
MikroTik
WISP
FOR
BEGINEERS
X
Kencana.Net
Fiber Optic and Wireless Networking Services

‘WISP with MikroTik’

ISP WIRELESS DIBANTU DENGAN PERANGKAT MIKROTIK TIDAK “IMPOSSIBLE”

MikroTik x

WENAS ONGKOWINOTO

CO-OWNER PRIMABANANEN

"Usaha ISP bukan seperti RTRWNet"

MikroTik x

PERKENALAN

- Dari:
  - PRIMABANANEN PTE. LTD. (Singapore – Co-Owner)
  - KencanaNET (Indonesia – Co-Owner)

- Pengalaman:
  - Pemasangan dan Design Jaringan Nirkabel seluas Kota
  - Perancangan Jaringan Nirkabel ber-Lisensi dan tanpa lisensi
  - Management xISP
  - Wireless Roaming menggunakan SSO (Single Sign On)
  - Dst.

Outline Presentasi

- DImana?
  - wISP
  - Pemain
- Bagaimana?
  - Kesulitan
  - Topology
  - Devices Sizing
  - Operational
    - D-D
    - QoS
    - SLA
    - Management
- Kenapa?
  - Daya Beli
  - Target
- SWOT - Conclusion

wISP

Apa itu wISP?

wISP itu adalah singkatan dari Wireless ISP

Alias Penyedia Jaringan Internet melalui Nirkabel.

- **INDONESIA**

Pemain xISP sekarang?

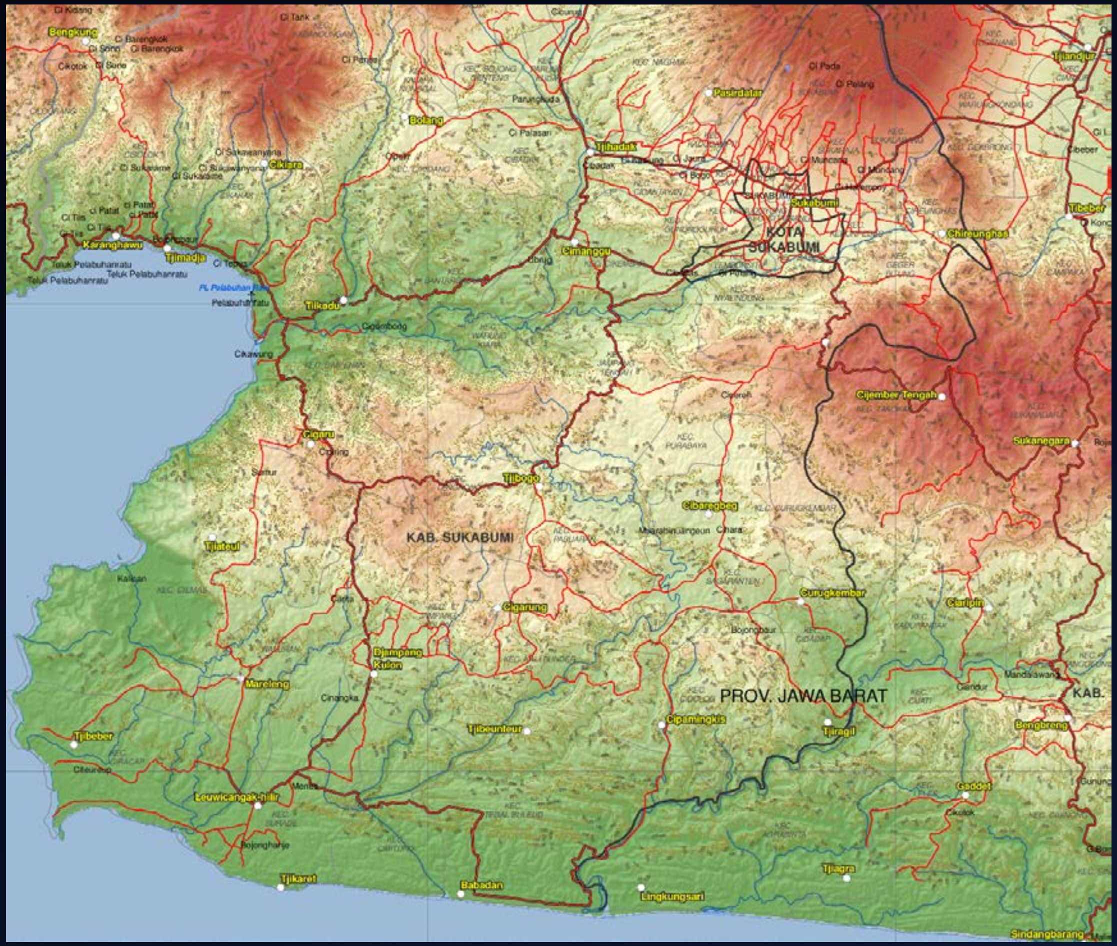
- Fixed/Wired/Wireless:
  - 100+ ISP
    - Incumbent = NAP
- Mobile Broadband:
  - 5 (all major operator)
  - 4G coverage ? – estimated less than 30% , major roads and urban area only.

Kesulitan dari wISP kecil

- $$$
- Limitasi Geografi
- Harga Bandwidth
- Populasi non padat. Tetapi memerlukan (US FCC's defined Broadband) speed. [25Mbps DL / 3Mbps UL]
- Listrik

