Enhanced Wi-Fi

Why use a Wi-Fi connection?

I have an Air-Card

I have Satellite Internet

- Why would I use Wi-Fi?

Why use a Wi-Fi connection?

I have an Air-Card

- 5 GB monthly limit

I have Satellite Internet

- response latency

Only way to get Internet

Wi-Fi Problems –

Too Far Away

Interference

Need for local LAN

Problems – Too far away

Sometimes the park geometry puts you far from the office, the normal location for the Wi-Fi antenna

Problems – Too far away

Problems – Interference

Problems – Need for a local LAN

When you want multiple PC to access your wireless printer

Problems – Too far away

Problems – Interference

Both of these problems are fixed by using an external antenna.

Location will minimize the Interference problem.

Antenna power will minimize the Range problem

Antennas – USB Extenders

The USB wireless adapters are really integrated wireless radios and antennas. The USB cable has a length limit of 5 meters.

There are powered extension USB cables that can go long distances but they induce time delays that will probably not let the USB wireless adapter work.

Effectively limited to the inside of the RV. Gain some range but still subject to other RV interference.

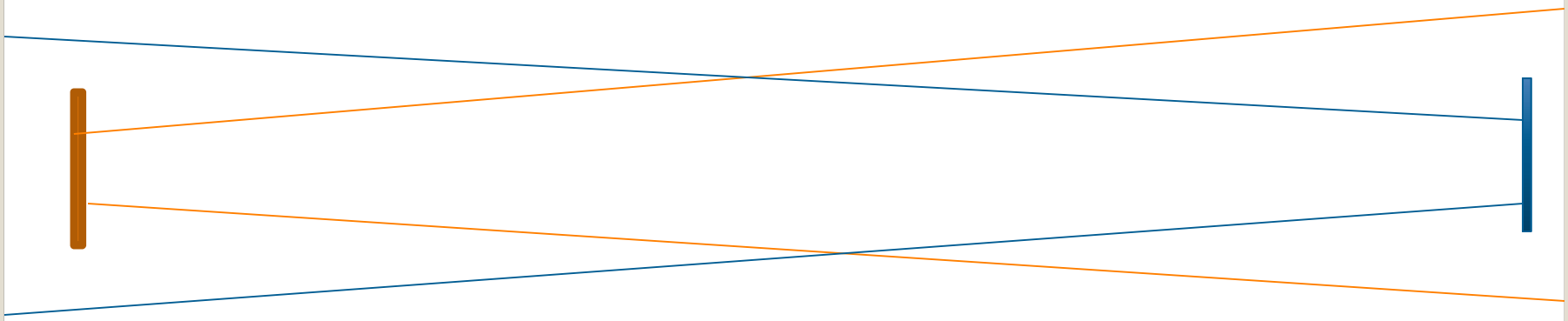
Antennas – Types

Two basic types for RV

Flat Panel
•Directional
•Most power for rating (DB)
•Have to Aim

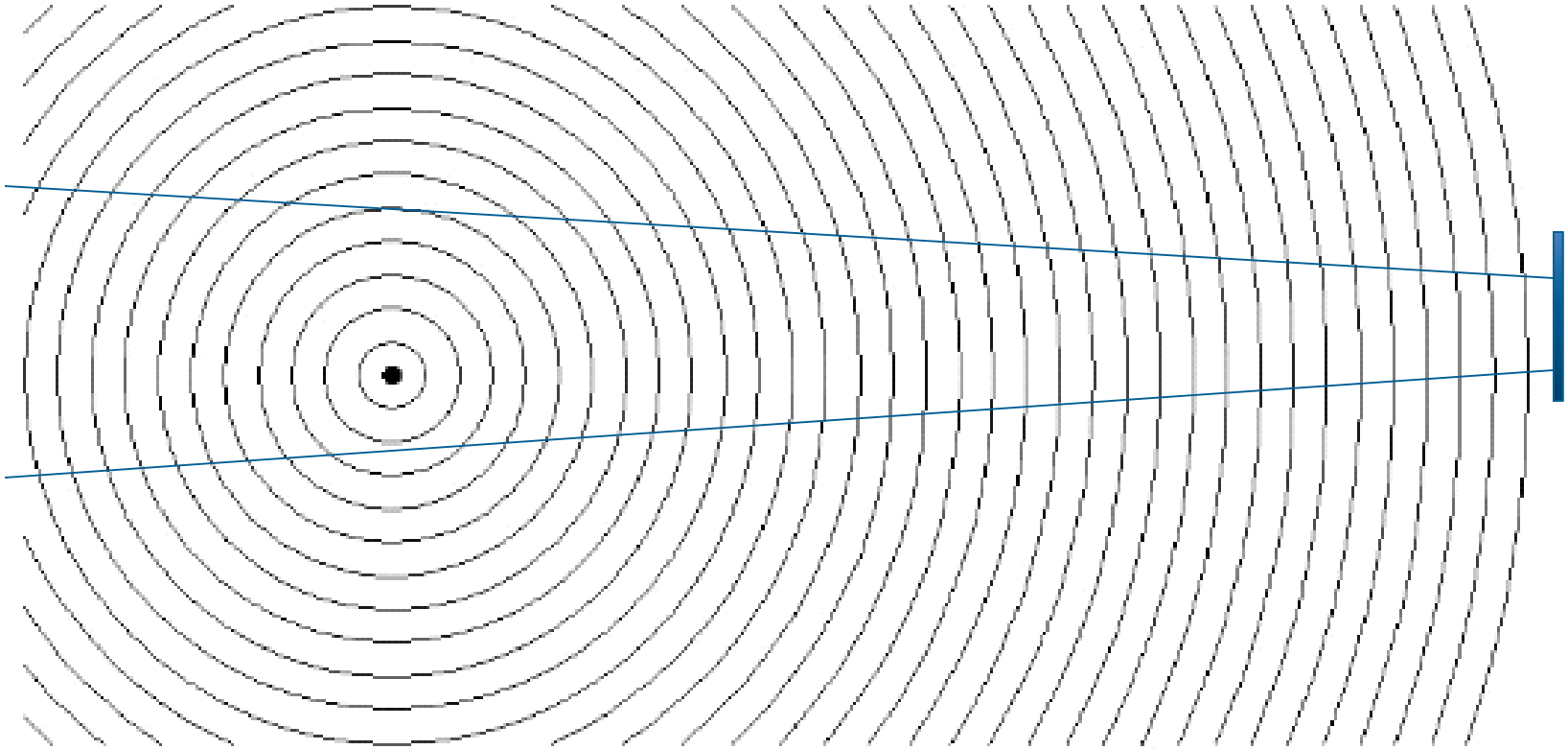
Omni-Directional
•All directions
•No aiming required
•Power not focused (DB)

Antennas – Flat Panel Directional



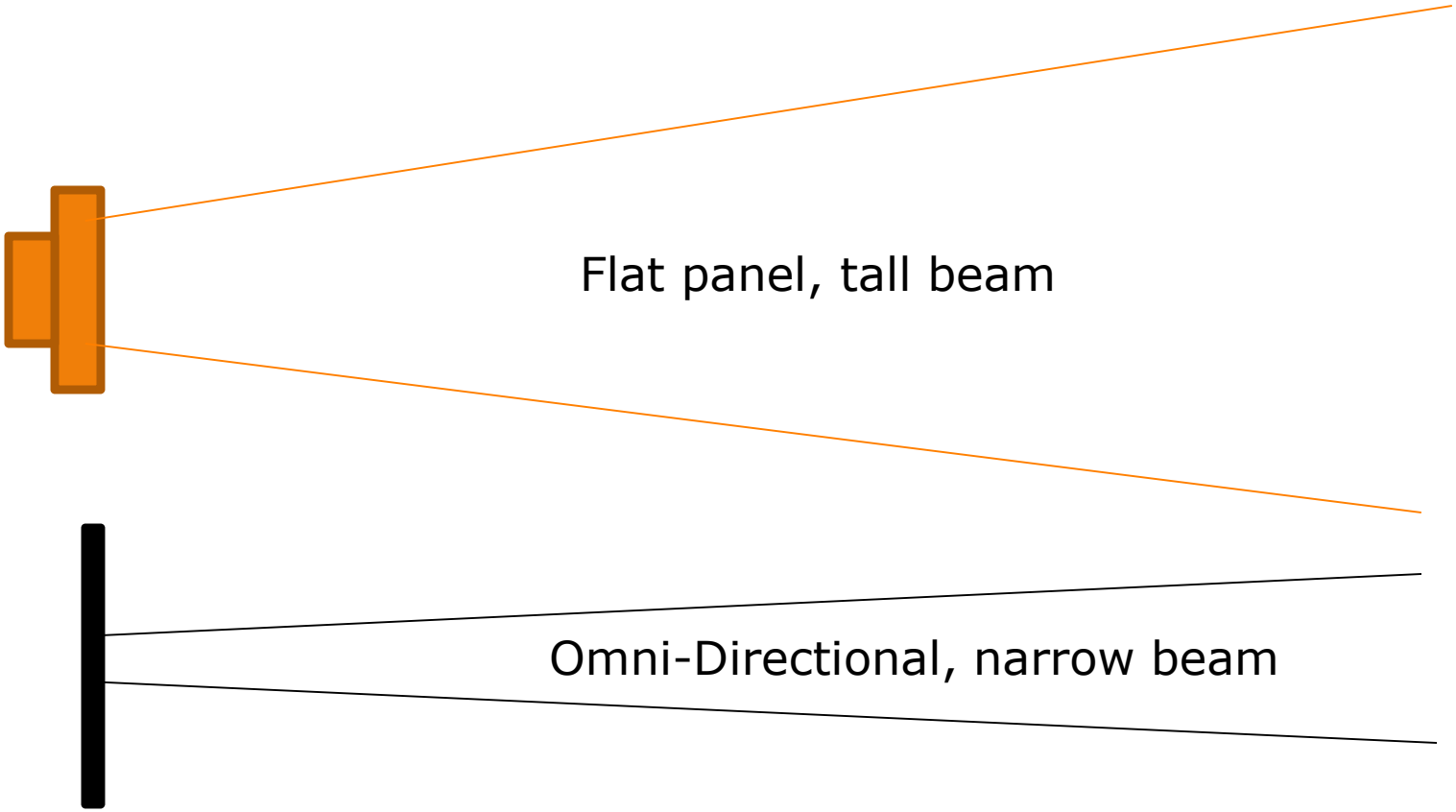
Horizontal beam in narrow pattern, power concentrated

