

Resolving Wireless Disconnects and Improving Uptime

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Who am I?

- Currently involved in three companies:
 - Airosurf Communications - A WISP Based in Edmond, Ok
 - Brink Networks - Component Distributor
 - WISPFForum.net - Operator, Contributor & Moderator
- A Mikrotik User Since version 2.x
- Have occupied many roles installer, tower climber, network administrator...



WISPforum.net
A Community for Wireless Internet Service Providers

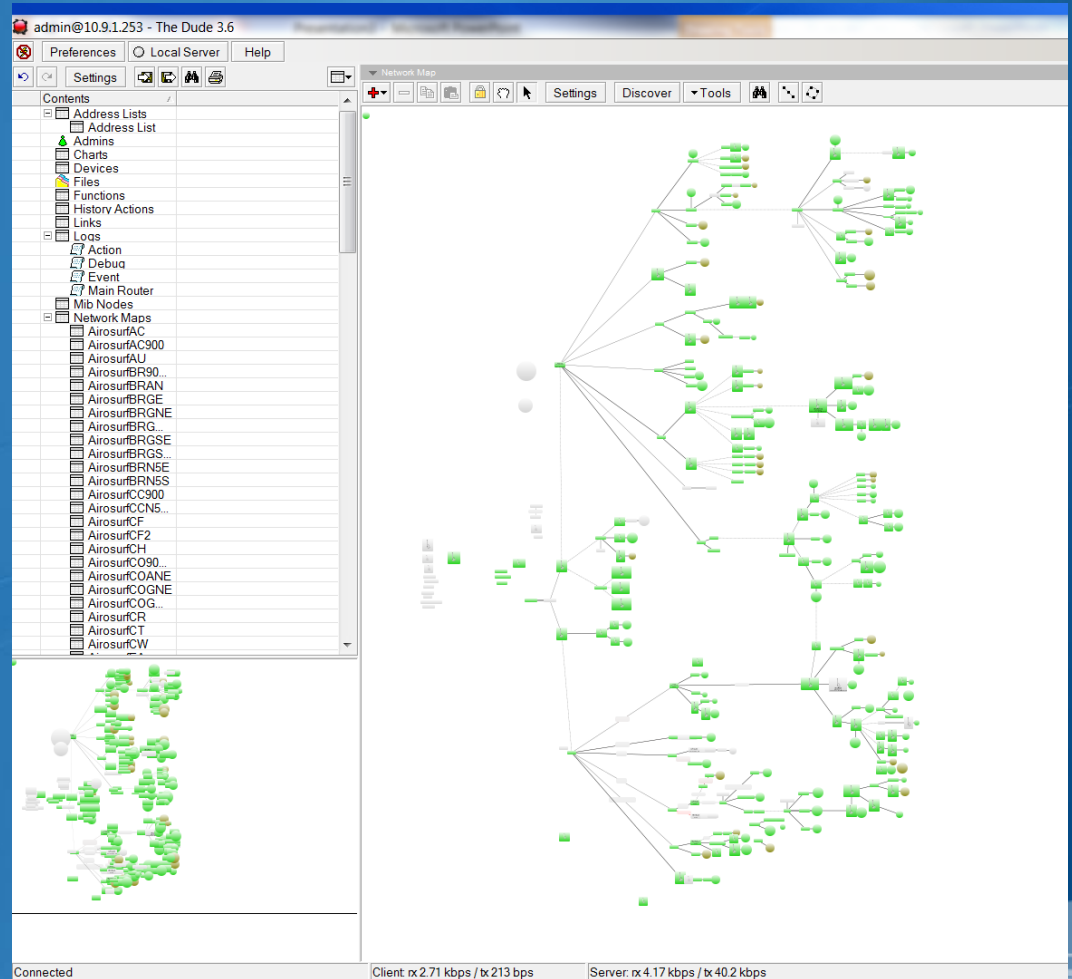
BRINKNETWORKS

Presentation Goals

- To help improve the uptime of your network by leveraging the several advance technical features exclusive to Mikrotik RouterOS.
- To run a more efficient, less labor intensive network
- To bribe your attention throughout the presentation with random goodies!

Live Network Overview

Live Network Overview



Assumptions and Perspective

- Airosurf is a WISP Based in Oklahoma...a part of the US that has 4 very distinct sometimes extreme (especially recently) seasons.
- Tornados, Lightning, Extreme Winds, Flooding, Icing, Blizzards.
- It's relatively flat (<300 ft elevation variation throughout our coverage area)

Assumptions and Perspective

- It's urban with lots of interference from the outside.
- The lowest offered plan is a bursted 4.2 Mb / 1.5 Mb
- Our entire backbone structure is feed by unlicensed Mikrotik Devices and aggregate throughput averages more than 100mb during peak usage.
- We use Google – Google Voice, Google Apps and Android.

