



Intranet OSPF over VPN

Muhti Subiyantoro

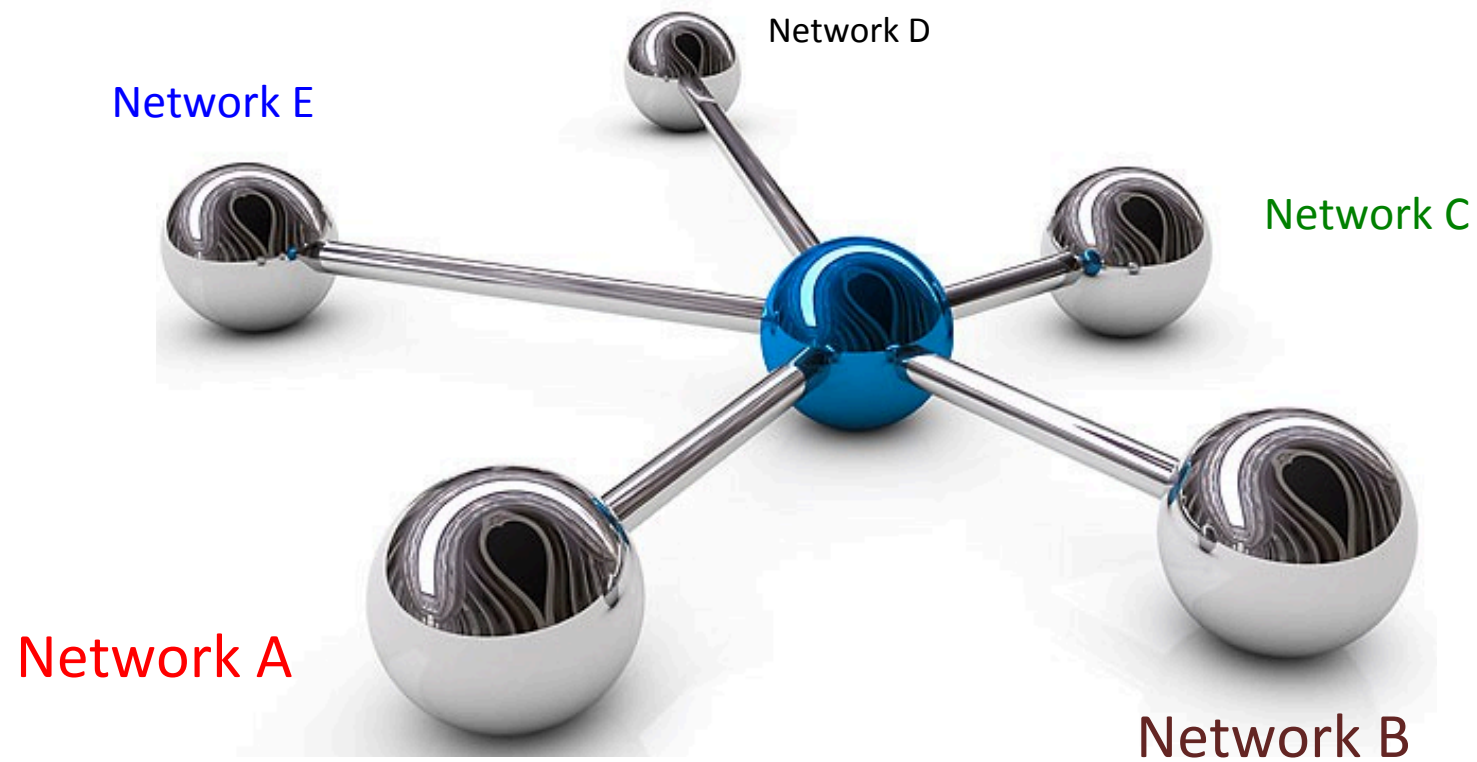
About Me

- Muhti Subiyantoro
- PT. Spectrum Indowibawa
- Training, R&D, RMA Manager



- Reseller Wireless & Router Equipment
- MikroTik
 - Konsultan
 - Certified Training Partner
 - MikroTik Academy Coordinator
 - Network System Integrator

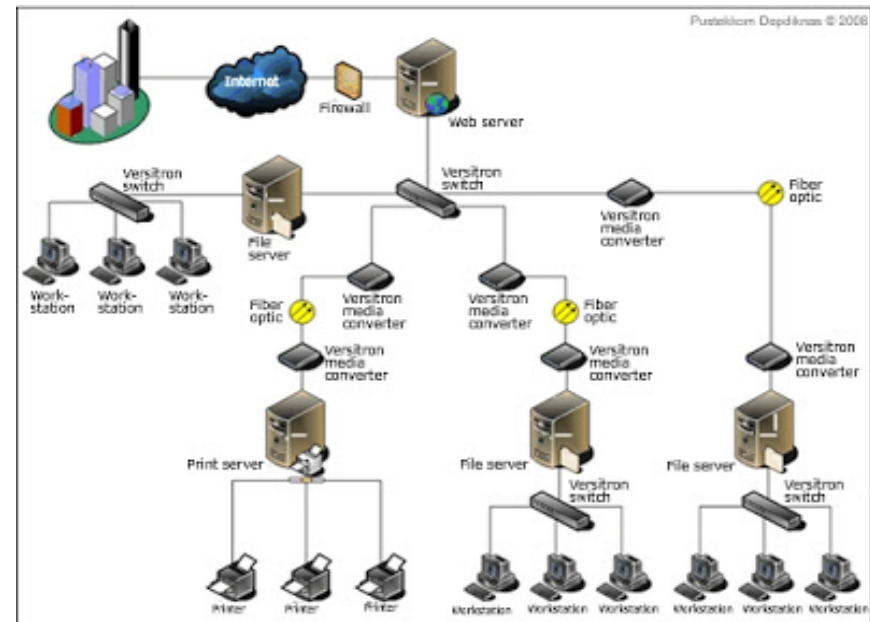
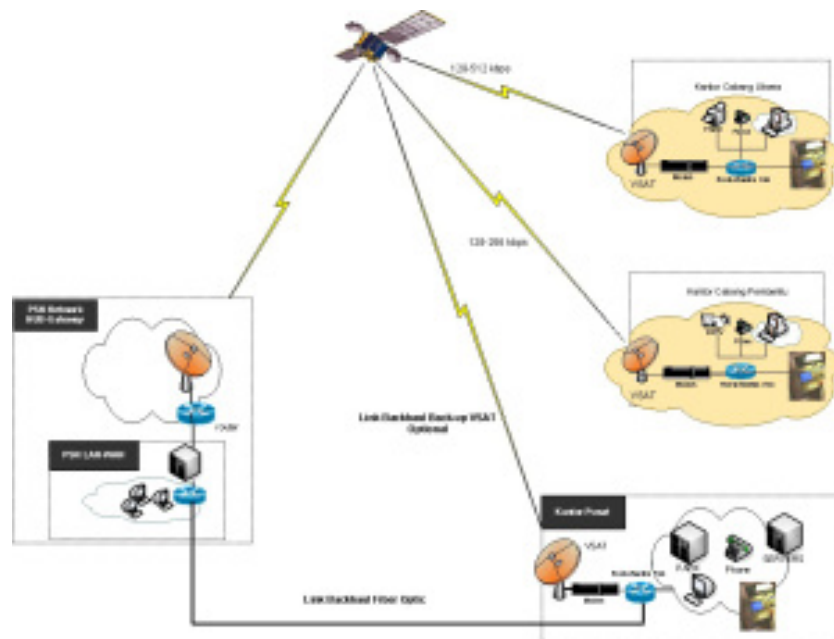
Intranet



