Advanced WiFi Capture

How to Improve WiFi Reception in the Mobile Environment

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Why Use WiFi?

- You need multiple sources for Internet when travelling
- Cellular and WiFi together give you good access
- Many RV parks and stores have decent WiFi – if it is available, you want to use it

Cellular Router

The *Heart* of Your Network

- A “regular” router, expanded to use Cellular AND/OR WiFi as the backhaul to the Internet

Terminology/Acronyms

- **CPE** – Customer Premise Equipment
- **Backhaul** – The connection to the Internet
- **WiFi "Hotspot", AP (Access Point)** – a radio device broadcasting a WiFi signal that connects you to the Internet
- **WISP** – Wireless Internet Service Provider
- **WiFi as WAN** – in a router, use of a wifi hotspot for backhaul; not physically tethered
- **Tethered** – physically connecting a cellular "Jetpack" to your router with a USB cord (typically)
- **WFR** – WiFiRanger product (generic term)
- **Cellular Router** – a router that .supports a cellular modem as a source of backhaul
- **POE** – "Power over Ethernet"

Issues With WiFi Connections

The issues are simple – the solutions are complex…..

- Line of sight (LOS) – this is the biggest issue
  - Other RVs
  - Trees
  - Hills
- Metal/Water
  - Your RV skin
  - Other RVs
  - Wet leaves
- Distance

The Solutions

Attributes that Maximize WiFi Signal Capture

- Issue: Line of Sight
  - Solution 1: Antenna on your roof
  - Solution 2: Better radio
- Issue: Signal is blocked – Metal or Water
  - Solution 1: Get above it
  - Solution 2: Blast through it
- Issue: Distance
  - Solution 1: Antennas – External antenna, directional antenna
  - Solution 2: Better radio

Solutions boil down to better radios, and better antenna technology positioned high for best Line of Sight.

Methods of Signal Improvement

- With your laptop
  - A better radio set – get a superior external wifi adaptor
  - Issues: USB, height limits, power antenna limitations
- Utilizing *WiFi as WAN* router
  - A better antenna – MIMO, external
  - More power – a better transmitter
  - Antenna positioning – put it higher
- A CPE

Methods of Signal Improvement

What's a CPE ?