Limitasi Geografis

Contoh: Sukabumi



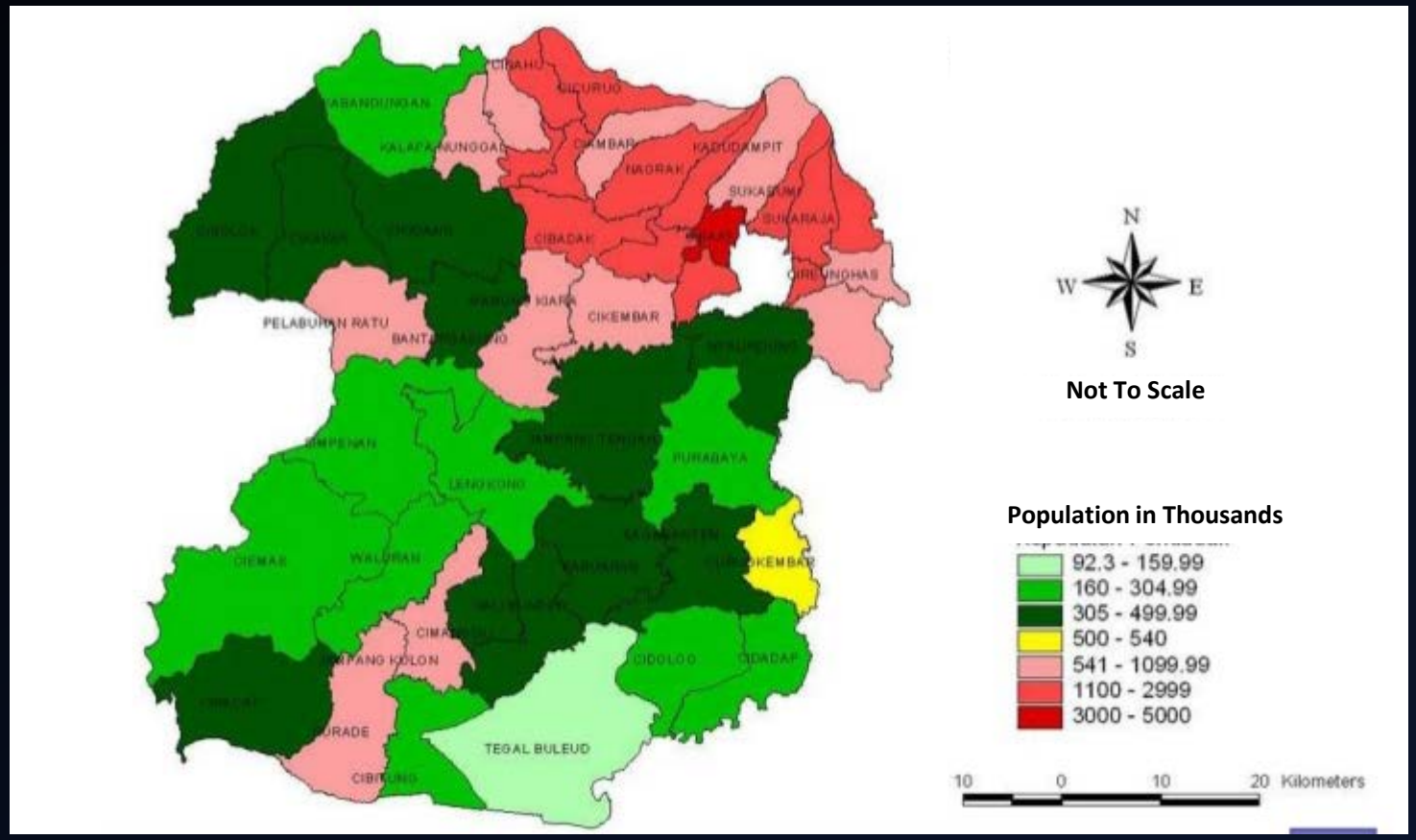
- Banyak tebing.
- Harus mengitari pegunungan dan lembah.

Harga Bandwidth

- Bujug buset. Shocking. Absurd.
- 100Mbps for ~50jt diantar (belum nego) [Luar Pulau Jawa]

Bandwidth (Mbps)	JaBoDeTaBek	Jawa
1	1,300,000	1,460,000
2	2,530,000	2,840,000
3	3,690,000	4,140,000
4	4,770,000	5,350,000
5	5,780,000	6,480,000
6	6,720,000	7,530,000
7	7,590,000	8,510,000
8	8,380,000	9,390,000
9	9,100,000	10,200,000
10	9,750,000	10,920,000
20	18,960,000	21,240,000
50	43,340,000	48,550,000
100	73,130,000	81,910,000
200	142,200,000	159,270,000
500	325,030,000	364,040,000
1000	506,800,000	567,600,000

Kepadatan Penduduk



Listrik

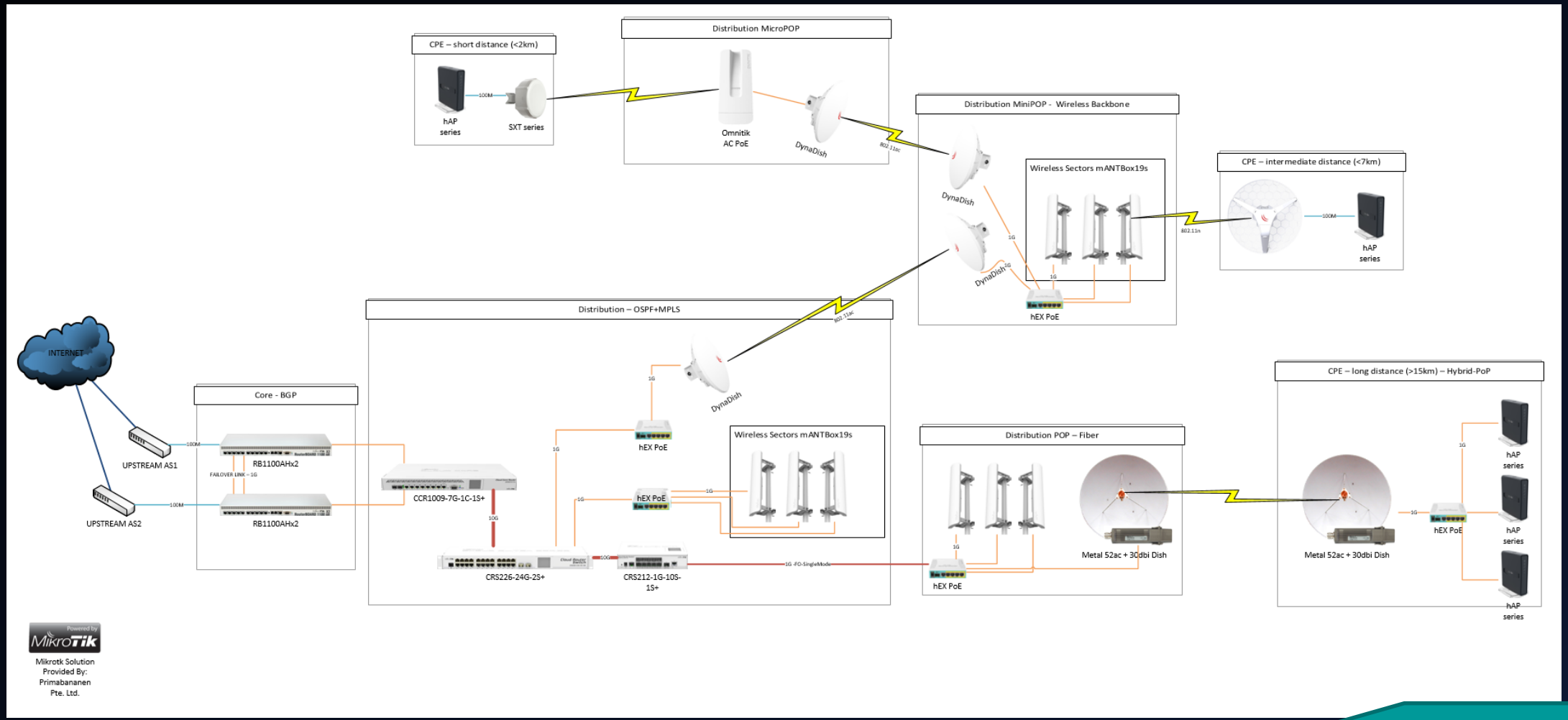
- SLA – nihil
- Coverage – hanya dekat jalan umum. Tidak ada di daerah pegunungan dan perkebunan.
- Solusi?