Intranet

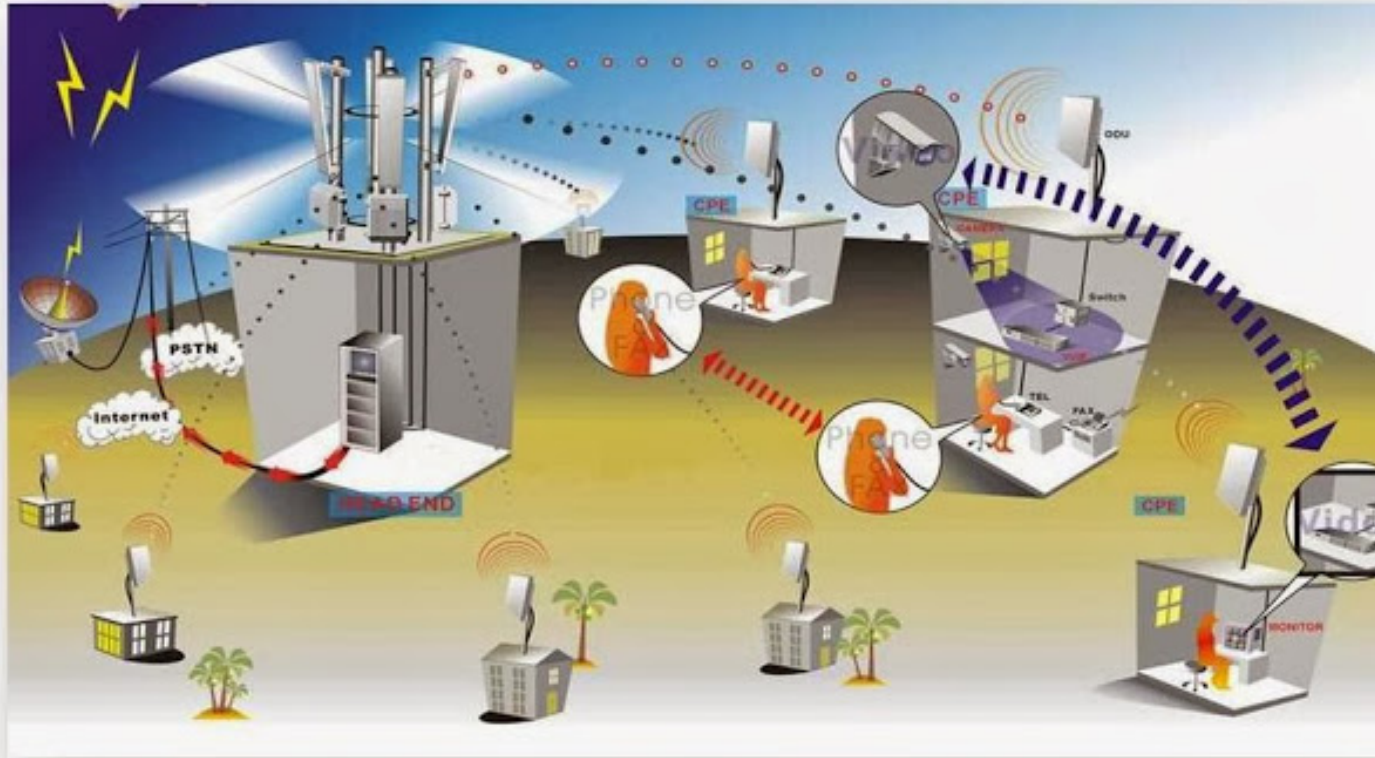
- Gabungan beberapa jaringan LAN
- Subnet IP Private
- Skala relatif kecil (jaringan kecil)
- Dikelola untuk membuat sebuah group koneksi antar LAN
- Akses terbatas untuk group tertentu

