INTERNET SERVICES.
NETWORK DESIGN.
SYSTEMS INTEGRATION.

MUM
April 28, 2007
Nigeria

Hotspot, VLAN and User Manager

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Short intro on ITClick Networx

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- Established since 2002 and is a subsidiary of ITClick Solutions Ltd.

- Briefly and simply put, we:
  - provide broadband internet service using
    - (i) 802.11 wireless.
    - (ii) C & KU iDirect VSAT
  - carry out Data & Voice Network Design and Integration
  - provide consulting Services

Our Transition towards Mikrotik

- 1999 - Started out with Dialup ISP.
- 2001 –Wireless experience with Breezecom products. Acquired Breezecom certifications
- 2003 - Licensed and began providing own Wireless Internet Service. Rolled out with a mix of Cisco Aironet and Proxim with bulky coax cables and amplifiers. Backend solution for Proxy, QoS and Firewall is RedHat Linux. Authentication is MAC Access List achieved on Radios
- 2004 –Purchased first set of Routerboards and RouterOS. Started with RouterOS 2.8.13 and RB200.
- 2004 – Attended RouterOS 2.8 Training in Ibadan Organised by Skannet.

Our Transition towards Mikrotik

- 2004 – Backend Solution for QoS, Firewall 100% changed to Mikrotik. Changed Authentication method to Mikrotik hotspot
- 2005 – Entire Wireless Network Base stations 100% changed to Routerboards and powered by Solar.
- 2006 – Attended Advanced RouterOS 2.9 Training in Singapore MUM organised by Mikrotik. Acquired Mikrotik Certifications
- 2007 – Adopted use of Mikrotik User Manager for Hosted Hotspot service for hotels, malls and Cybercafés
- 2007, March – 14 ISP base station sites with over 20 Routerboard 532s total. In all, we have deployed over 200 RouterBoards in consulting projects and client premise links

Why Transition to Mikrotik?

- Reliability - We find RouterBoards the most powerful and reliable outdoor solution ever deployed. With over 200 deployment of routerboard between 2004 and 2007, we've only RMA'd 2 units.
- Performance - ability to handle high traffic. Low power consumption (about 350mA on RB532 with two 400mW cards. Very solar friendly!)
- Features: Unlimited options for system integrators and users. Your solutions and designs are limited only by how far you can imagine...
- Cost: Everybody wants reliability and performance at low price...

Why Transition to Mikrotik?

- Ease of use: Most users' reason for using RouterOS. Winbox is love at first sight!
- Control: Network Admins first love. All the power you can imagine to enforce resource control with just a few key strokes.