- ADA

Listrik

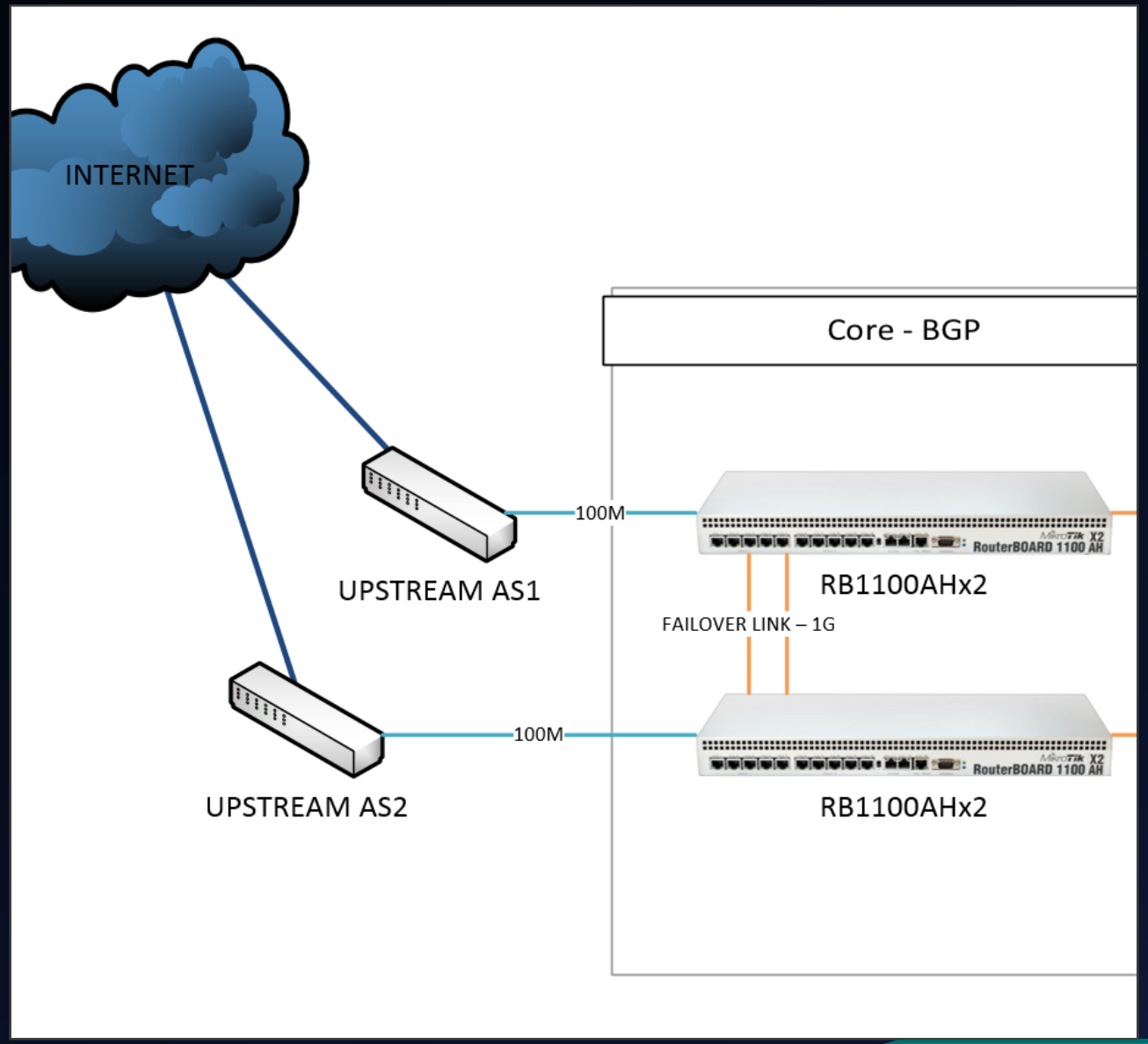
- Pakai Solar Panel and DC-DC inverter.