Intranet Example

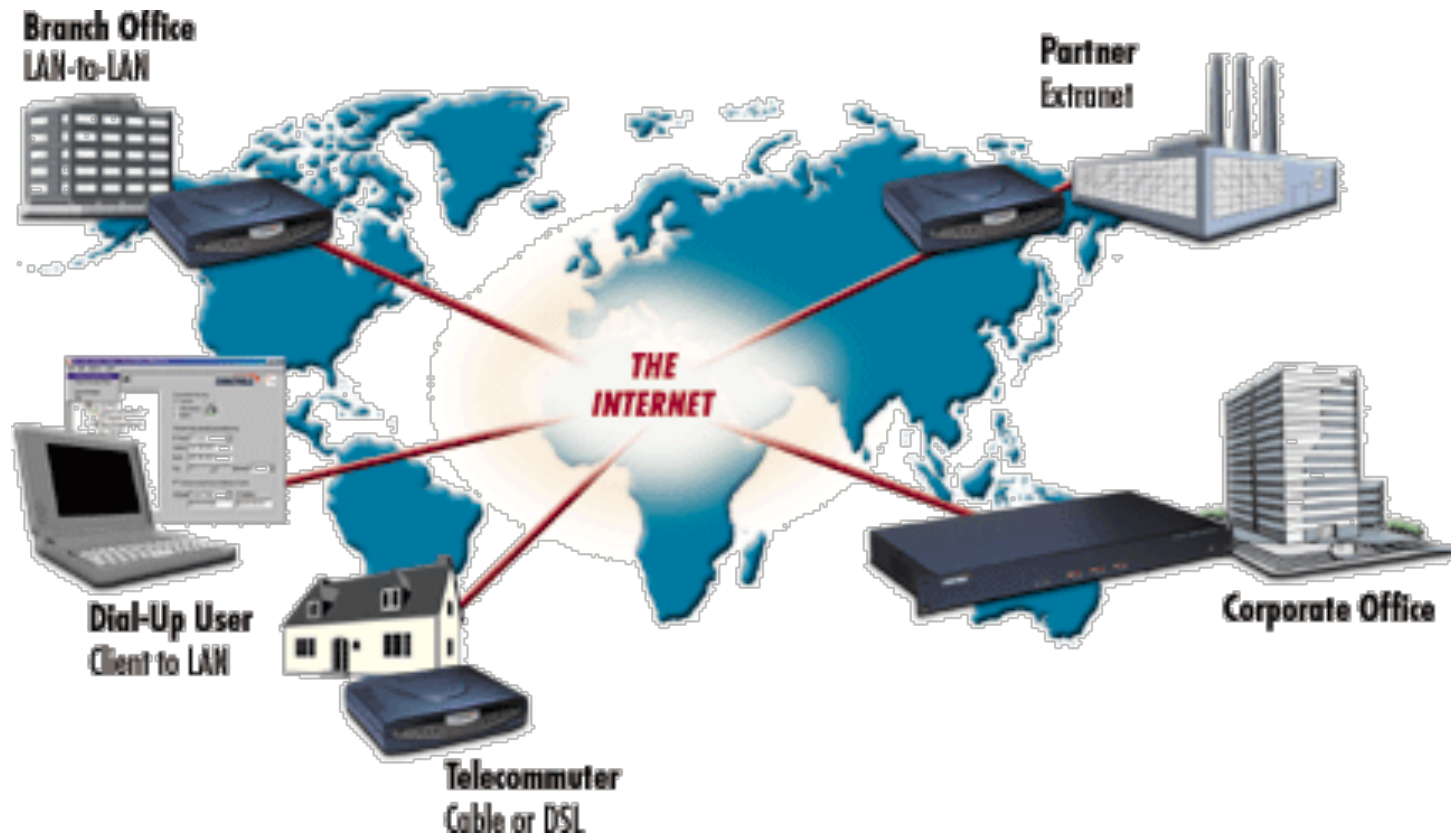


INTERNET

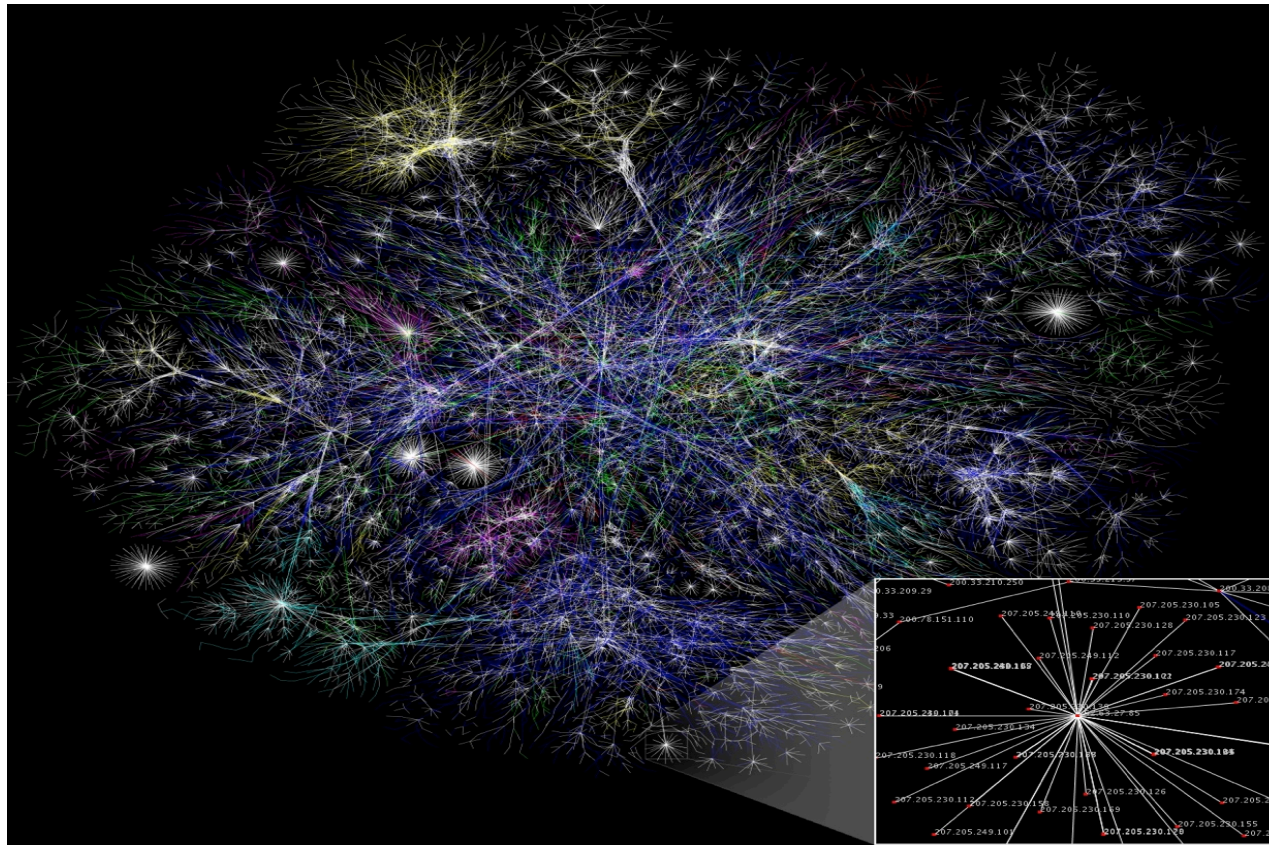
- Jaringan sangat besar dan luas
- Menggunakan IP Public
- Bisa diakses siapa saja, kapan saja dan dimana saja