Antennas – Omni-Directional



Horizontal beam in all directions, power spread out

Antennas – Vertical Beam



Generally, the higher the DB rating, the narrower the beam.

Antennas – Clear & Range

Roof mounted antenna will clear other RVs and have a direct shot at Park antennas.

Antennas – Mounts

Wi-Fi antennas are generally 2.4 GHz antennas.

The normal mounting method for Wi-Fi antennas and the integrated WISP radios (covered later) us U-Bolts to attach the antenna/radio to a vertical mast.

Antennas – Mounts

This antenna comes in the 8 db (db is a power rating) range. The base of the antenna has a screw mount that fits marine antenna mounts.

Marine mounts come in stainless steel and plastic. The plastic is plenty strong enough and wind loads on boats antennas is high and a lot more cost effective.

These mounts allow the antenna to be swung down for traveling.

Antennas – Mounts

I used a regular 15 db omni-antenna, U-bolted to a 4’ marine antenna extension mast screwed onto a marine antenna base.

This gave a tall collapsible configuration.

I used 15 db to compensate for the omni all around power distribution.

No need to aim, just raise.

Antennas – Issues

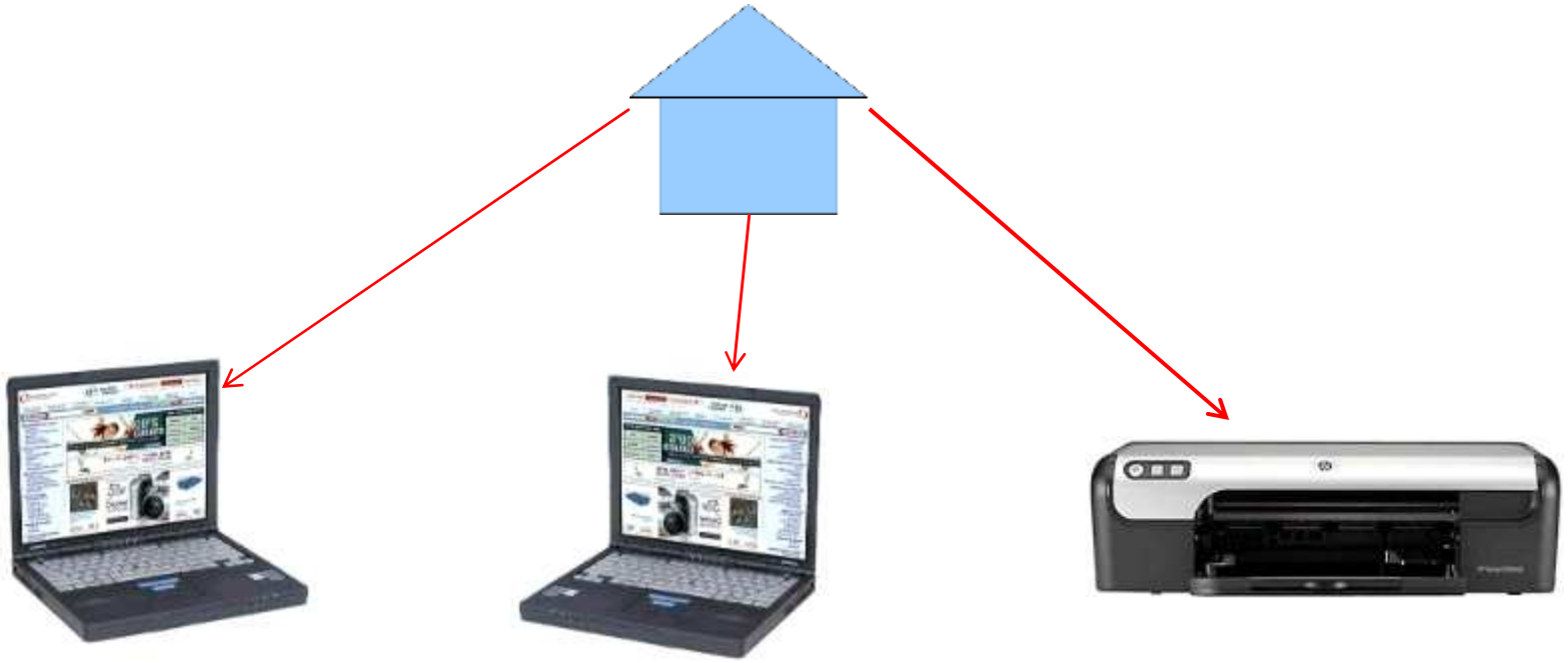
To use just an antenna as an extension to you wireless PC connection, the connection (PC, PCMCIA card) needs a connector.

Most PC connections are pretty frail. Repeated connection of the antenna cable will take it's toll on the PC connection.

The cable used to connect your PC to will lose signal over long lengths. Larger cables have less lose but are harder to run.

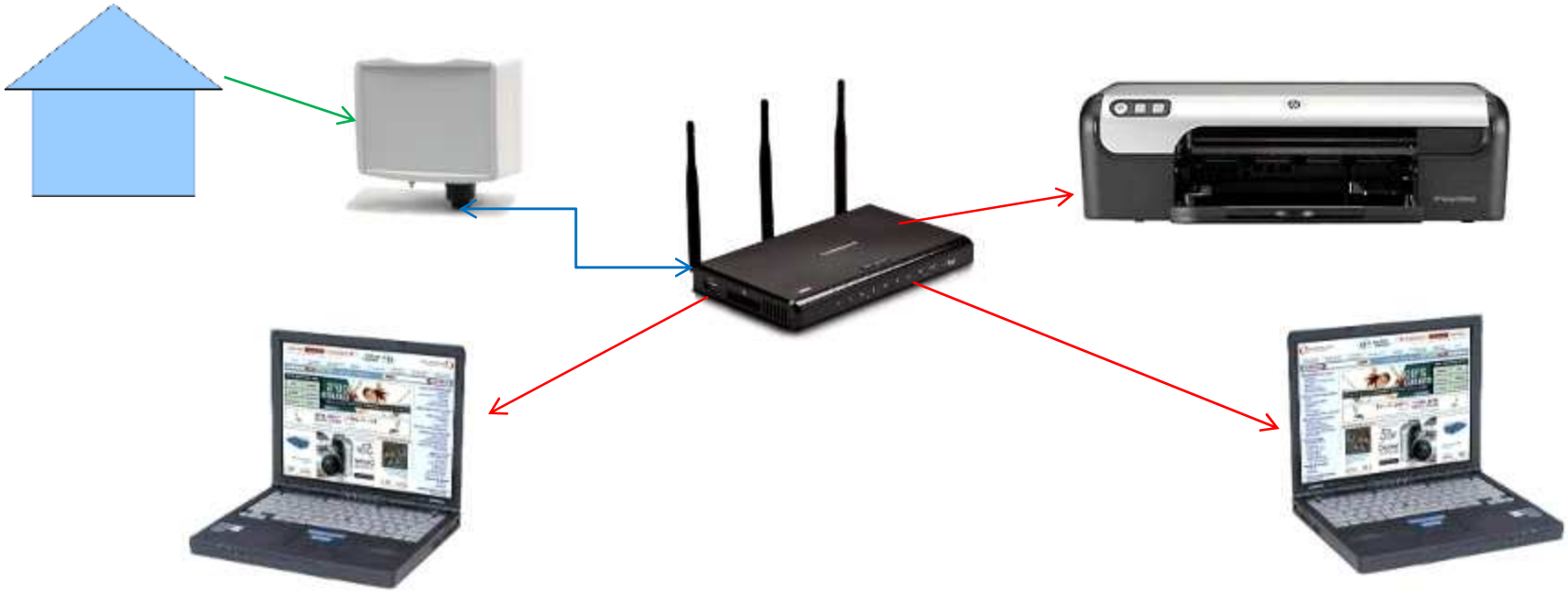
Remote antennas will mean large hole to pass the antenna ends through the side/roof of you rig.