Wireless Network

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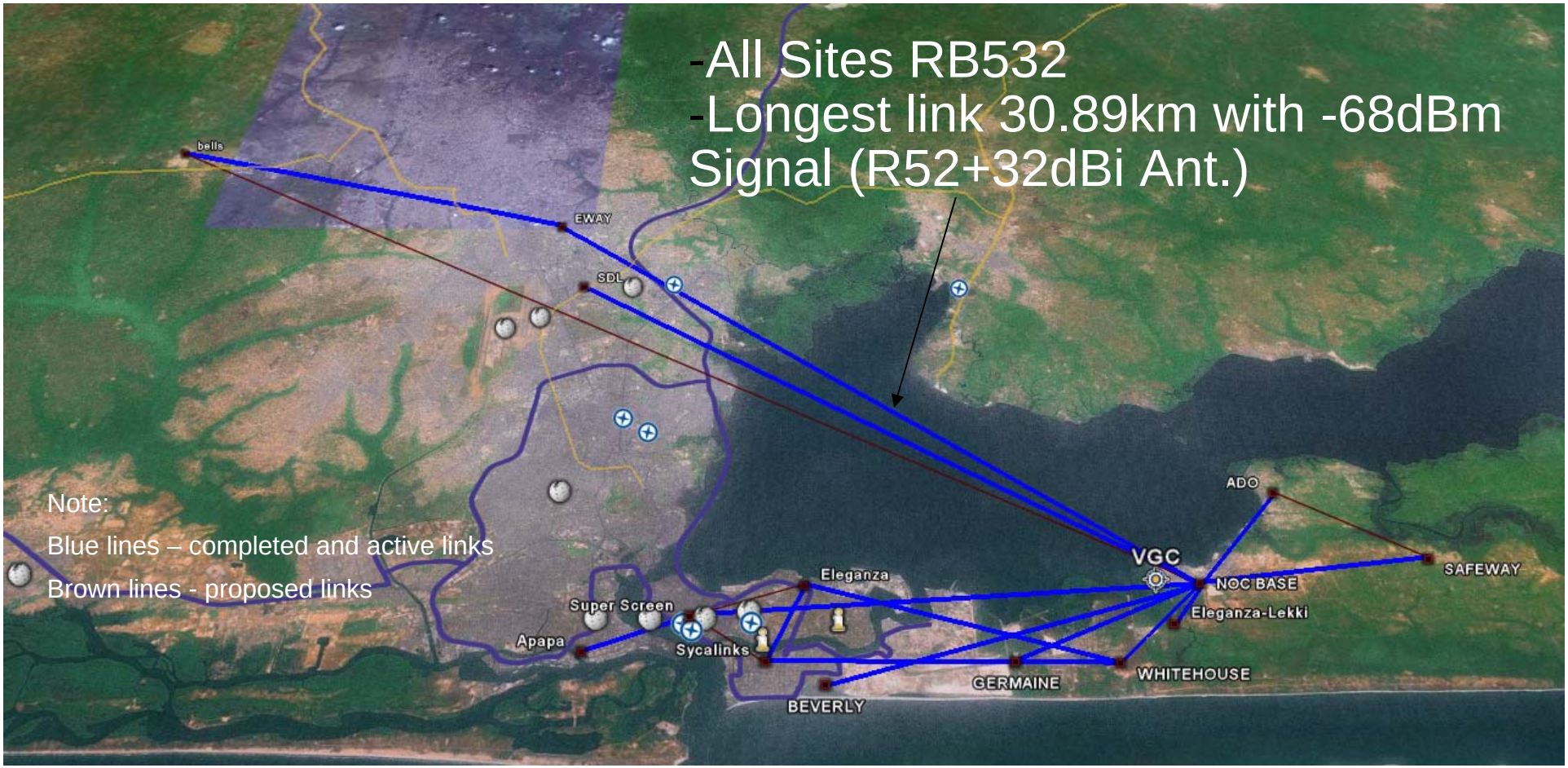
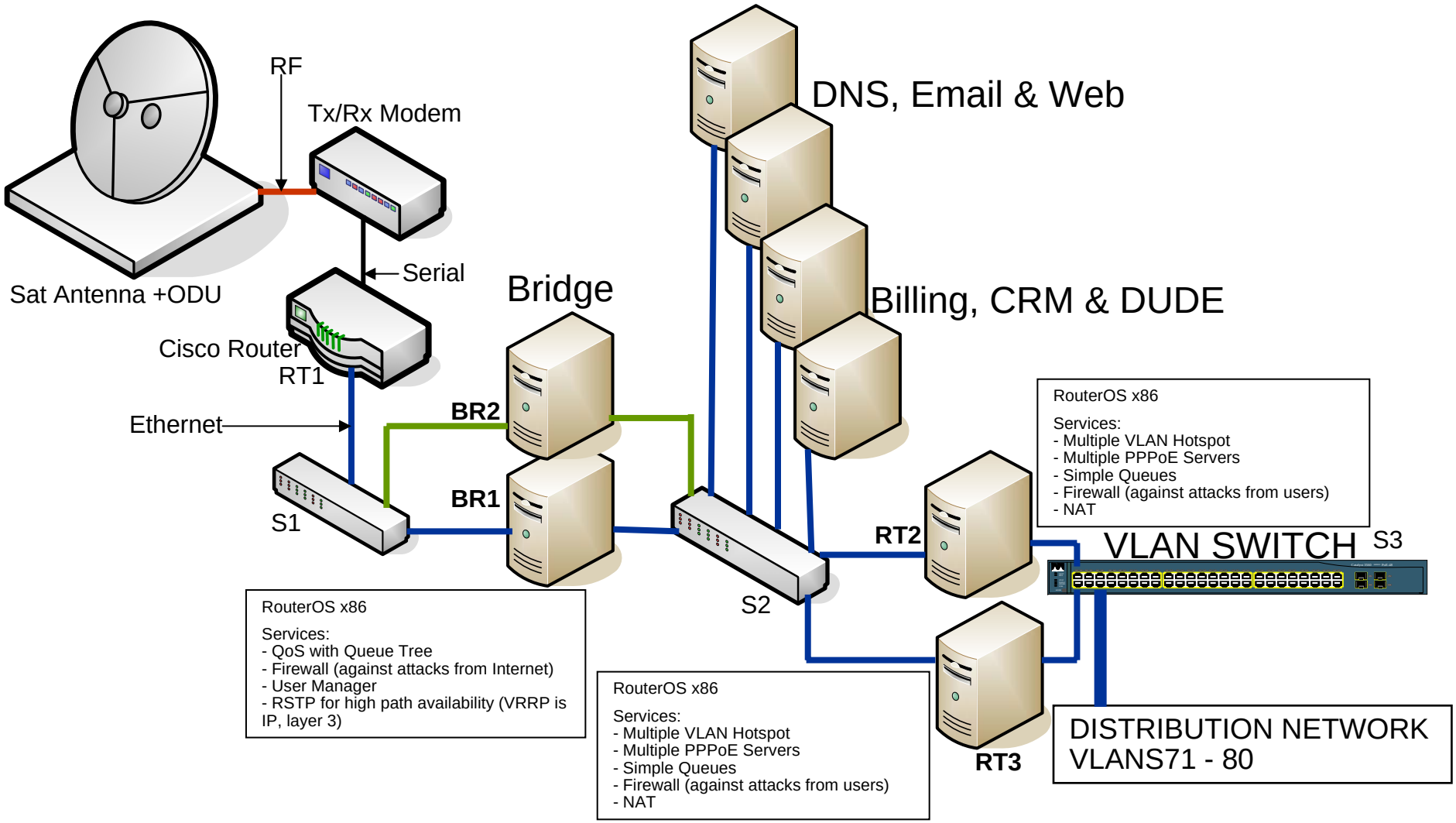