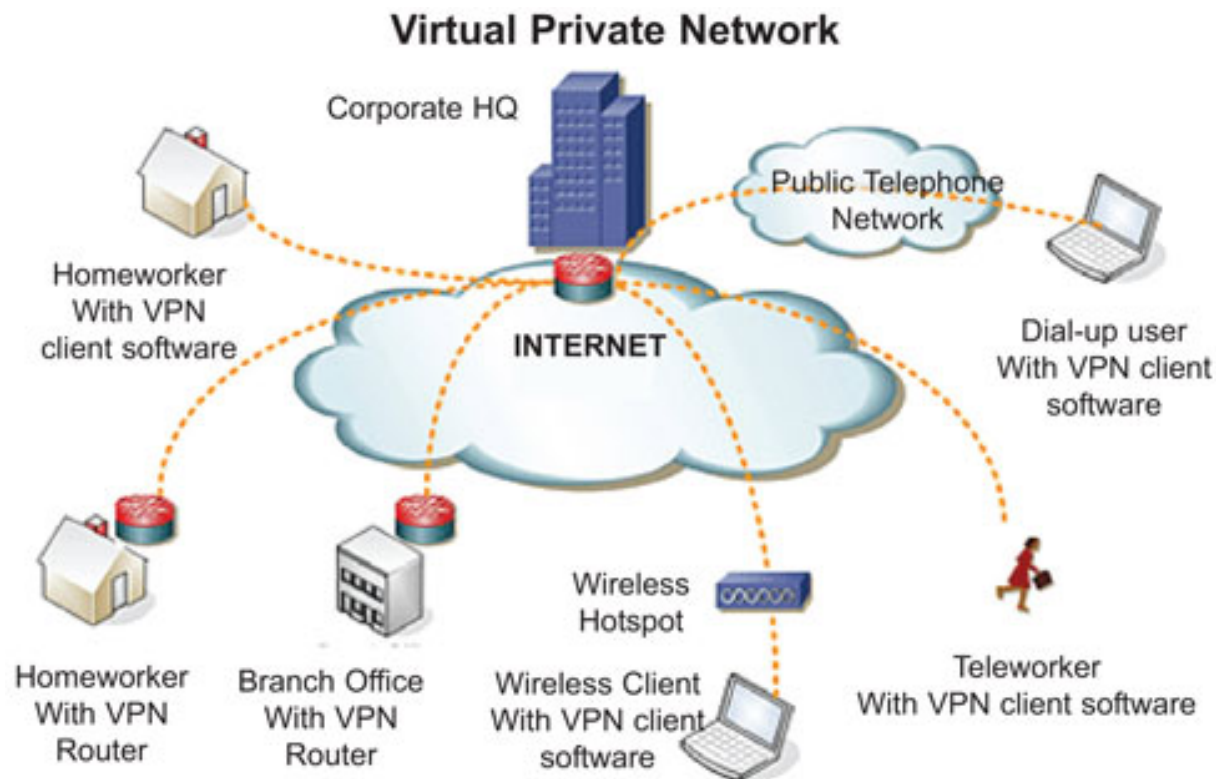
Koneksi Internet Inter-Company



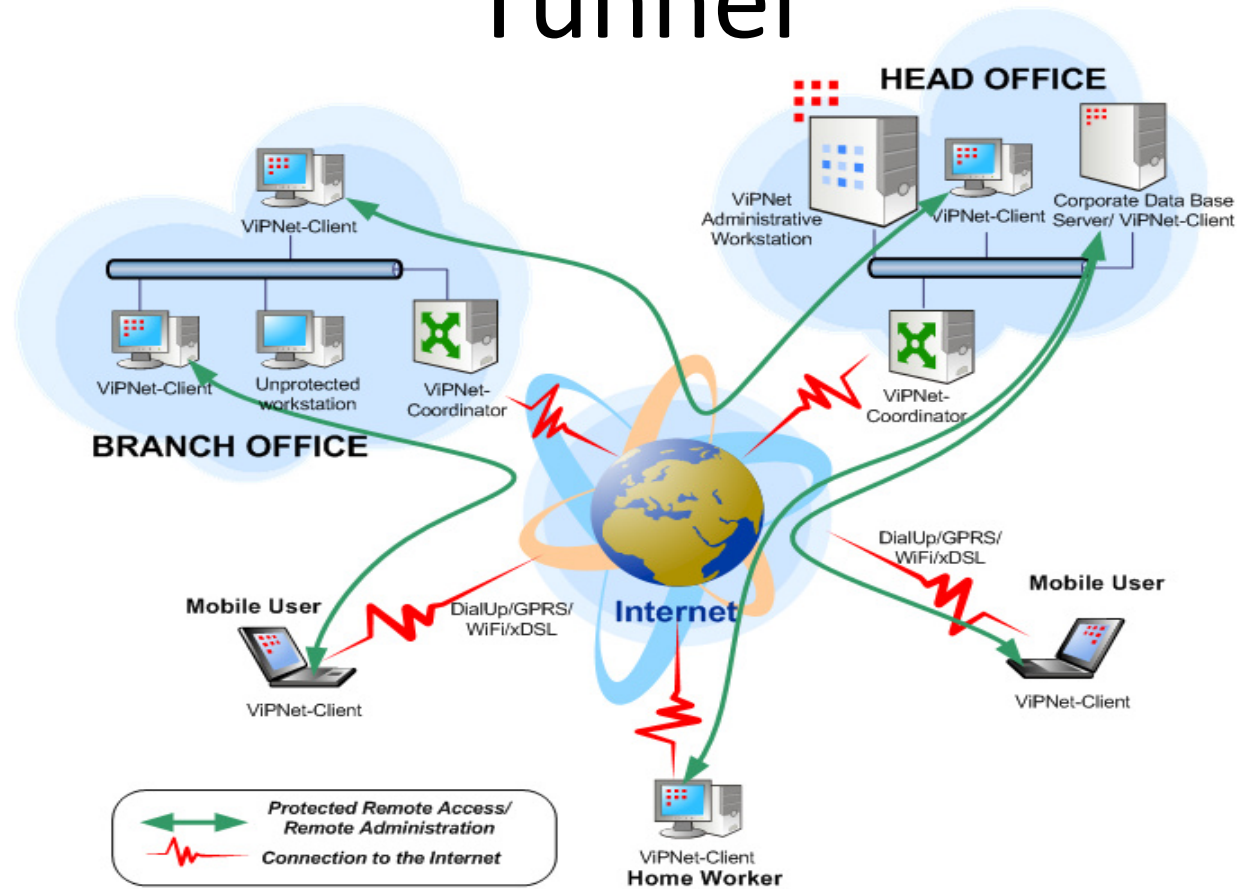
Internet di Dunia



Intranet over Internet



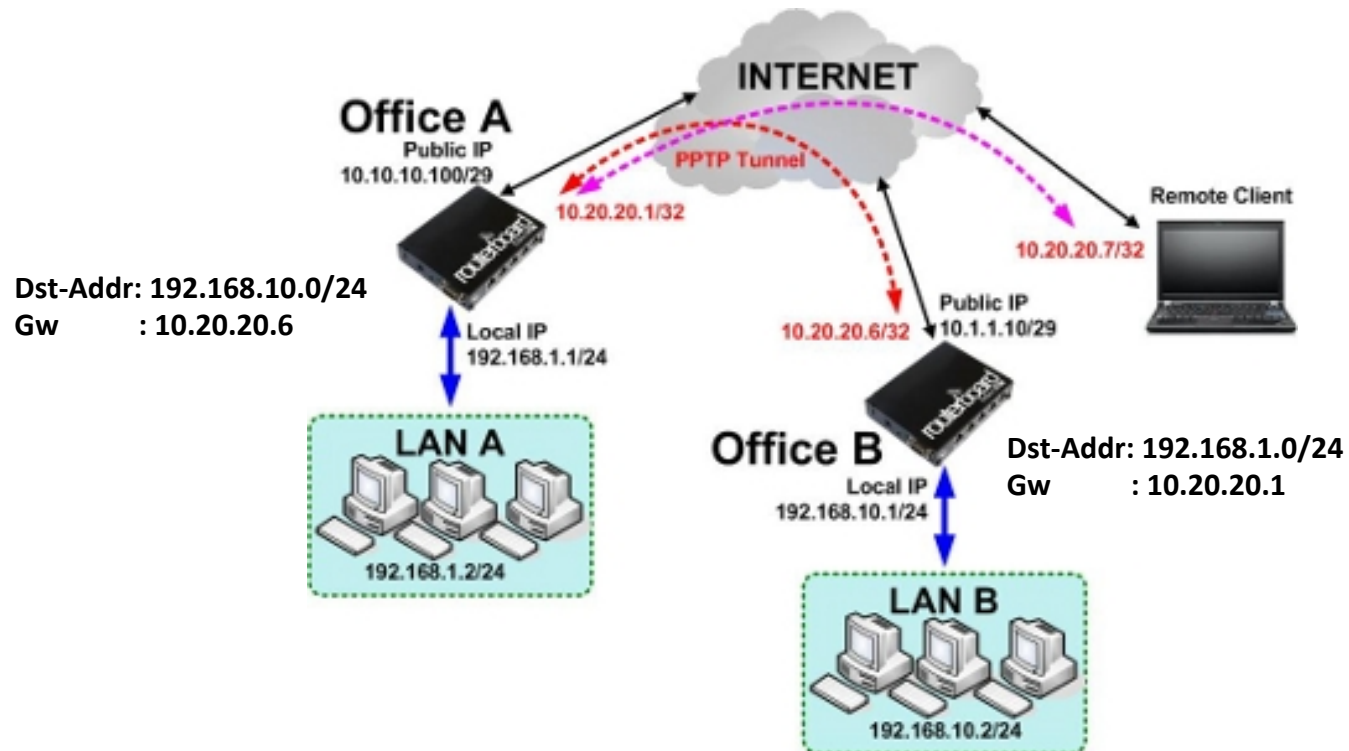
Tunnel



VPN / PPTP



VPN & Static Routing



Keterbatasan Static Routing