Topology – Hybrid WAN



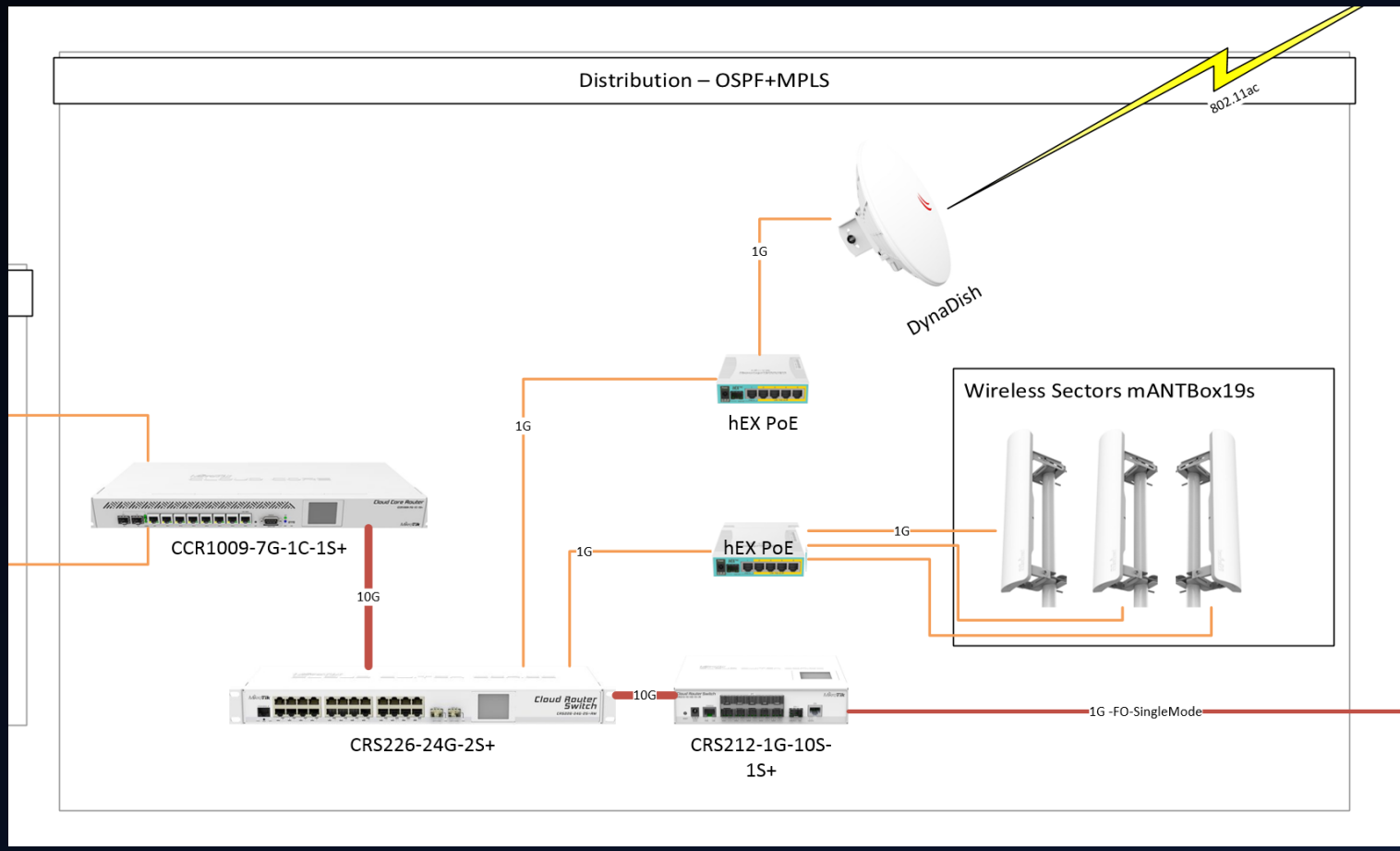
TCORE

- 2 Upstreams – Multihoming
- Failover - OSPF
- Core -> Redundancy
- RB1100AHx2 – 2x BGP Full Feed



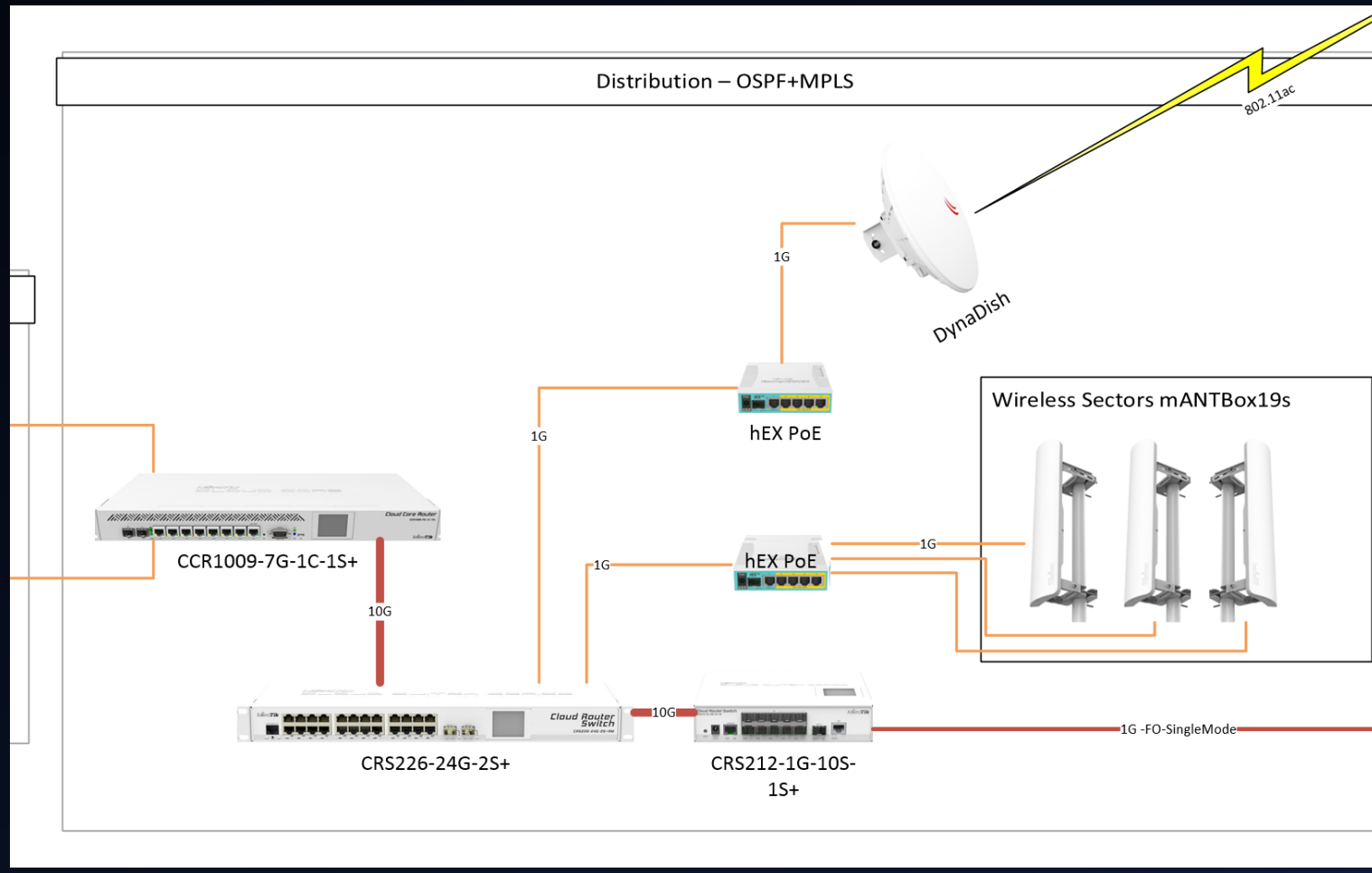
DISTRIBUTION

- Core Distribution Router
  - MPLS
  - OSPF
- Firewall and PPPoE+RADIUS
  - Dipisah
- 10G Switch = CCR's Port Multiplier
- Common MPLS PE = RB960PGS
- Fiber-uplinked PoP lewat CRS212 (affordable SFP switch)