Backend Diagram (Simple)



Wireless Network (Simplified)

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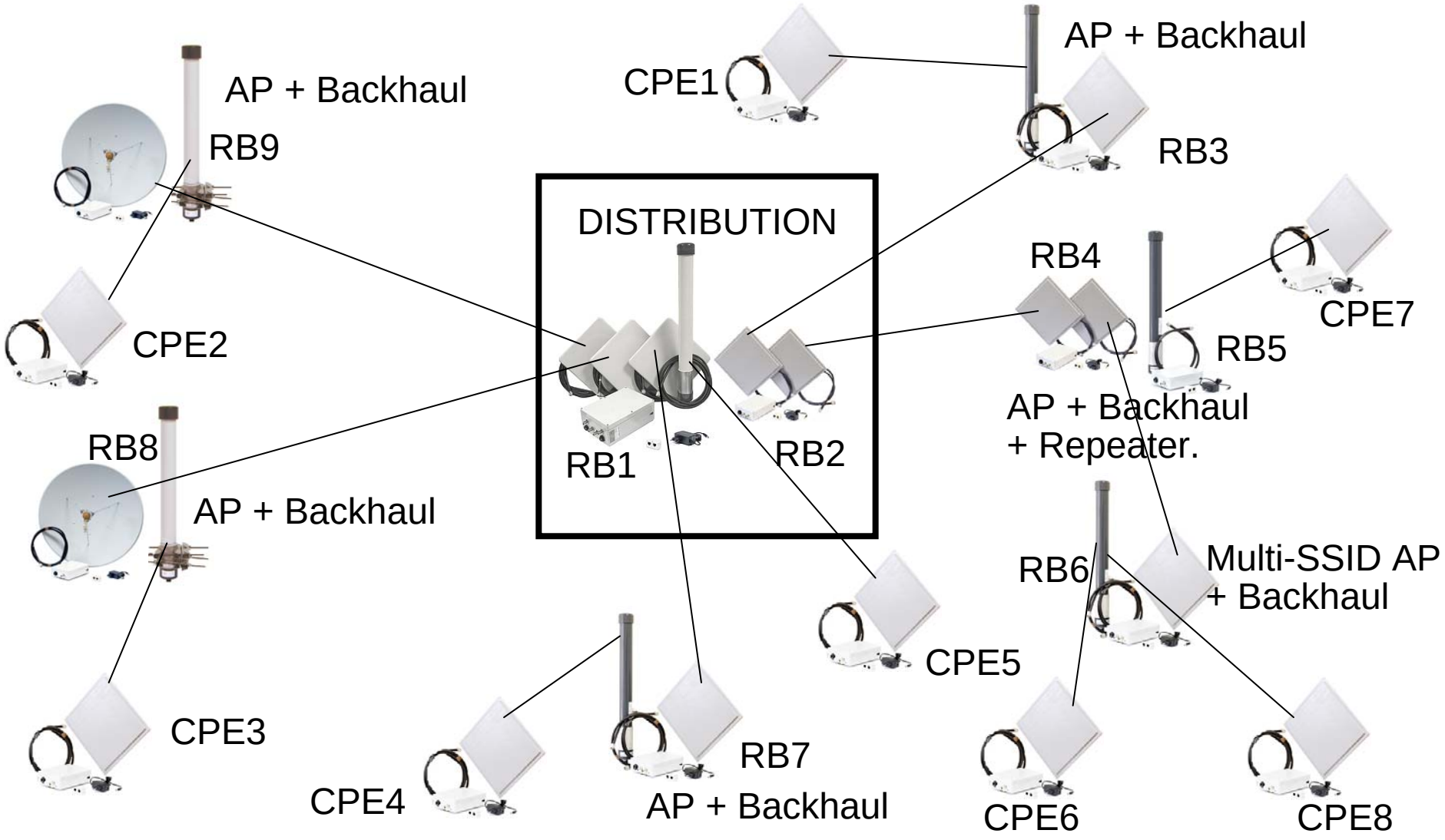