- Tidak bisa mengikuti perubahan dalam jaringan secara otomatis
- Tidak bisa fail over
- Entry routing manual
- Banyak router dan subnet, butuh extra resource SDM

Routing Tabel Komplek



Solusi



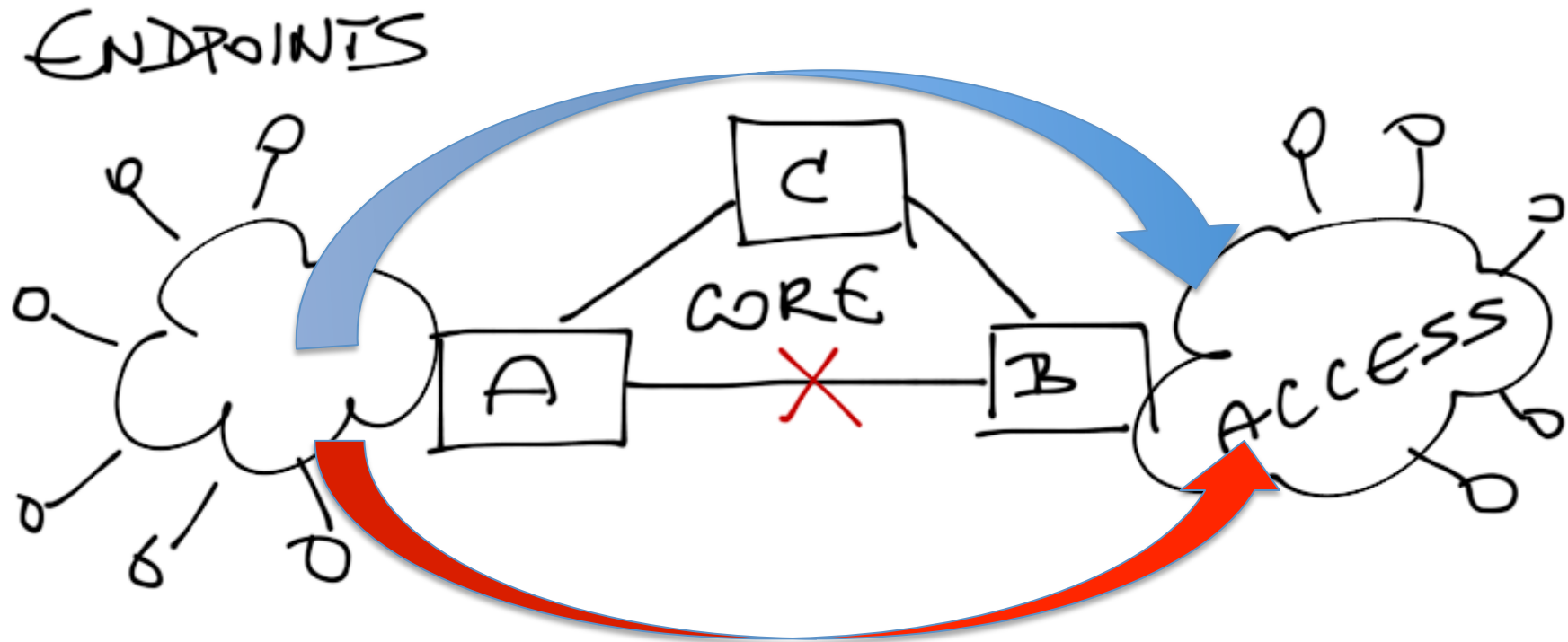
Permasalahan:

