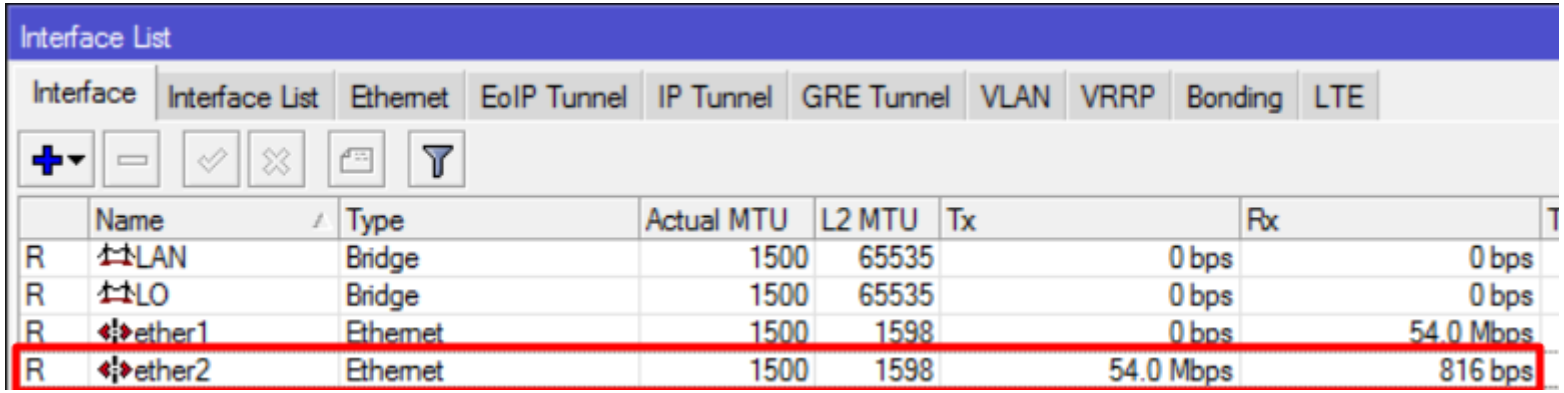
NOC



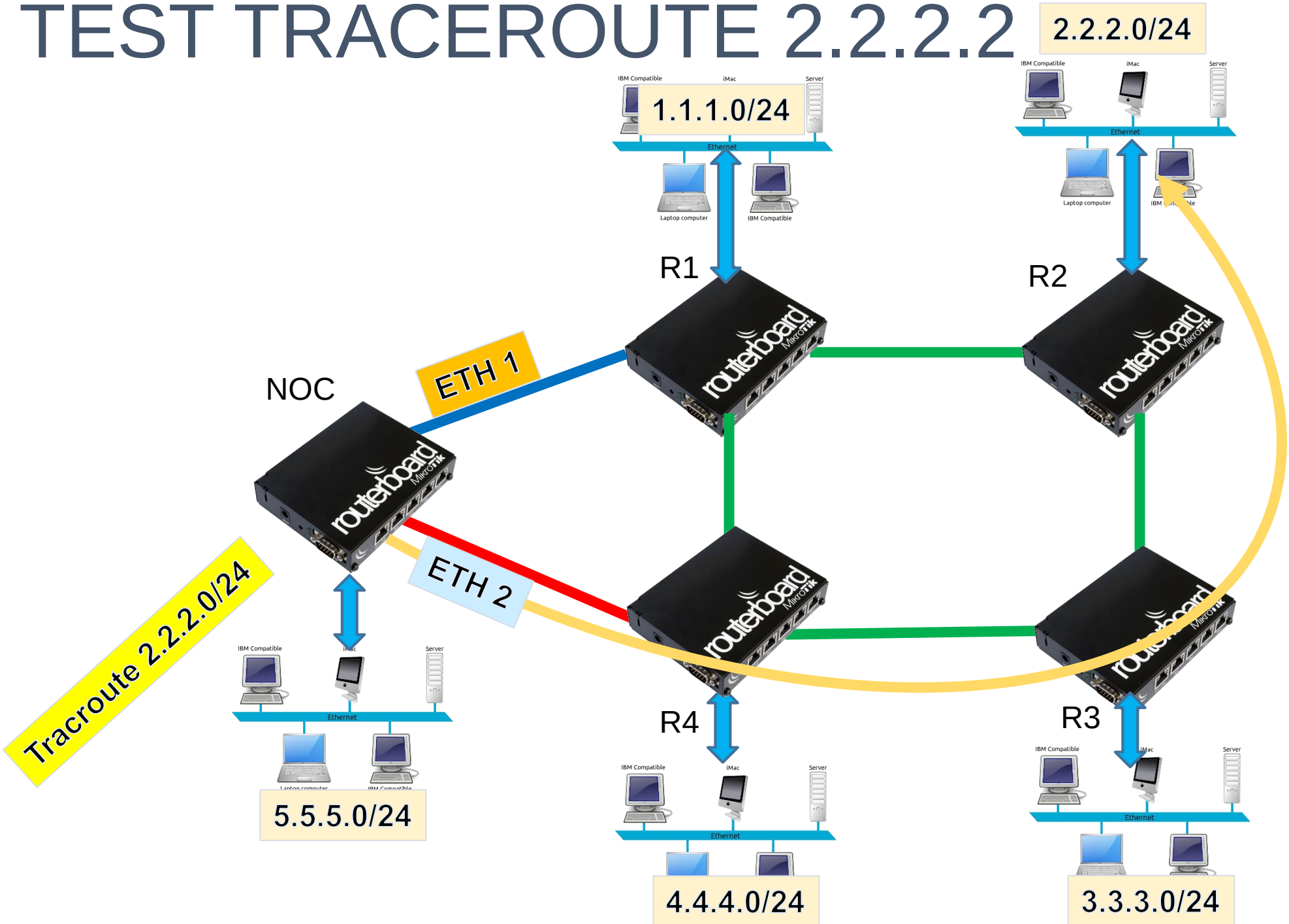
TRACEROUTE 2.2.2.2