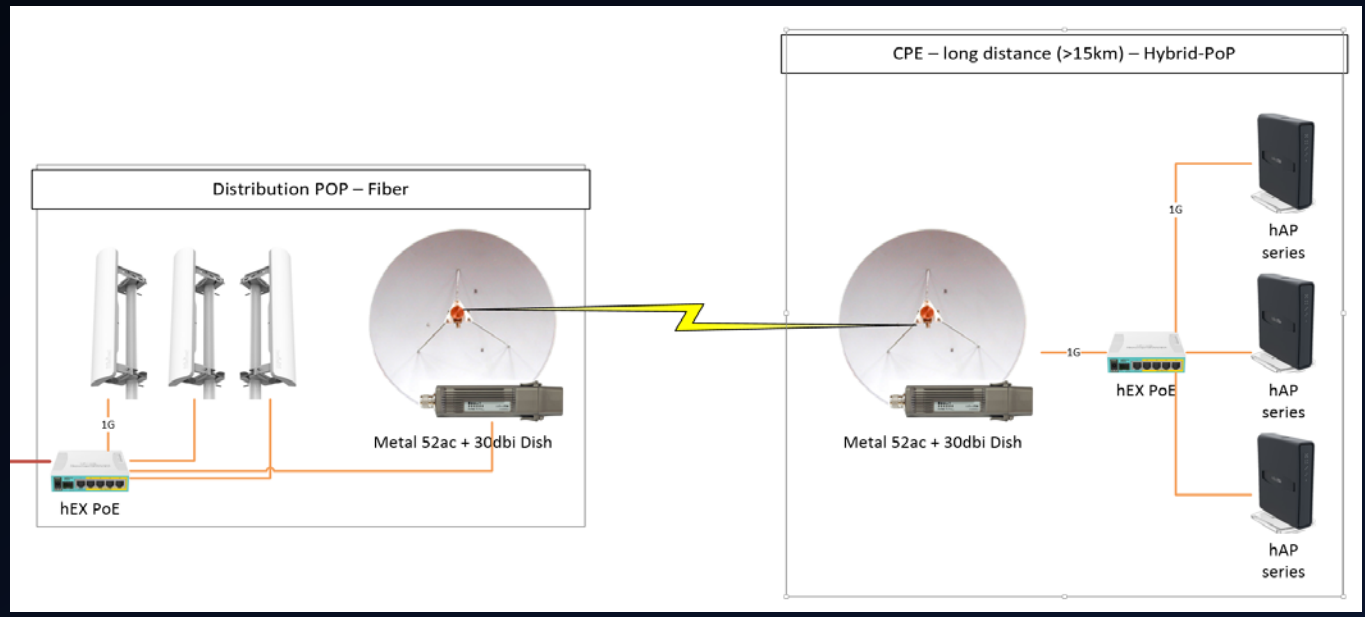
DISTRIBUTION (CONT'D)

- Menggunakan hEX PoE sebagai PoE Injector untuk mANTBox
- 3x mANTBox = 360° coverage sekitar PoP
- Untuk PtP Links, pakai Dynadish or QRT5ac, for < 10km



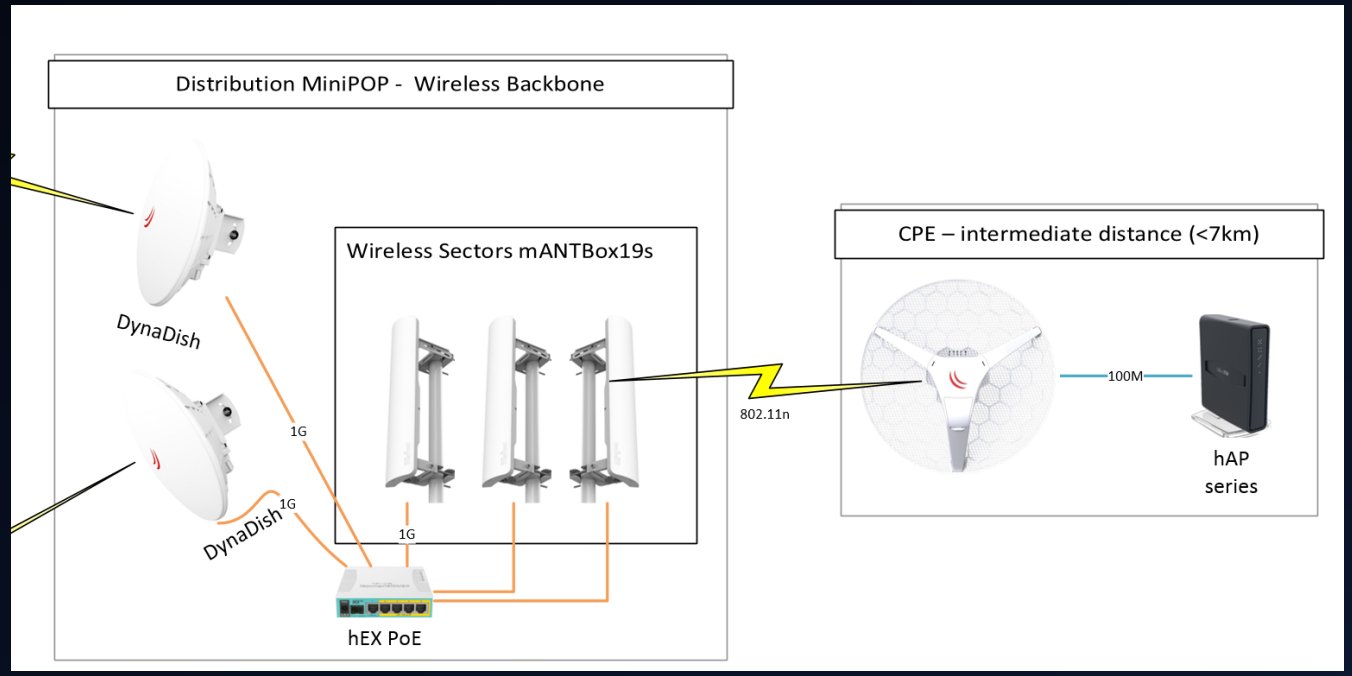
POP AND CPE - FIBER

- Fiber Uplinked PoP memberikan kapasitas bandwidth besar.
- Long Distance PtP repeater.
- Metal 52ac with 30dB Solid = 25km.
  - Masih melewati 30-40Mbps TCP duplex dengan sedikit latency spike.