… and Why Would I Want One

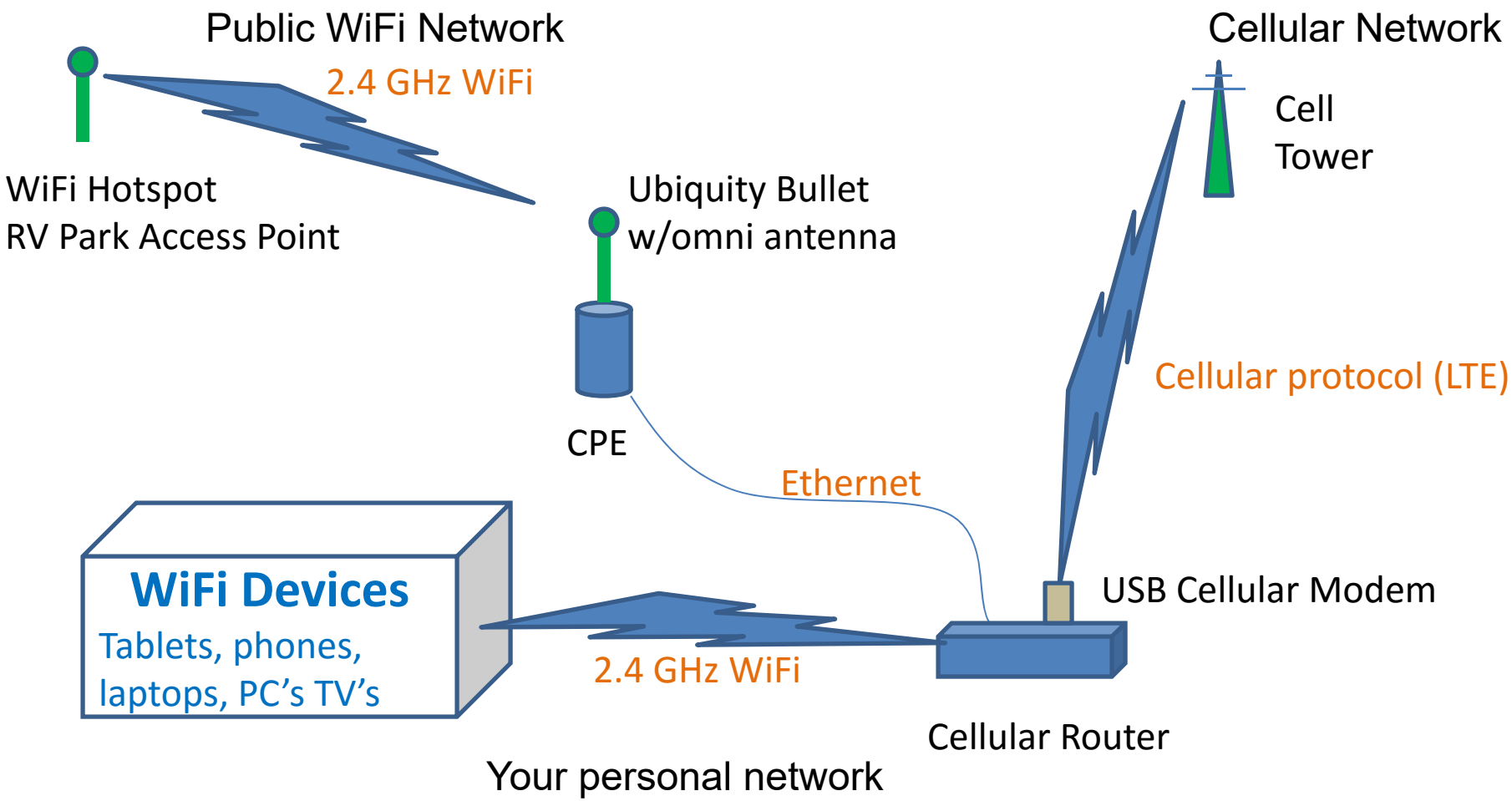
- "***Customer Premise Equipment***" - a separate WiFi radio and Antenna
- The CPE captures a wifi signal and communicates with your router (or computer), typically via Ethernet
- A CPE addresses all of the issues associated with WiFi signal capture
  - Can be positioned on the roof
  - Has an advanced antenna
  - Has a superior radio (receive and transmit sensitivity) with higher power

What's a CPE ?