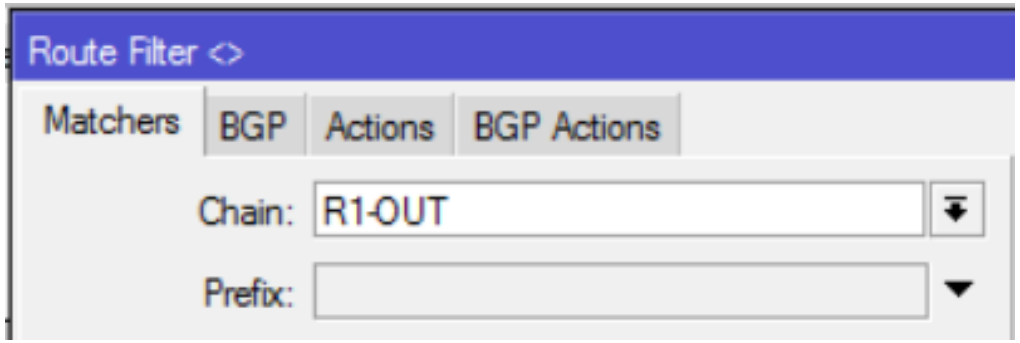
NOC

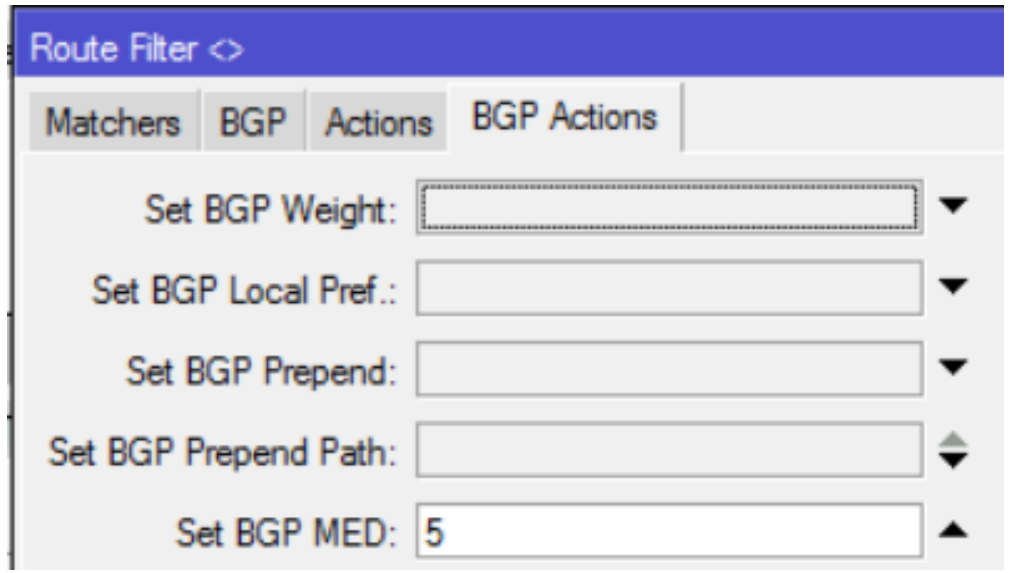


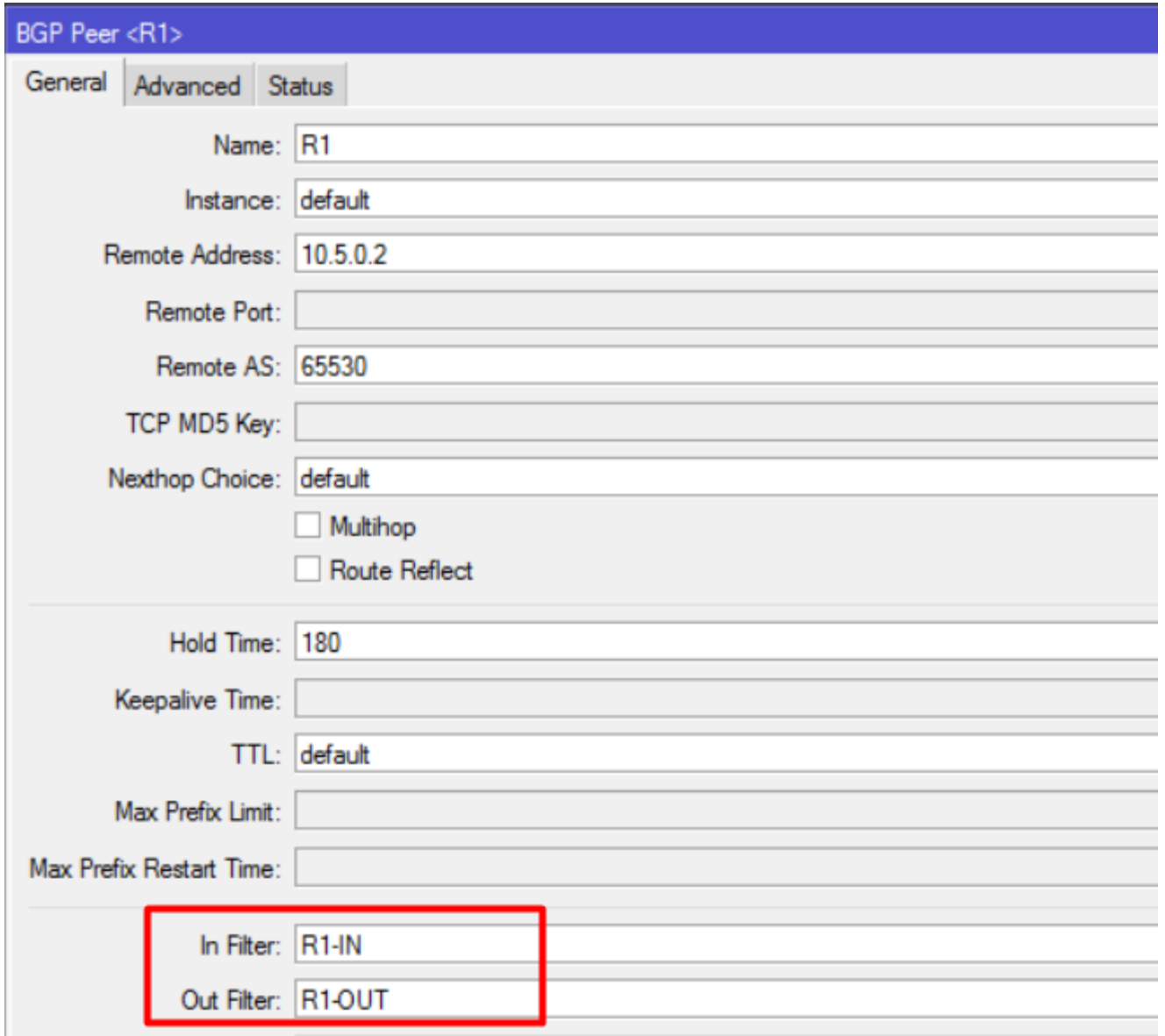