VLAN Based Hotspot & PPPoE

Design objectives:

- Centralized Firewall and QoS, Radius Authentication and Access Gateway (Hotspot & PPPoE) for simplified administration and single point of failure.
  Layer 2 a must for Central PPPoE. Optional for Hotspot and Firewall. Central Hotspot is also possible at layer 3 (routing). Use VLAN.

VLAN Based Hotspot & PPPoE cont'd

- Centralized Hotspot type login with different login pages and different classes of service (hosted service for Virtual ISP reseller model) **Possible in two ways:**
  (1) Multiple 'real' interfaces on gateway. You need install as many interface as hotspot servers required
  (2) virtual interfaces on single interface (VLANs). Cost effective and most reasonable option is VLAN

VLAN Based Hotspot & PPPoE cont'd

- Hotspot Trial Feature enabled; e.g. 5 minutes trial per day

  Layer 2 link required between users and hotspot server.

  With Trial enabled, Hotspot allows users' mac free browsing as configured by the administrator. Routers replace users' mac with own mac. Use VLAN.

VLAN Based Hotspot & PPPoE cont'd

- Control PPPoE & Hotspot Login based on Radius 'Caller-id' and 'Called-id' attributes. **Layer 2 required, use VLAN**
- Prevent user to user packet forwarding. **Disable 'default forwarding' in all APs**
- Provide hosted billing service for resellers (Hotels, Cafes, Virtual ISPs. **Different login pages and called-id for resellers. Again we need layer 2, use VLAN**

- Peering, Co-lo and backup transport Services for Network Operators**. ISP-A is peered to ISP-B's network. Both use Mikrotik. ISP-A wishes to sell hotspot or PPPoE type128k Internet service where ISP-B has coverage. ISP-B offers ISP-A 128k data only transport at a fee. ISP-A is now able to offer service to customer. This peering and service type is provided at layer 2, while separating the networks. Use VLAN**

VLAN Based Hotspot & PPPoE cont'd

- Ability to provide Private layer 2 Network Services. **Customer needs to network two sites in one broadcast domain. ISP has service covering both sites. ISP offers customer cheaper networking alternative at layer 2. Use VLAN**

VLAN Based Hotspot & PPPoE cont'd

Things you must know:

-A LAN is a local area network and can be defined as all devices in the same broadcast domain.
-Routers stop broadcasts, switches forward them.
- A VLAN is a virtual LAN. In technical terms, a VLAN is a broadcast domain created by switches.
-Administrators must create the VLAN's then assign what port goes in what VLAN, manually.

VLAN Based Hotspot & PPPoE cont'd

-VLAN's provide better performance for medium and large LAN's.
-For devices in different VLAN's to communicate, you must use a router (Layer 3.)