Examples Utilizing a Ubiquity Bullet

The Complete System

Your ***Best*** Chance at Getting Internet



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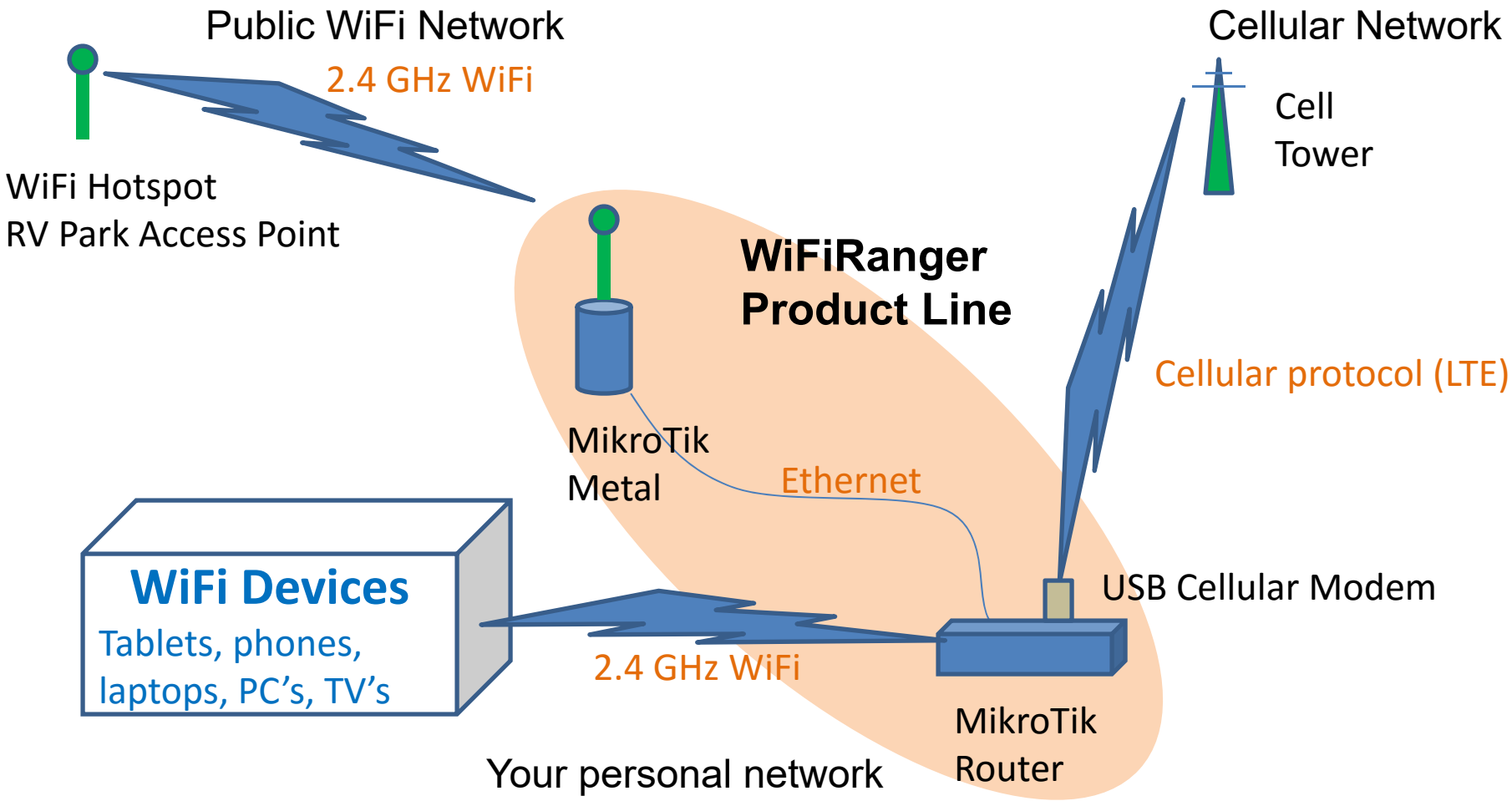

Antennas

- Directional
  - Focuses energy in a narrow band – around 30 degrees (typically)
  - Must be pointed at signal source
  - Typically not ideal for Rvers
- Omnidirection
  - 360*
  - Requires no pointing
  - Not as much gain/performance
  - …but ideal for RVers

Cellular Routers

What Attributes Do You Look For?

- Reliability
- Ease of Configuration and Management
- Completeness
- Signal Range
- WiFi As WAN
- LAN ports for physical connection
- Cellular Modem Support
- Works with a CPE, or has add-on CPE
- Support

Technology Solutions
Categories of solutions

- WiFiRanger product family: Elite, Sky, Go2 Router
  - "Best in Class" solution
  - Lots of capability and range
- Rouge Wave
  - Range is similar to WiFiRanger, but less capabilities/features
  - Simpler to use than WFR
- Homebuilt Solutions
  - Typically built around a Ubiquity CPE paired with a Cellular router.
- USB adaptors, Pepwave CPE's and other "in RV" solutions
  - Can enhance performance but not to the extent of externally mounted solutions
  - Good if you can see the Access Point from your RV Window

Building Your Own
MikroTik vs. Ubiquity

- Both build high performance products that are inexpensive
- Both are oriented towards Networking professionals.
- Notice that the WFR products were originally based on Ubiquity but are now all MikroTic-based.
- There is more “available” experience with Ubiquity products. More YouTube, more independent “Guides”, and the products are easier for a novice to work with.

Bottom line: For the professional use MikroTik. All others should use Ubiquity.

OK – This is totally Confusing

Just Tell me what I should do….