TEST TRACEROUTE 2.2.2.2



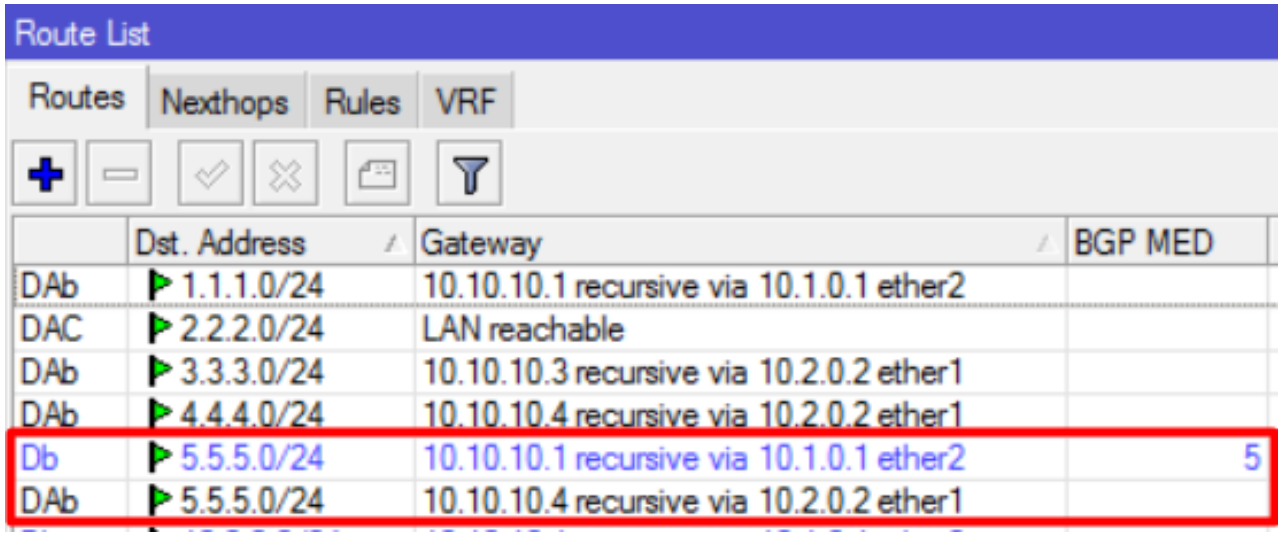
UBAH RX 2.2.2.2 via ETHER 2



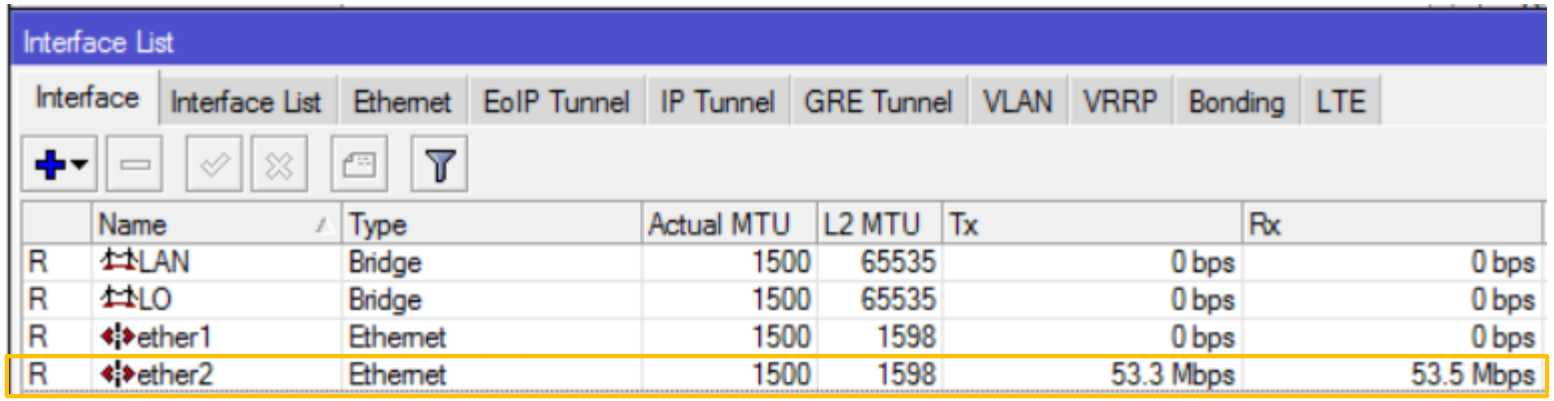