Reference the network diagram above, create multiple hotspot with different login pages on RT2

STEPS:

1. Create VLANs on RT2

```
[admin@RT2] > interface ethernet print
  Flags: X - disabled, R - running
  #    NAME                          MTU   MAC-ADDRESS       ARP
  0  R ;;; Internet
         ether1                       1500  00:05:5D:2E:2F:75 enabled
  1  R ;;; Internal
         ether2                       1500  00:04:76:C9:CB:0D enabled

[admin@RT2] > interface vlan add name=ether2-vlan71 vlan-id=71 interface=ether2 disabled=no
[admin@RT2] > interface vlan add name=ether2-vlan72 vlan-id=72 interface=ether2 disabled=no
[admin@RT2] > interface vlan add name=ether2-vlan73 vlan-id=73 interface=ether2 disabled=no
[admin@RT2] > interface vlan add name=ether2-vlan74 vlan-id=74 interface=ether2 disabled=no
add comments as appropriate
[admin@Peacock] > interface vlan print
Flags: X - disabled, R - running
 #    NAME                          MTU  ARP       VLAN-ID INTERFACE
 0  R ;;; visp hotspot service
      ether2-vlan71                 1500 enabled    71      ether2
 1  R ;;; v72 clickspot service
      ether2-vlan72                 1500 enabled    72      ether2
 2  R ;;; clickspot – Seaview hotels
      ether2-vlan73                 1500 enabled    73      ether2
 3  R ;;; clickspot – Parkview estate
      ether2-vlan74                 1500 enabled    74      ether2
```

Setup cont'd

- Add ip addresses to the vlan interfaces
- Create dhcp-server on each vlan interface

```
[admin@RT2] > ip dhcp-server print
Flags: X - disabled, I - invalid
 #   NAME          INTERFACE RELAY        ADDRESS-POOL  LEASE-TIME ADD-ARP
 0   dhcp-v71      ether2-vlan71          v71-dhcp      6h
 1   dhcp-v72      ether2-vlan72          v72-dhcp      6h
 2   dhcp-v73      ether2-vlan73          v73-dhcp      6h
 3   dhcp-v74      ether2-vlan74          v74-dhcp      6h
```

- Create hotspot server on each vlan interface

```
[admin@RT2] > ip hotspot print
Flags: X - disabled, I - invalid, S - HTTPS
 #   NAME              INTERFACE ADDRESS-POOL  PROFILE      IDLE-TIMEOUT
 0   v71-clickspot      ether2-vlan71          v71-clickspot          none
 1   v72-clickspot      ether2-vlan72          v72-clickspot          none
 2   v73-clickspot      ether2-vlan73          v73-clickspot          none
 3   v74-clickspot      ether2-vlan74          v74-clickspot          none
```

Setup cont'd

- Modify server profiles as necessary

```
[admin@RT2] > ip hotspot profile print
Flags: * - default
0 * name="default" hotspot-address=0.0.0.0 dns-name="" html-
                directory=""  rate-limit="" http-proxy=0.0.0.0:0 smtp-
server=0.0.0.0
    login-by=http-chap,http-pap split-user-domain=no use-radius=no

1   name="v71-clickspot" hotspot-address=192.168.0.1 dns-name=""
    html-directory=hotzone rate-limit="" http-proxy=0.0.0.0:0
    smtp-server=0.0.0.0 login-by=http-chap,http-pap split-user-domain=no
    use-radius=yes radius-accounting=yes radius-interim-update=received
    nas-port-type=wireless-802.11 radius-default-domain=""
    radius-location-id="" radius-location-name=""

 2   name="v72-clickspot" hotspot-address=192.168.1.1 dns-name=""
    html-directory=clickspot rate-limit="" http-proxy=0.0.0.0:0
    smtp-server=0.0.0.0 login-by=http-chap,http-pap split-user-domain=no
    use-radius=yes radius-accounting=yes radius-interim-update=received
    nas-port-type=wireless-802.11 radius-default-domain=""
    radius-location-id="" radius-location-name=""
```

Setup cont'd

3 name="v73-clickspot" hotspot-address=192.168.2.1 dns-name="" html-directory=clickspot rate-limit="" http-proxy=0.0.0.0:0 smtp-server=0.0.0.0 login-by=http-chap,http-pap split-user-domain=no use-radius=yes radius-accounting=yes radius-interim-update=received nas-port-type=wireless-802.11 radius-default-domain="" radius-location-id="" radius-location-name=""

4 name="v74-clickspot" hotspot-address=192.168.3.1 dns-name="" html-directory=clickspot rate-limit="" http-proxy=0.0.0.0:0 smtp-server=0.0.0.0 login-by=http-chap,trial split-user-domain=no trial-uptime=5m/1d trial-user-profile=datatrial use-radius=yes radius-accounting=yes radius-interim-update=received nas-port-type=wireless-802.11 radius-default-domain="" radius-location-id="" radius-location-name=""