- Banyak Kantor Cabang
- Banyak Router
- Banyak Subnet IP
- Banyak Routing Entry
- “Static route tidak efisien”

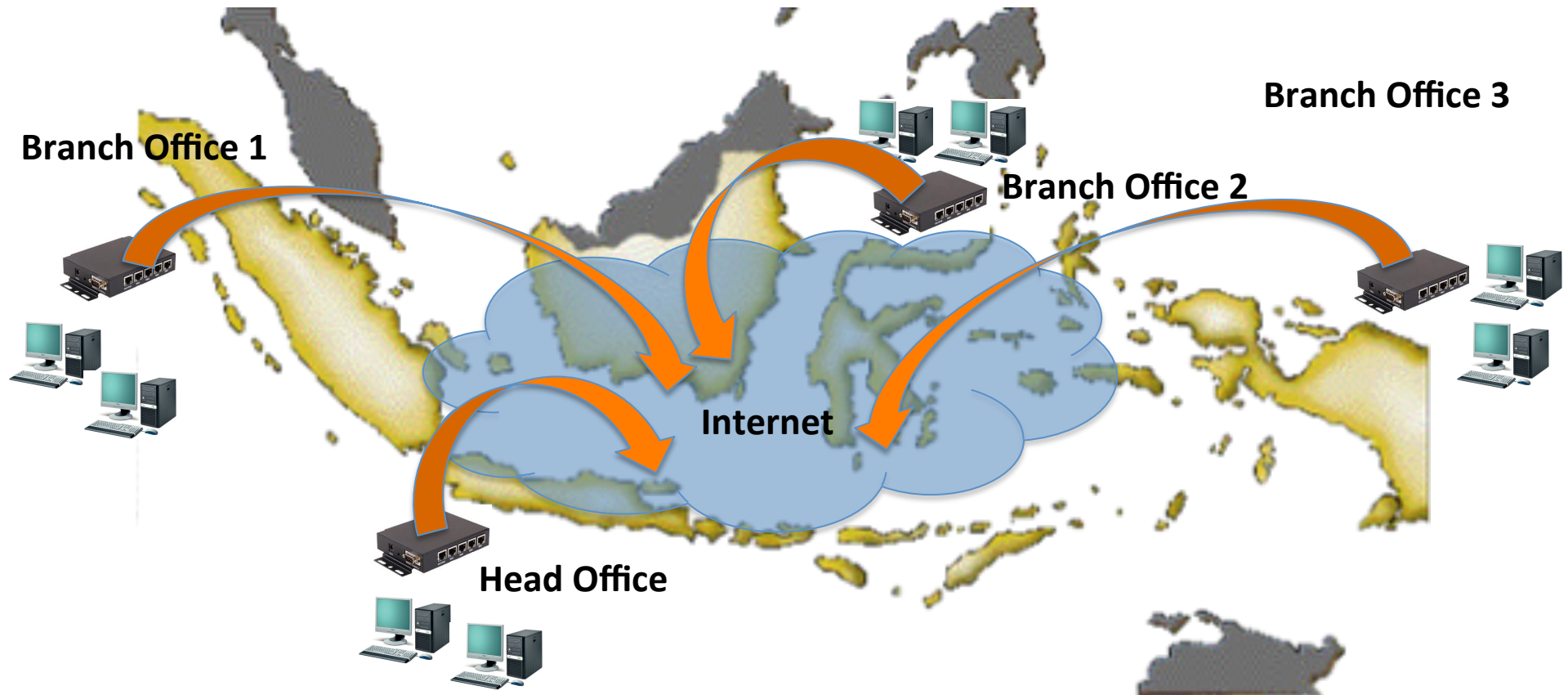
Dynamic Routing

- Tabel routing update otomatis
- Entry Routing terjadi secara otomatis saat IP atau routing ditambahkan
- Bisa Fail Over bila terjadi kegagalan dalam sebuah router

