WISP 101

The DO's and DON'T's of
becoming a Wireless ISP

WISP 101 topics

- Choosing your hardware
- Setting up the Highsite
  - Hardware
  - Software
  - Security
  - Wireless
  - Backhaul
- Setting up the client

Choosing your hardware

- Highly dependant on current and future client requirements
- Routerboard 532 is fine for highsites handling around 20 clients
- For 20 - 40 clients consider the newer RB 532A – 400Mhz + 64MB RAM
- For 40+ clients consider using multiple RB532's or check the Routerboard roadmap for upcoming higher speed units

Setting up the highsite – Hardware

- The hardware you use will determine the highsite setup
- Remember to allow for future expansion!

Highsite Hardware

- DO use a IP65 rated metal enclosure with STP cable and sinewave PSU
- DON’T use plastic with switch mode power supply unless you enjoy have 2-way radio operators take an axe to your equipment!
- DO use multiple sector antenna’s to distribute the signal
- DON’T use omni-directional antenna’s on highsites unless you enjoy other WISP operators taking an axe to your equipment…

WAPA Guidelines for Highsites

- Members will conform to basic WAPA high site requirements, including:
  - Any antenna with a beam width of greater than 120 degrees is restricted to maximum gain of 6dbi in 2400-2483 MHz;
  - Any antenna with a beam width of greater than 120 degrees is restricted to maximum gain of 10dbi in 5470-5875MHz;
  - No Amplifiers may be used; and
- Power backup system needs to be in place

Setting up the highsite - software

- Several factors are involved in setting up the RouterOS software
- The authentication that clients will use will determine how complex setup will be
  - The WISP standard is to use PPPOE for client authentication for easy management and tracking.
  - PPPOE also makes the most efficient use of IP addresses
  - Manual IP addressing can also be used – this will be easier to setup but less secure and manageable in the long run

Setting up the highsite - software

- Your IP addressing scheme will depend on how many sectors you have along with your backhaul and routing strategy
- DHCP can be used to assign IP addresses for both manual addressing and PPPOE
- Larger networks can use RADIUS to authenticate PPPOE clients and assign IP addresses
- Consider Mikrotik Usermanager as an easy to setup and configure RADIUS solution

Highsite Software Setup

- DO spend some time planning your IP and routing setup – get an expert to do it for you if necessary
- DON’T choose a random highsite IP layout – you will just have to redo it sometime in the future

Security 1/2

- Several methods are available to protect your investment
- Use wireless access lists to stop unauthorized users connecting to the highsite
- Considering using WEP / WPA to encrypt communication – this will place extra CPU load on the system
- Use PPPOE with MSCHAPv2 to encrypt username and password setting

Security 2/2

- Use firewall address lists to drop all outgoing traffic not listed as a registered client
- Use separate NAT rules per client as additional security
- Static ARP or Reply-only can enhance security
- HotSpot can be used where you require clients to enter a username and password for internet access

Wireless

- Wireless setup depends on client side equipment
- Use technology like Nstreme if all clients run Mikrotik to more efficiently manage data transfer and also enhance security
- Disable Default Authenticate and Default Forward
- Use 6 channel spacing on 2.4Ghz for multiple sector layouts. Even better use 5.8Ghz for clients
- Use 5.8 Ghz on backhaul point to point links
- Use the Regulatory Domain feature of Mikrotik to keep within legal power limits

Backhaul

- The backhaul link will carry all the traffic for your clients
- Use 5.8Ghz only to ensure a solid link
- Use ptp addressing and good security between backhaul links
- Consider active routing technology such as OSPF to maintain redundancy and load balancing on your network

Backhaul

- DON’T use /30 addressing unless combined with additional security – it is very easy to hack
- DO use multiple paths for redundancy on the network

Setting up the Client

- Client setup depends on the highsite configuration
- Typical client setup:
  - Wireless connection
  - PPPoE / IP Address on Wlan interface
  - IP Routing (for manual IP setup)
  - IP DNS (for manual IP setup)
  - LAN IP setup
  - LAN DHCP Setup
  - Masquerade rule

Basic Router Setup Checklist

1. Connect via MAC Winbox to router
2. Add ethernet IP address 192.168.1.254/24
3. Connect to highsite wireless SSID=wisp101
4. Add wlan ip 10.1.1.x/24. Confirm that you can ping 10.1.1.254
5. Add a default route of 10.1.1.254
6. Add a DNS server 10.1.1.254. Allow remote requests
7. Change the router's Identity
8. Add a firewall masquerade rule
9. Setup DHCP Server on the ethernet port
10. Setup / check the client computers IP settings
11. Confirm that you can access the Internet

More Information

- WAPA – Wireless Access Providers Association

  http://wapa.org.za

- Mikrotik support in South Africa

  http://www.mikrotiksa.com

  david@mikrotiksa.com

- Mikrotik Global

  http://www.mikrotik.com