The Mikrotik ToolBox

- MAC-Telnet
 - Without a doubt one of Mikrotik's most powerful tools and a primary reason we continue to choose them over other wireless equipment.
- Telnet
 - It's extremely robust – Doesn't disconnect even with registration drop (unlike MAC-Telnet)
- Freq. Usage, Scan, Snooper

MAC-Telnet

- Exclusive to RouterOS
- Life saver when no IP network is present.
- Uses the UDP transport Protocol on port 20561
- Accessible in three primary ways: (*Live Demo*)
 - Wireless Registration Window
 - IP Neighbors Window
 - Telnet / Terminal Window

PTMP Wireless Disconnect Causes

- Interference
- Poor Signals (i.e. >80 dBi)
- Damaged Hardware
- Software / Version Mismatches
- Upgrade Baggage*

PTMP Wireless Disconnect Solutions

- Confirm you're on a clean channel.
- Improve signals of the worst clients
 - *Live demonstration of Worst Signal Impacts on an otherwise healthy sector*
- Identify damaged radios using ConnectAccessList
 - Add every client to the connect list – Add them back one by one until the problem comes back.
- Resolve RouterOS Version Mismatches
 - Upgrade OS *&* Firmware
- Run Scripts to Reset Wireless Interfaces
 - Upgrades can leave baggage that keeps the client from staying connected
- Don't mix radio types – stick with Mikrotik!

PTMP Wireless Disconnect Solutions

NV2, Nstreme or Nothing at ALL

- Recently NV2 shows incredible performance
 - (Live Demonstration of PTMP 2.4ghz sector clients getting 20mb with 30 clients in crowded environment)
- Nstreme is still extremely useful.
- In worst case scenarios sometimes nothing at all is your best bet.

PTMP Wireless Disconnect Solutions

Ideal Baseline Configuration

- If not using using Nstreme or NV2 – Start Yesterday!
- Configuration of your network depends on the environment it exists in.
- There is no “Magic Bullet” configuration
- Your environment is constantly changing
- Frequently test latency and throughput

PTMP Wireless Disconnect Solutions

Ideal Baseline Configuration using Nstreme

- Ideal Nstreme framing policy settings with balance of Robustness and Speed
 - 900Mhz - Exact Size @ 100 (Live Demo)
 - 2.4 Ghz - Best Fit @ > 1000
 - 5ghz – Best fit @ > 2000
- Use Adaptive Noise Immunity
- HW Retries Usually between 10 & 15

PTMP Wireless Disconnect Solutions

Get Creative

- If one sector of many on a tower fails Try using VirtualAPs on the other sectors to temporarily restore service until a tower climb can be done.
- If a particular client is having trouble connecting due to interference - Use telnet and the command line scan to find other AP's nearby.
 - Use MACTelnet to move the network.
 - Can temporarily restore service until a Tech Call can be done.
- Try *temporarily* over riding the card TX power.
 - Some cards do better than others
 - Pay attention to EIRP – Of Course.

PTP Wireless Disconnect Solutions

Slow Down Traffic

- A weak link will begin to disconnect as the load begins to increase.
- Stop or drastically limit traffic so that you can make changes to the link
- Restrict the load by Using simple or interface queues.

PTP Wireless Disconnect Solutions

Slow Down Traffic

- Disable interfaces or network addresses so that traffic drops off.
 - Be sure to re-enable them after you've identified the max capacity
- Use BTest tool and ping tool to determine the most possible traffic the link can handle - set the queue to this amount
- A slow packet is better than no packet at all!

PTP Wireless Disconnect Solutions

Restore the defaults

- Disable Nstreme or NV2
- Turn off Adaptive Noise Immunity
- Try using 802.11A/N vs Only N

PTP Wireless Disconnect Solutions

Change the Physical Characteristics of the link

- Wider Channels work better in Icy Conditions or when an antenna has moved.
 - If a link was on a 20mhz channel change it to 40mhz
 - You're doubling the physical size of the wavelength
- If wet trees are the issue
 - Narrowing the link can sometimes help (20mhz down to 10mhz or even 5mhz channels)

PTP Wireless Disconnect Solutions

Get Creative

- Broken backhauls may limit you from getting into the client radio to make changes.
 - Turn a reachable neighboring AP into a temporary client, then Mac-Telnet through the wireless registration to make the necessary changes to the broken client side.
- Try *temporarily* overriding the card TX power.

PTP Wireless Disconnect Solutions

Back in the Radio!

- Start with Nstreme – Framing Policy Exact Size @ 100 is the most robust but slow.
- Increase framing policy until link disconnects.
- Use queues to keep traffic flowing.

Damage Assessment Using the Dude

- With all your clients in the dude you can quickly Identify the impact of widespread outages on your network.
- By disabling Polling and Re-enabling it on a Map you can see if changes made to restore service might have “left behind” some clients.

Beyond the Field

Communication and Expectation Levels

- We all want a 5 9's network – set a realistic level of expectation with your customers.
- Communicate outages early.
 - If setup properly the Dude can help you do this effectively.
 - Be able to Update the VM remotely – We use Google Voice for everything to make this possible.
 - Customers like text messages!
- Tell them EXACTLY what's wrong – even if you don't think they'll understand.
 - Good: "We had a wireless mini-pci card in an upstream radio get damaged by a nearby lightning strike – we're going to have to climb the tower to replace it."
 - Bad: "It's broke – Be patient"

Thank you !

Questions ?