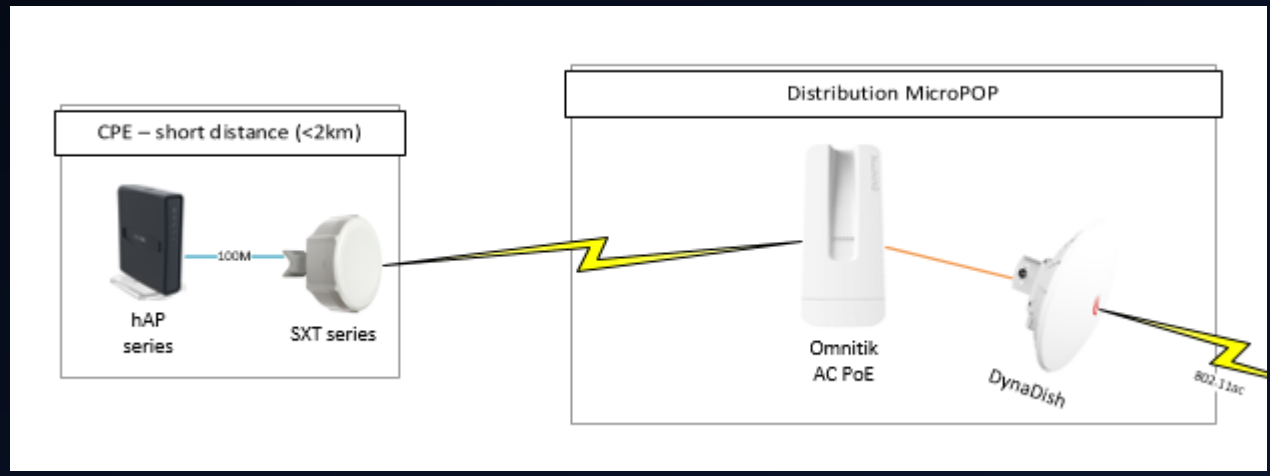
POP AND CPE – WIRELESS UPLINKED

- Wireless Uplinked PoP memberikan kapasitas skalable dengan biaya awal terjangkau.
- Limitasti Geografis, MiniPOP akan membantu menghilangkan dead/blank spots.
- MiniPOP = 7-10km coverage
- Harga dari MiniPOP?
  <1500USD
- CPE = LHG5



POP AND CPE – WIRELESS UPLINKED

- MicroPOP konsep baru dalam penyaluran fixed broadband melalui wireless.
- Cocok untuk pemukiman padat.
- Lebih murah dari MiniPOP.
- CPE <120USD
  - Balik modal dengan 10USD per bulan dalam 1 tahun.



Penggunaan Mikrotik

- Core:
  - RB1100AHx2

    - Legendary Uptime
    - Bypass Ports
    - No Fuss Architecture
- Distribution [Wired]:
  - CCR1009-7G-1C-1S+

    - 9 cores at 1.2Ghz
    - Great as PPPoE BRAS
    - MPLS ready
    - Wonderful Simple Queue performance
    - 10G!

- CRS226-24G-2S+-RM
  - Switch at line rate.
  - 2x 10G for daisy chain.
  - More and more documentation available.
  - Cheaper than major brands.
- CRS212-1G-10S-1S+

  - CRS226's Fabric Extender
  - Great for OE/AE CPE and Backbone
- hEX PoE / Powerbox Pro
  - Affordable Gigabit PoE Injector
  - MPLS ready CE/PE
  - SFP for Fiber

Mikrotik Devices Used

- Distribution [Wireless]:
  - Dynadish 5
    - Unlicensed Spectrum Ready
    - 25db Gain, on a compact dish footprint
    - High throughput, 802.11ac ready.

  - mANTBox-s
    - 15/19dBi 120° sectoral antenna
    - 3 for 1 great 360° coverage
    - Big RAM = more devices can connect
    - SFP for Fiber uplink, GPON ONU.

- Metal 52ac
  - Rx Sensitivity – Best in Class (SISO)
  - Rugged built quality.
  - Common N-Type Connector for wide range of antenna selection.
  - Gigabit.

Mikrotik Devices Used

- MicroPOP [Wireless]:
  - Omnitik AC PoE
    - Uplinking two or more Backbone PtP Wireless Radio
    - PoE out, use Midspan for best result.

- CPE [Wireless]:
  - SXT – affordable <2km
  - DiscLite – SXT killer but no 802,11ac yet. <5km

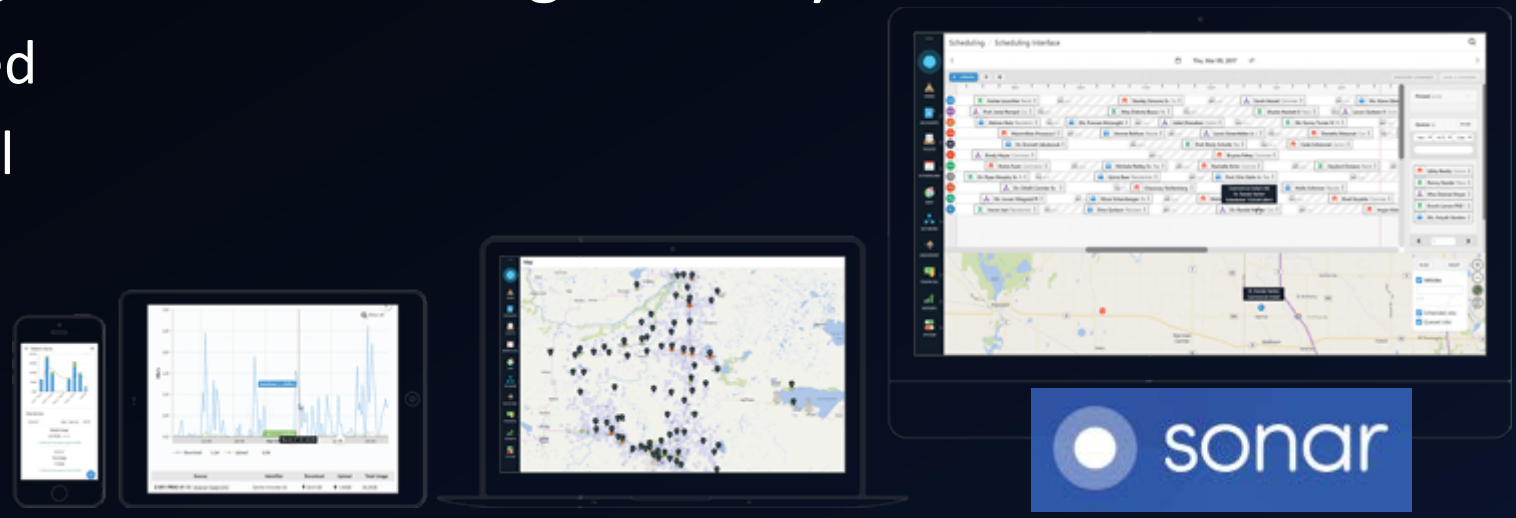
- LHG5 – lightweight. <7km
- QRT5ac – more expensive but gold radio performance <10km
- LDF5 + KuBand Offset dish 90cm⌀ – 30km OK!
- Dish, Grid, Panel + Metal 52ac = <15km