Problems – Need for a local LAN



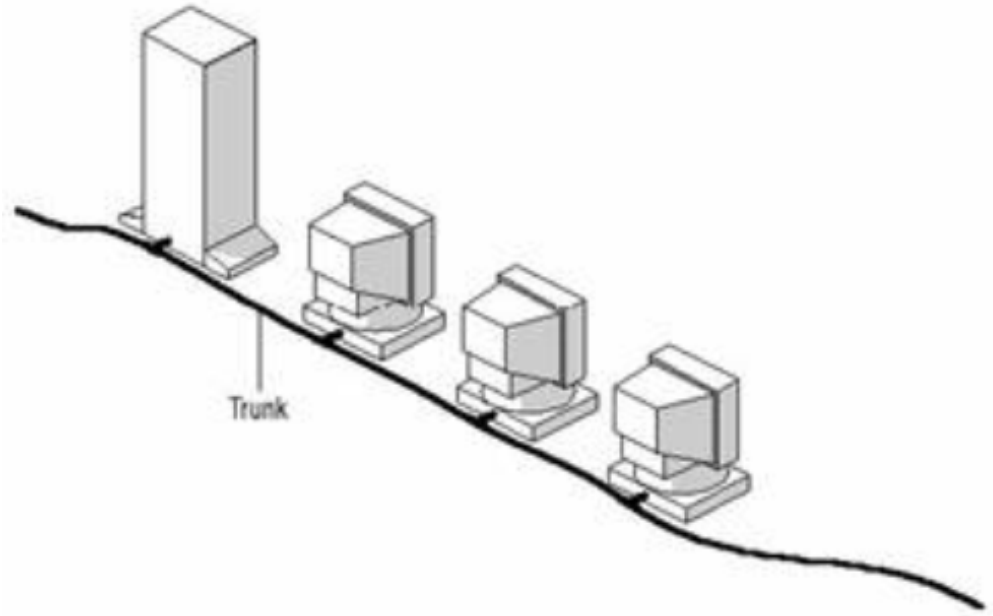
You can connect all your PCs and Printer to the Park Wi-Fi but your PCs won’t be able to communicate to your printer

Problems – Need for a local LAN



By using a WISP (CPE) radio to connect to the Park Wi-Fi and connecting your wireless router to the radio, your PCs and Printer can communicate on you local LAN and to the Internet via the WISP.

Basics - Ethernet



The original Ethernet was really never a loop but the terminology was attached to indicate a cable with devices attached.

All devices on the loop (cable) had to have the same base Address

Basics – IP Address

An Internet Protocol (IP) address is displayed in four groups of numbers. Each group ranges from 0 to 255

192.168.0.1

This part of the address indicates that it is an internal address, not viewable from the Internet