- If you need the BEST solution for the least work (and most money)
  - WiFiRanger Family
- For a DIY Solution
  - Ubiquity Picostation with Pepwave Cellular Router
- For Less Flexibility but less complexity and cost
  - Rouge Wave with any router (non cellular solution)

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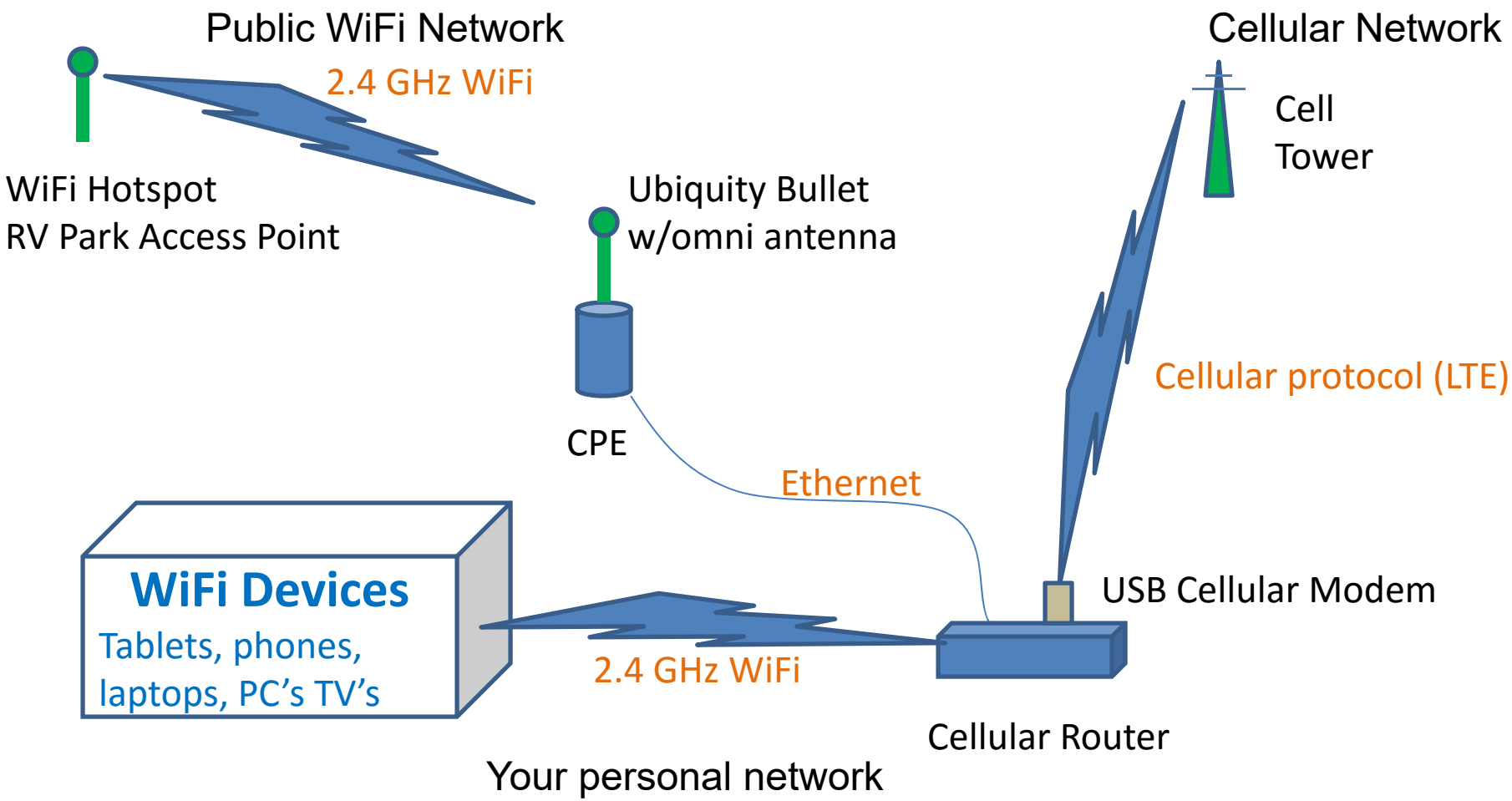

Resources

- The Mobile Internet Handbook - http://www.technomadia.com/internet/
- Building A WiFi Capture Device
- Pepwave Surf SOHO Review
- Pepwave Surf OTG Review
- WiFiRanger Review

.....all on http://jackdanmayer.com/communication.htm