TRACEROUTE 2.2.2.2



R2



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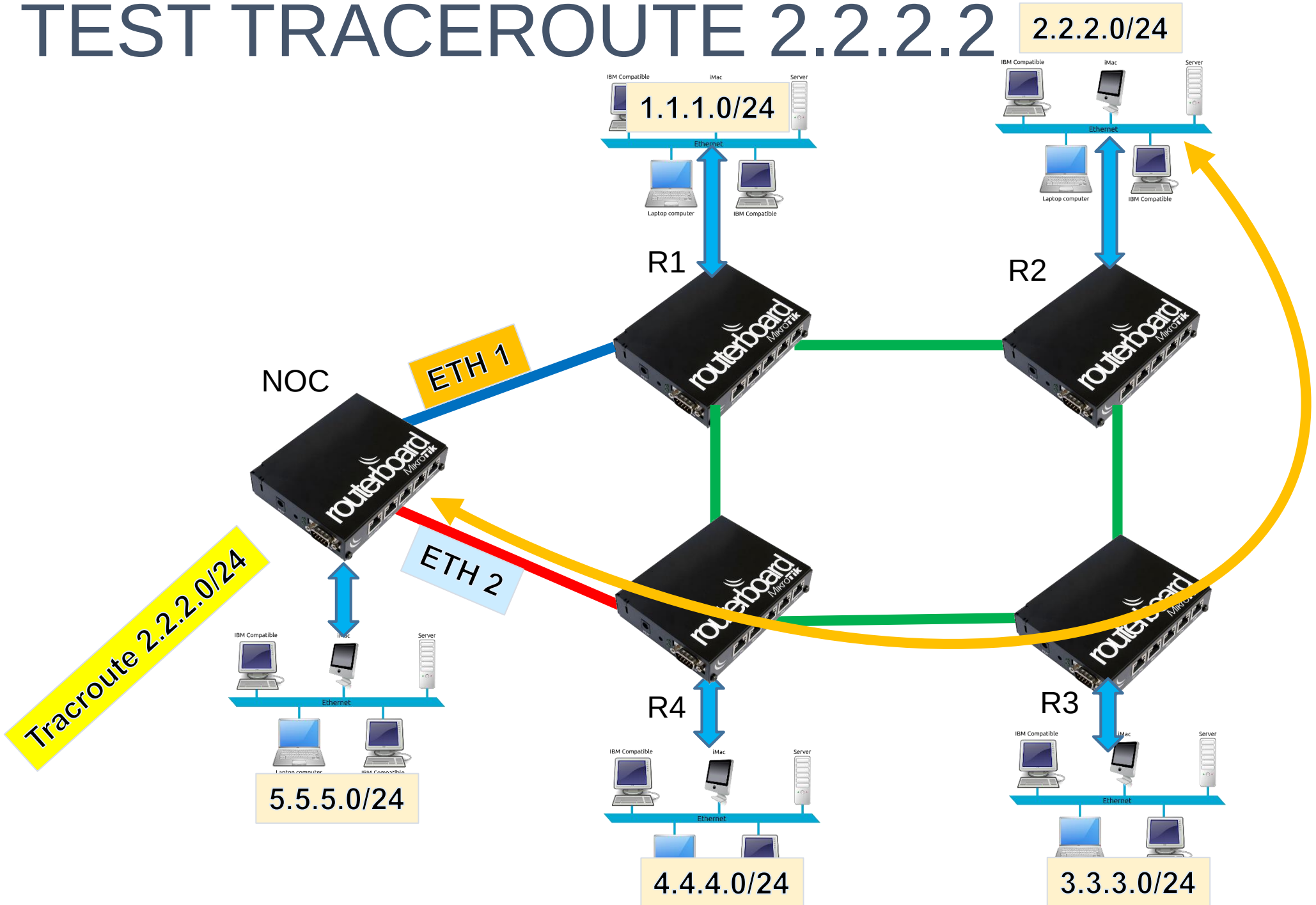

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THANK YOU

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