This part of the address indicates a loop or node

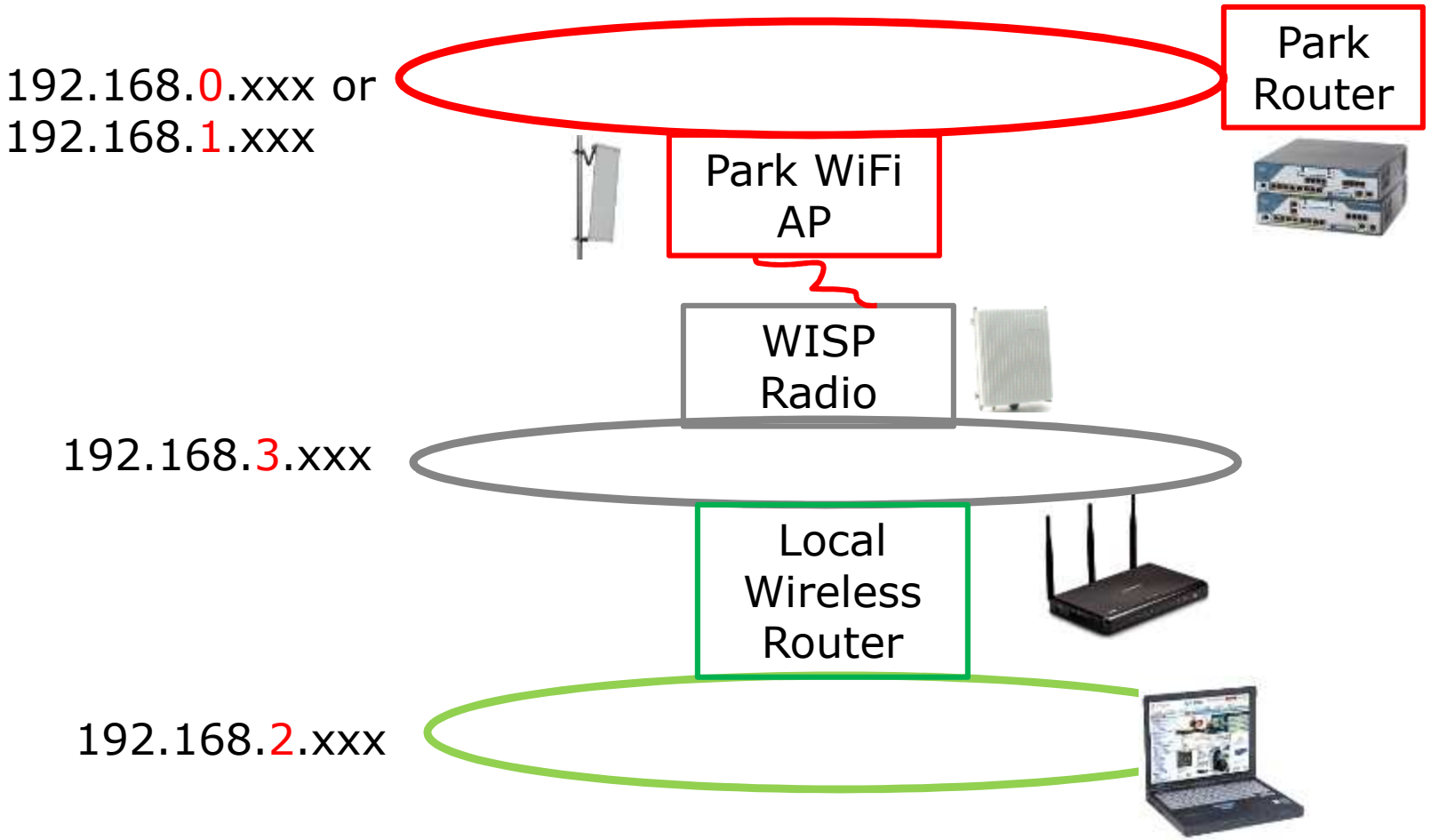
This part of the address is unique for each device on the network

Basics – Router

The purpose of a Router is to connect two IP loops together.

The importance of a router to you is that is takes an IP address on the external side and changes it into one or more IP addresses on the local side.

Basics – IP Address Assignment



Each loop needs to have a different loop address

WISP/CPE Radios

WISP (Wireless Internet Service Provider) / CPE (Customer Premises Equipment) radios are basically wireless routers in reverse. They take wireless traffic and turns it in to wired traffic.

Comes in two basic formats.

An integrated unit with the radio mounted inside a directional flat panel antenna. Has to be aimed.

A connectorized radio that is attached to an antenna. No aiming if used with an omni antenna.

WISP/CPE Radios - Wiring

How are they wired?

They use Cat-5 Ethernet cable from your router to the radio. Cat-5 cable is available is outdoor rating and is easy to run because it is relatively thin.

If the WISP radio is an integrated unit, that is the total wiring.

If the WISP radio is connectorized, then an antenna cable is run from the radio to the antenna.

WISP Radios - Power

How are they powered?

They use Power over Ethernet injectors

There are 8 wires in the Cat-5 (Category 5, a specification) cable. The Ethernet signal uses only 4.

Two other wires in the cable carry the power.

The POE Injector has a small power brick and two RJ-45 (8 wire) jacks. The Cat-5 cable to the WISP radio plugs into one, the Cat-5 cable to your router into the other.

Enhanced Wi-Fi - Recap

- External Antenna
- WISP Radio
  - Enables local LAN

Discussion