Enhanced Wi-Fi

2014 National HDT Rally

Why use a Wi-Fi connection?

- Example statistics of Wi-Fi Availability (2010 tour)

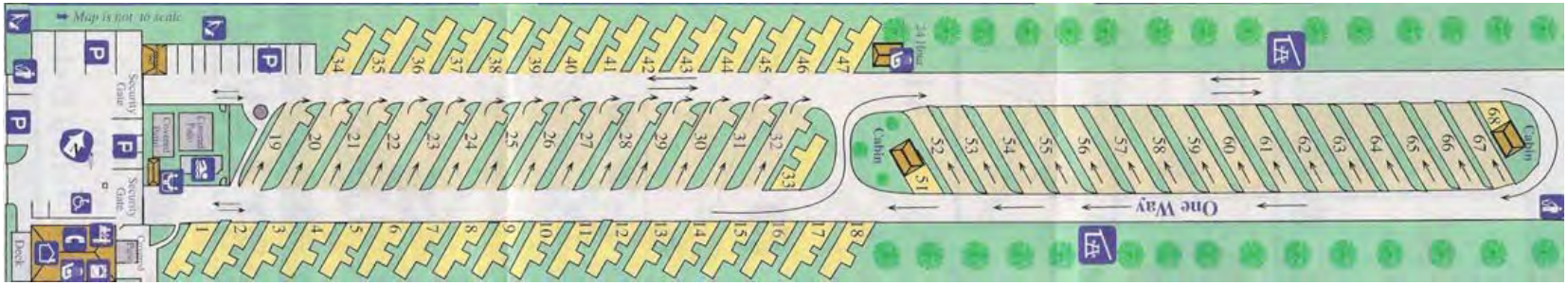
Days	Wi-Fi Available	Wi-Fi used	Wi-Fi Bad	Satellite used
186	131	108	23	78
	70%	58%	18%	42%

Observations:
It appears that there is more Park Wi-Fi available and more is bad.

Wi-Fi Problems –

- Too Far Away
- Interference
- Need for local LAN

Problems – Too far away - Wi-Fi



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

Problems – Too far away

Problems – Interference

Roof mounted antenna will clear other RVs and have a direct shot at Park Wi-Fi

Problems – Need for a local LAN

When you want multiple devices 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 Wi-Fi 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.