-Create user Profiles
-Add Radius Servers

Wireless Setup

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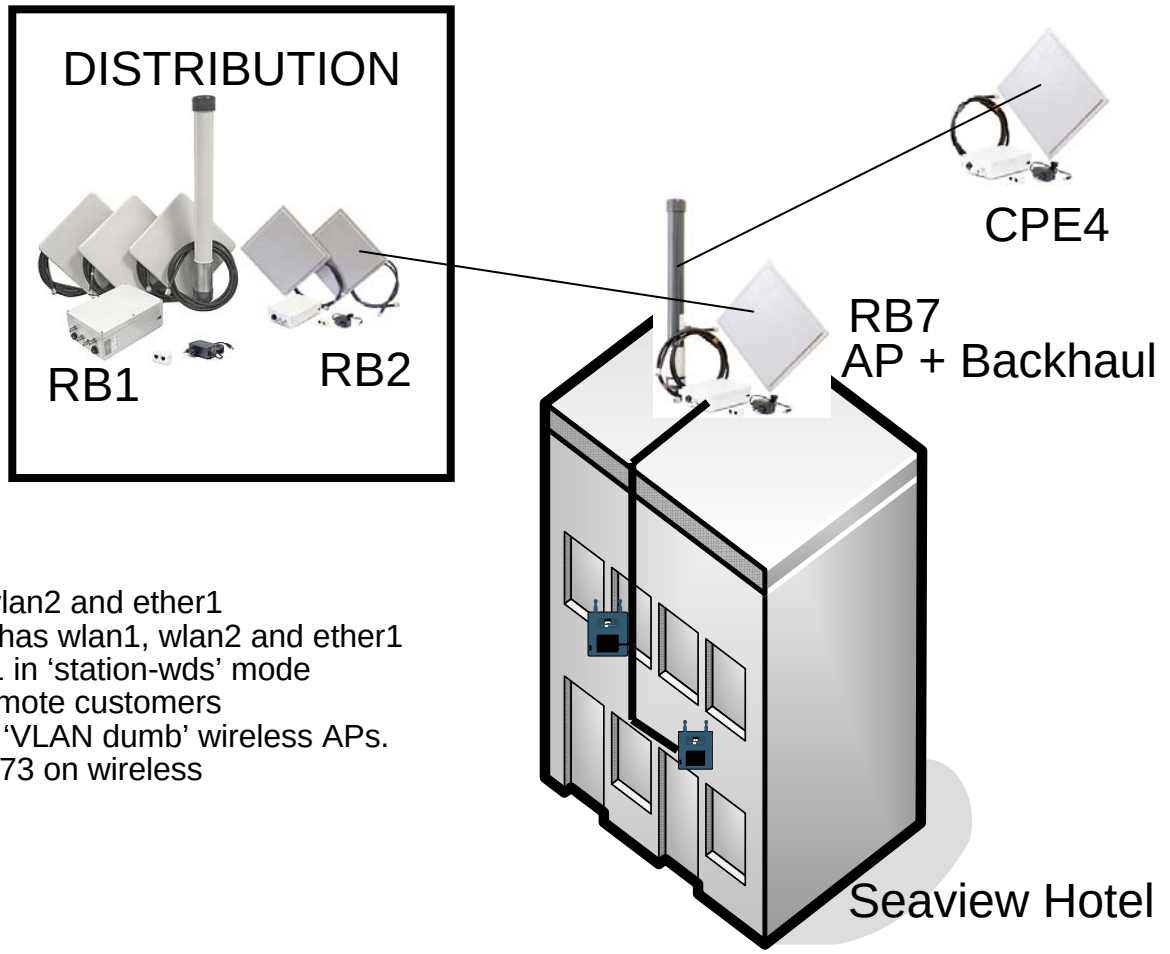
Example:

-Seaview hotel is buying 256/128kbps Internet from ITClick to resell using own branded login page to guests. Vouchers from seaview CANNOT be used elsewhere. Authentication and Vouchers are hosted at ITClick. Seaview will login to Mikrotik user manager hosted at ITClick to manage users and generate vouchers. Seaview is paying ITClick for both internet and voucher services.

- Other customers must NOT see the Seaview login page



-RB2 is at the NOC and has wlan1, wlan2 and ether1
-RB7 is located at seaview hotel and has wlan1, wlan2 and ether1
-RB7 wlan1 is backhaul to RB2 wlan1 in ‘station-wds’ mode
-RB7 wlan2 is AP and repeater for remote customers
-Ether1 of RB7 will connect to hotel’s ‘VLAN dumb’ wireless APs.
-Ether1 of RB7 will be bridged to vlan73 on wireless

Thank you!

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