Dynamic Routing & Fail Over



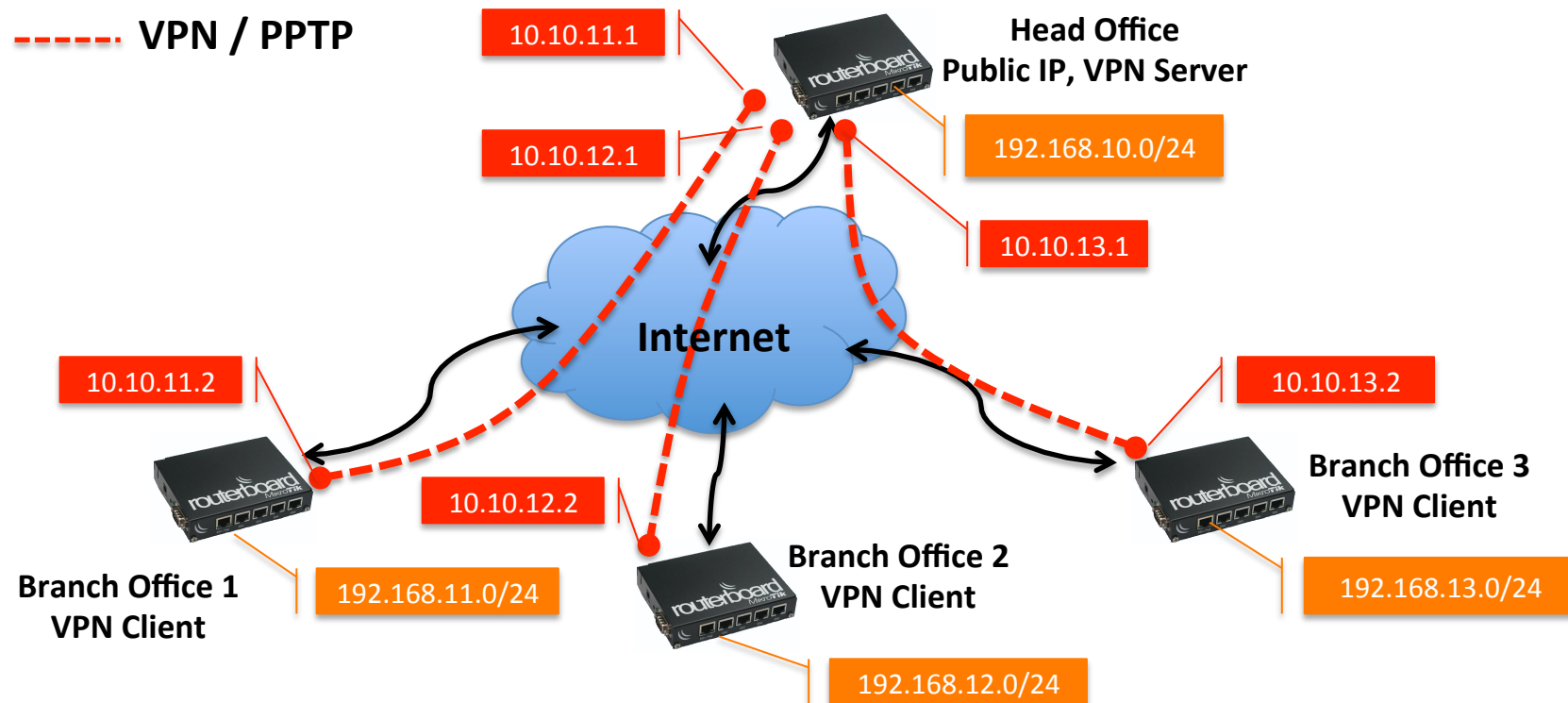
Topologi



Network Design

— Internet / IIX

- - - VPN / PPTP



Konf. Head Office (Address & Route)

```
[admin@Main-Router] > ip address print
```

Flags: X - disabled, I - invalid, D - dynamic

#	ADDRESS	NETWORK	INTERFACE
0	[REDACTED].135/28	[REDACTED].128	ether1
1	192.168.10.254/24	192.168.10.0	ether5

```
[admin@Main-Router] > ip route print
```

Flags: X - disabled, A - active, D - dynamic,

C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,

B - blackhole, U - unreachable, P - prohibit

#		DST-ADDRESS	PREF-SRC	GATEWAY	DISTANCE
0	A S	0.0.0.0/0		[REDACTED].129	1
1	ADC	[REDACTED].128/28	[REDACTED].135	ether1	0
2	ADC	192.168.10.0/24	192.168.10.254	ether5	0

Konf. Head Office (PPP Secret & Profile)

```
[admin@Main-Router] > ppp profile print
Flags: * - default
0 * name="default" use-mpsl=default use-compression=default use-vj-compression=default
  use-encryption=default only-one=default change-tcp-mss=yes address-list=""

1 * name="default-encryption" use-mpsl=default use-compression=default
  use-vj-compression=default use-encryption=yes only-one=default change-tcp-mss=yes
  address-list=""
[admin@Main-Router] > ppp secret print detail
Flags: X - disabled
0  name="ppp1" service=any caller-id="" password="ppp1" profile=default
   local-address=10.10.11.1 remote-address=10.10.11.2 routes="" limit-bytes-in=0
   limit-bytes-out=0 last-logged-out=nov/27/2013 22:28:48

1  name="ppp2" service=any caller-id="" password="ppp2" profile=default
   local-address=10.10.12.1 remote-address=10.10.12.2 routes="" limit-bytes-in=0
   limit-bytes-out=0 last-logged-out=nov/27/2013 22:28:51

2  name="ppp3" service=any caller-id="" password="ppp3" profile=default
   local-address=10.10.13.1 remote-address=10.10.13.2 routes="" limit-bytes-in=0
   limit-bytes-out=0 last-logged-out=nov/27/2013 22:28:53

3  name="muhti" service=any caller-id="" password="muhti" profile=default
   local-address=10.10.14.1 remote-address=10.10.14.2 routes="" limit-bytes-in=0
   limit-bytes-out=0 last-logged-out=jan/01/1970 00:00:00
```

Konf. Head Office (OSPF Instance & Network)

```
[admin@Main-Router] > routing ospf instance print
Flags: X - disabled, * - default
0  * name="default" router-id=0.0.0.0 distribute-default=never
    redistribute-connected=as-type-1 redistribute-static=no redistribute-rip=no
    redistribute-bgp=no redistribute-other-ospf=no metric-default=1 metric-connected=20
    metric-static=20 metric-rip=20 metric-bgp=auto metric-other-ospf=auto in-filter=ospf-in
    out-filter=ospf-out
[admin@Main-Router] > routing ospf network print
Flags: X - disabled, I - invalid
#  NETWORK          AREA
0  10.10.13.2/32     backbone
1  10.10.11.2/32     backbone
2  10.10.12.2/32     backbone
[admin@Main-Router] > routing filter print
Flags: X - disabled
0  chain=ospf-out prefix=[REDACTED].128 prefix-length=28 invert-match=no action=discard
    set-bgp-prepend-path=""
```


Konf. Head Office (OSPF Running)

```
[admin@Main-Router] > ip address print
Flags: X - disabled, I - invalid, D - dynamic
#   ADDRESS          NETWORK    INTERFACE
0   [redacted].135/28  [redacted].128 ether1
1   192.168.10.254/24 192.168.10.0 ether5
2   D 10.10.11.1/32   10.10.11.2  <pptp-ppp1>
3   D 10.10.12.1/32   10.10.12.2  <pptp-ppp2>
4   D 10.10.13.1/32   10.10.13.2  <pptp-ppp3>

[admin@Main-Router] > ip route print
Flags: X - disabled, A - active, D - dynamic,
C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
B - blackhole, U - unreachable, P - prohibit
#   DST-ADDRESS      PREF-SRC  GATEWAY          DISTANCE
0   A S 0.0.0.0/0       [redacted].129 1
1   A D o 10.10.11.1/32    10.10.11.2    110
2   A D C 10.10.11.2/32  10.10.11.1    <pptp-ppp1>     0
3   A D o 10.10.12.1/32    10.10.12.2    110
4   A D C 10.10.12.2/32  10.10.12.1    <pptp-ppp2>     0
5   A D o 10.10.13.1/32    10.10.13.2    110
6   A D C 10.10.13.2/32  10.10.13.1    <pptp-ppp3>     0
7   A D C [redacted].128/28  [redacted].135 ether1            0
8   A D C 192.168.10.0/24  192.168.10.254 ether5            0
9   A D o 192.168.11.0/24  10.10.11.2    110
10  A D o 192.168.12.0/24  10.10.12.2    110
11  A D o 192.168.13.0/24  10.10.13.2    110
```