- CPE [Wired]:
  - hAP ac lite
    - Dual Band

OPERASIONAL

D-D Operation

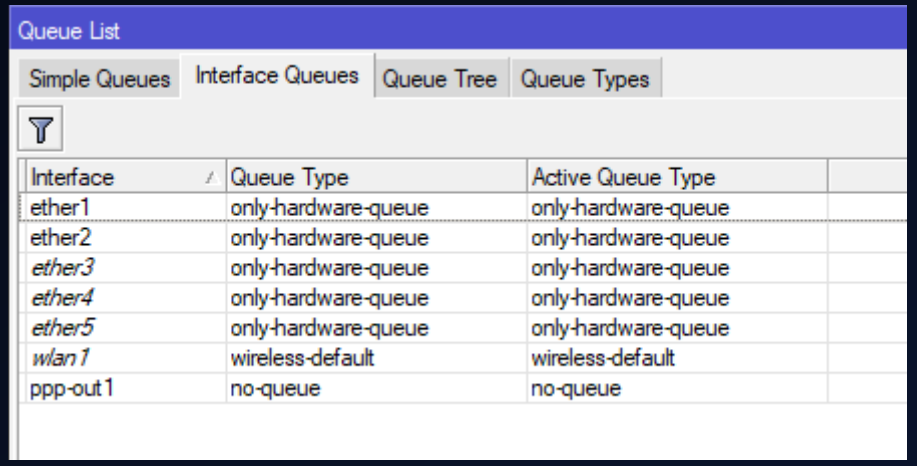
- Kita dapat menggunakan ISP management system
  - Cloud vs Dedicated
  - Hosted vs Physical



- Simple. Gak ribet.
- Billing, CRM, Monitoring and Provisioning semua dalam satu pintu.

QoS

- Cukup menggunakan “queue-ing” milik Mikrotik, kita dengan mudah menyalurkan Internet dengan “quality of service”.
- Ditambah dengan DSCP, 802.11q Priority.
- PCQ – HTB – SFQ – Dll.



SLA

- Apakah device-device Mikrotik dapat memberikan dan menyalurkan servis Internet dengan SLA?

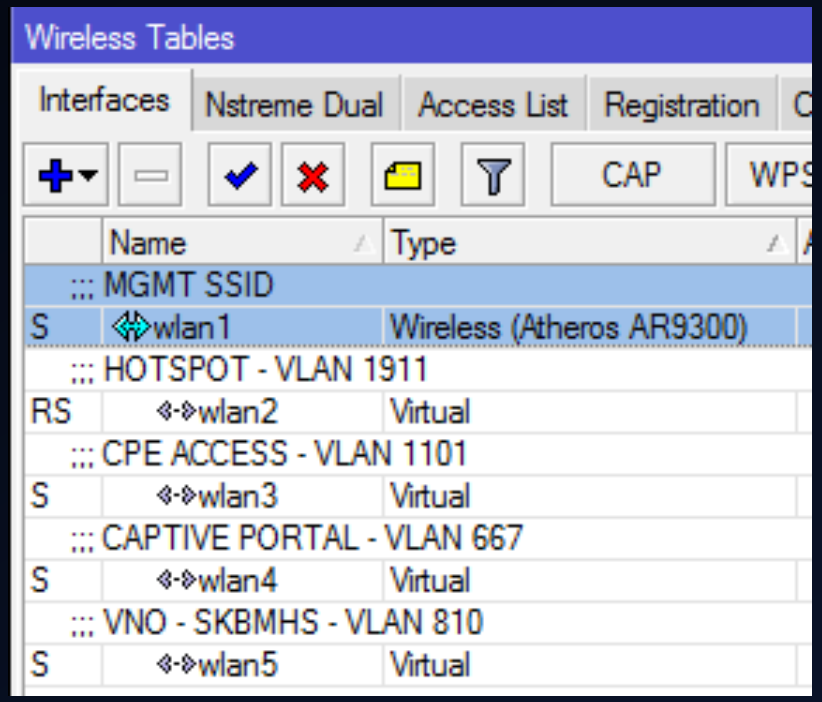
- **BISA**

Ide Sharing

- Sharing Economy?
  - Provision “Virtual” SSID
    - HOTSPOT FREE/PAID
      - SNS LOGIN
      - [giveme.online]
    - ADVERTISEMENT AS A SERVICE
    - WiFi Roaming
      - e.g (eduroam, iPass, etc.)

Ide Sharing

- Sharing Economy?
  - VNO “VIRTUAL NETWORK OPERATOR”
    - Other ISP = join Infrastructure = save cost



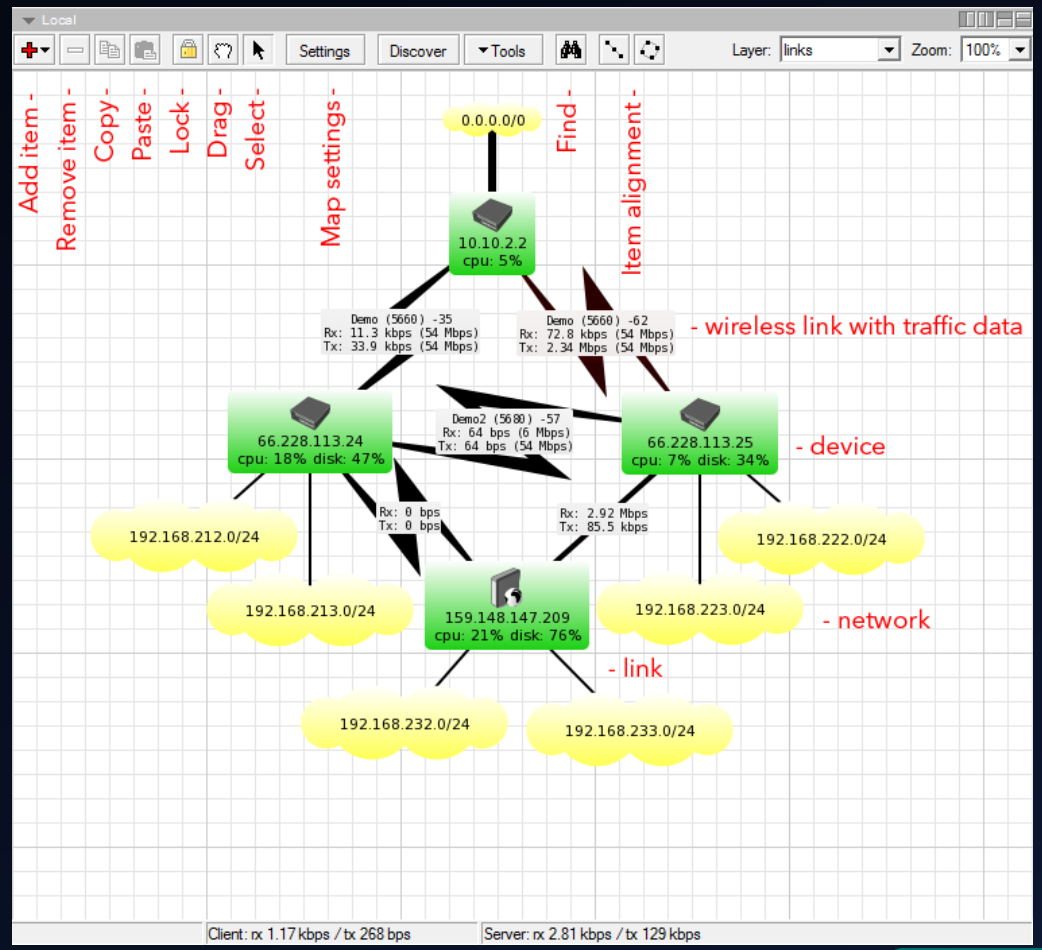
Staff Management

- Di awal, cukup dengan:
  - 2 shifts of 2 people on NOC
  - 1 Billing
  - 1 Marketing

Small Team = Coordinated Work

The DUDE Monitoring

Visit:
wiki.mikrotik.com



Tapi....