Konf. Head Office (Traceroute)

```
[admin@Main-Router] > tool traceroute 192.168.11.1
```

#	ADDRESS	LOSS	SENT	LAST	AVG	BEST	WORST
1	10.10.11.2	0%	4	13.9ms	19	13.7	27.8
2	192.168.11.1	0%	4	13.3ms	16.1	13.1	24.3


```
[admin@Main-Router] > tool traceroute 192.168.12.1
```

#	ADDRESS	LOSS	SENT	LAST	AVG	BEST	WORST
1	10.10.12.2	0%	3	72.7ms	44.3	15.8	72.7
2	192.168.12.1	0%	2	16.2ms	16.8	16.2	17.3


```
[admin@Main-Router] > tool traceroute 192.168.13.1
```

#	ADDRESS	LOSS	SENT	LAST	AVG	BEST	WORST
1	10.10.13.2	0%	10	12.9ms	12.8	12.6	13.1
2	192.168.13.1	0%	10	12.7ms	12.7	12.3	13.6

Konf. Branch Office (Address & Route)

```
[admin@Router-11] > ip address print
```

Flags: X - disabled, I - invalid, D - dynamic

#	ADDRESS	NETWORK	INTERFACE
0	192.168.11.254/24	192.168.11.0	ether1
1 D	192.168.20.61/24	192.168.20.0	wlan1

```
[admin@Router-11] > ip route print
```

Flags: X - disabled, A - active, D - dynamic,
C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
B - blackhole, U - unreachable, P - prohibit

#		DST-ADDRESS	PREF-SRC	GATEWAY	DISTANCE
0	ADS	0.0.0.0/0		192.168.20.1	1
1	ADC	192.168.11.0/24	192.168.11.254	ether1	0
2	ADC	192.168.20.0/24	192.168.20.61	wlan1	0

Konf. Branch Office (PPP Client)

```
[admin@Router-11] > interface pptp-client print
Flags: X - disabled, R - running
0      name="pptp-out1" max-mtu=1450 max-mru=1450 mrru=disabled connect-to=[REDACTED].135
      user="ppp1" password="ppp1" profile=default-encryption keepalive-timeout=60
      add-default-route=no dial-on-demand=no allow=pap, chap, mschap1, mschap2
```

Konf. Branch Office (OSPF Instance & Network)

```
[admin@Router-11] > routing ospf instance print
Flags: X - disabled, * - default
0 * name="default" router-id=10.10.11.2 distribute-default=never
    redistribute-connected=as-type-1 redistribute-static=no redistribute-rip=no
    redistribute-bgp=no redistribute-other-ospf=no metric-default=1 metric-connected=20
    metric-static=20 metric-rip=20 metric-bgp=auto metric-other-ospf=auto
    in-filter=ospf-in out-filter=ospf-out
[admin@Router-11] > routing ospf network print
Flags: X - disabled, I - invalid
#   NETWORK          AREA
0   10.10.11.1/32     backbone
[admin@Router-11] > routing filter print
Flags: X - disabled
0   chain=ospf-out prefix=192.168.20.0/24 prefix-length=24 invert-match=no action=discard
    set-bgp-prepend-path=""
```

Konf. Branch Office (OSPF Running)

```
[admin@Router-11] > ip address print
Flags: X - disabled, I - invalid, D - dynamic
#   ADDRESS          NETWORK    INTERFACE
0   192.168.11.254/24  192.168.11.0   ether1
1 D 192.168.20.61/24   192.168.20.0   wlan1
2 D 10.10.11.2/32      10.10.11.1     pptp-out1
[admin@Router-11] > ip route print
Flags: X - disabled, A - active, D - dynamic,
C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
B - blackhole, U - unreachable, P - prohibit
#   DST-ADDRESS      PREF-SRC  GATEWAY          DISTANCE
0 ADS 0.0.0.0/0         192.168.20.1    1
1 ADC 10.10.11.1/32     10.10.11.2     pptp-out1        0
2 ADo 10.10.11.2/32     10.10.11.1     110
3 ADo 10.10.12.1/32     10.10.11.1     110
4 ADo 10.10.12.2/32     10.10.11.1     110
5 ADo 10.10.13.1/32     10.10.11.1     110
6 ADo 10.10.13.2/32     10.10.11.1     110
7 ADo 192.168.10.0/24    10.10.11.1     110
8 ADC 192.168.11.0/24    192.168.11.254 ether1            0
9 ADo 192.168.12.0/24    10.10.11.1     110
10 ADo 192.168.13.0/24   10.10.11.1     110
11 ADC 192.168.20.0/24    192.168.20.61  wlan1            0
```

Konf. Branch Office (Traceroute)

```
[admin@Router-11] > tool traceroute 192.168.13.1
```

#	ADDRESS	LOSS	SENT	LAST	AVG	BEST	WORST	STD-DEV	STATUS
1	10.10.11.1	0%	4	18.7ms	16.3	15	18.7	1.4	
2	10.10.13.2	0%	4	53.2ms	35.8	26.5	53.2	12.3	
3	192.168.13.1	0%	3	29.4ms	30.8	29.2	33.7	2.1	


```
[admin@Router-11] > tool traceroute 192.168.12.1
```

#	ADDRESS	LOSS	SENT	LAST	AVG	BEST	WORST	STD-DEV	STATUS
1	10.10.11.1	0%	4	16.8ms	19.8	14.2	25.1	4.5	
2	10.10.12.2	0%	4	31.6ms	30	27.9	31.6	1.6	
3	192.168.12.1	0%	3	30.1ms	34.1	30.1	36.7	2.9	


```
[admin@Router-11] > tool traceroute 192.168.10.254
```

#	ADDRESS	LOSS	SENT	LAST	AVG	BEST	WORST	STD-DEV	STATUS
1	192.168.10.254	0%	6	21.5ms	25.9	15.2	63.9	17.1	





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