Target User

- Kantor Pemerintahan
  - Kepolisian
  - Branweer
- Rumah Sakit, Klinik
- Kantor Kelurahan / Kecamatan
- NGO/NPO
- Daerah yang belum terjangkau oleh mode Telekomunikasi yang “terjangkau”.

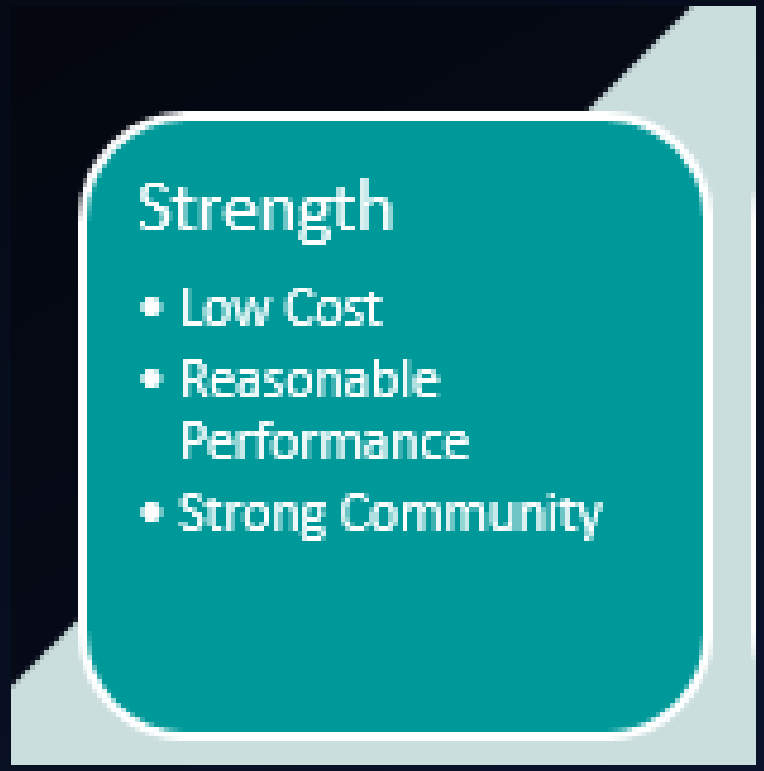
Daya Beli

- Dari survey setempat (Bandung):
  - Paket Internet yang paling banyak digunakan = 300rb Rupiah
    - Termasuk:
      - Internet @ 10Mbps DL / 2Mbps UL
      - IPTV @ FTA channels
  - Apa yang kita berikan dengan harga yang sama?
    - Internet @ 25Mbps DL / 5Mbps UL
    - Tapi CPE dibayarin customer.
    - Tidak paling murah, tapi servis memuaskan.

SWOT di Infrastruktur menggunakan MikroTik

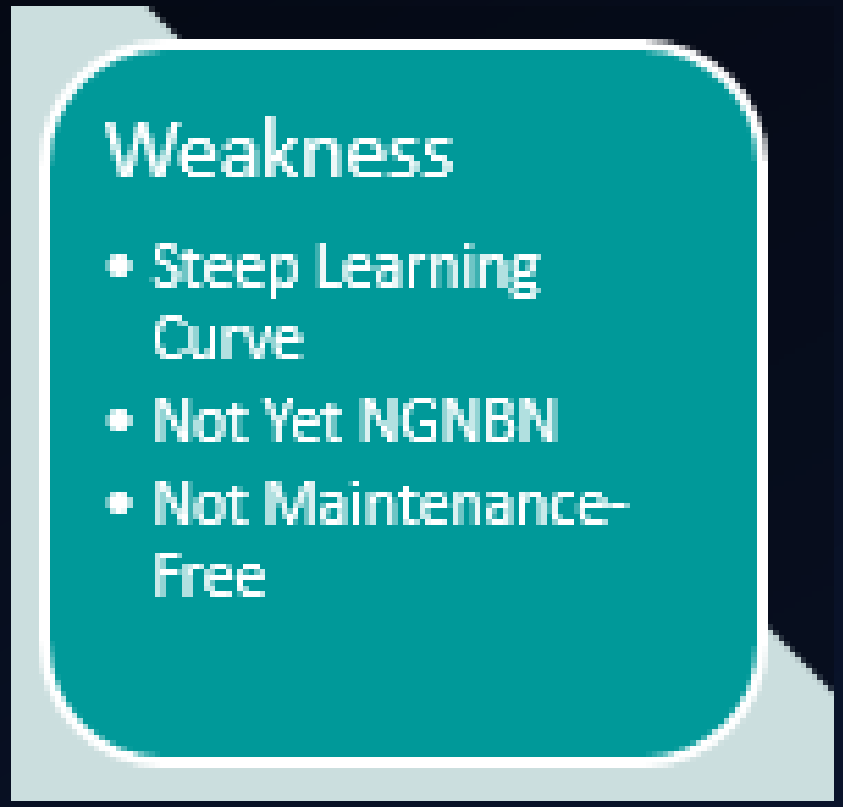
SWOT di Infrastruktur menggunakan MikroTik

- Strength (Kekuatan)
  - Harga Terjangkau
  - Performa Masuk Akal
  - Komunitas



SWOT di Infrastruktur menggunakan MikroTik

- Weakness (Kelemahan)
  - Tidak Mudah Untuk Belajar Dari Dasar
  - Belum NGNBN Ready
  - Sangat Rentan Dengan Maintenance Rutin



SWOT di Infrastruktur menggunakan MikroTik

- Opportunities (Kesempatan)
  - Sistem Ekonomi Gotong Royong
  - Masih Banyak Daerah Yang Bisa Diserbu
  - Terobosan Pasar Kepada Socio-economy Menengah.

SWOT di Infrastruktur menggunakan MikroTik

- Threats (Ancaman)
  - Pemain Tidak Asing
  - Kecepatan vs Fiber GPON
  - Skala Ekonomi

THANK YOU

WHERE TO FIND ME ?

wenas.ongkowinoto

MikroTik x