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

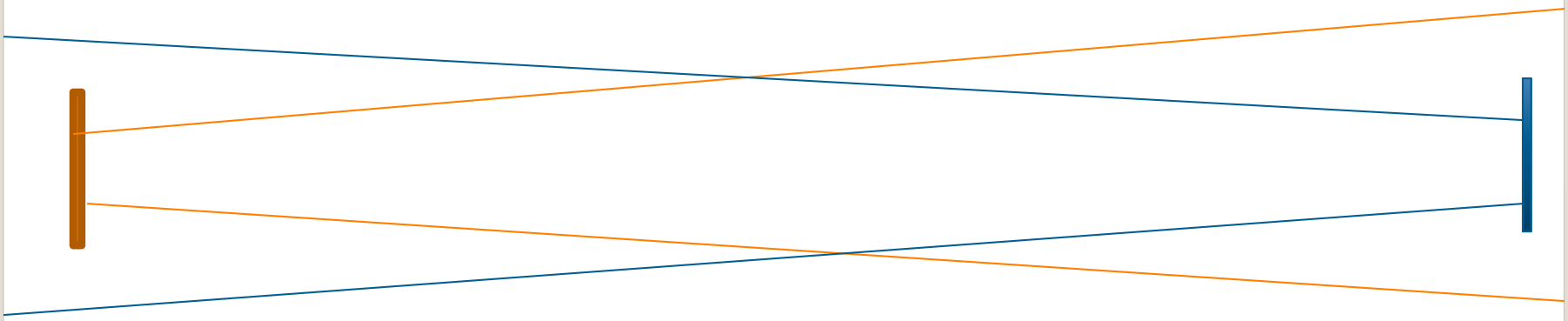
Antennas – Types

Two basic types for RV

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

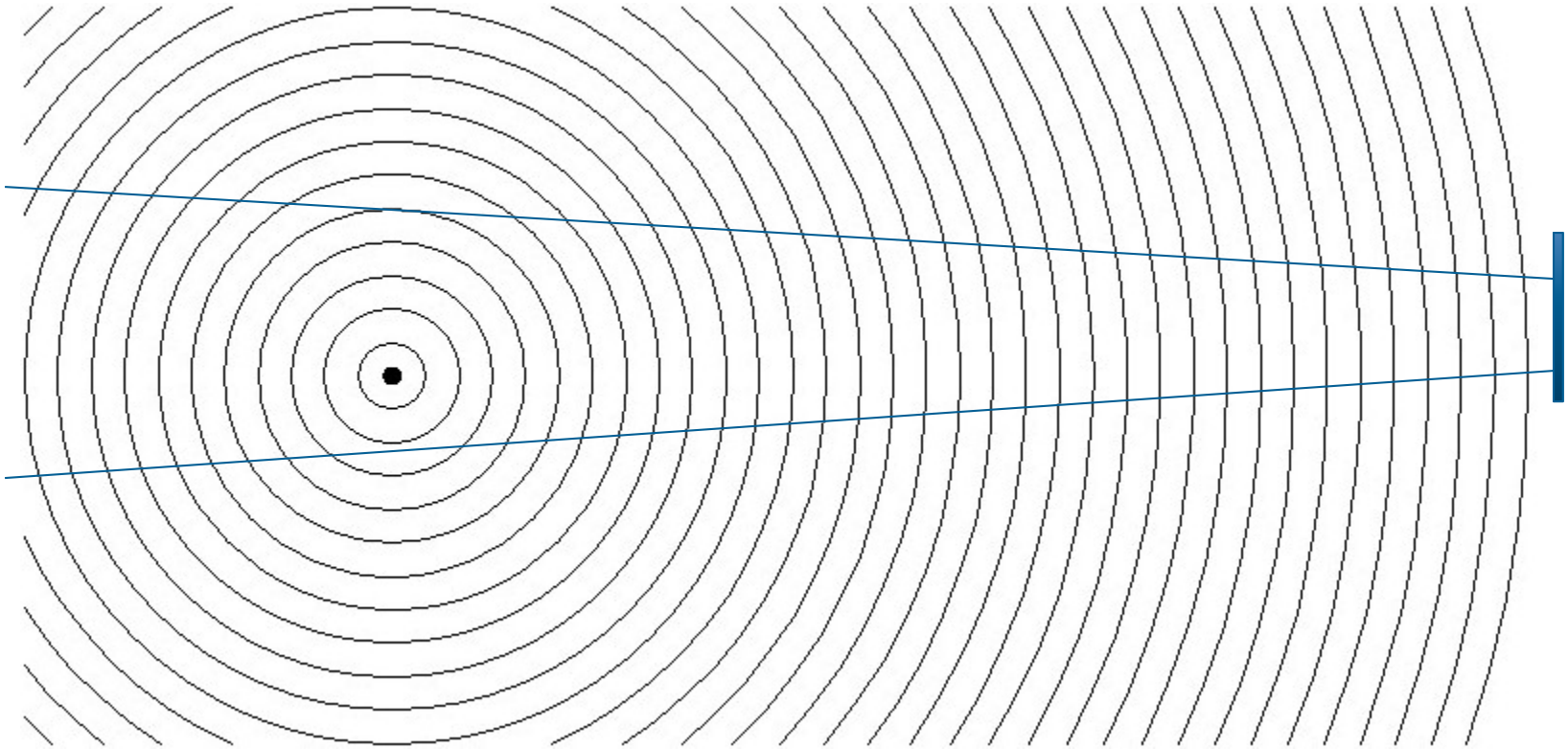
Omni-Directional
- All directions
- No aiming required
- Power not focused (DB)

Antennas – Flat Panel Directional



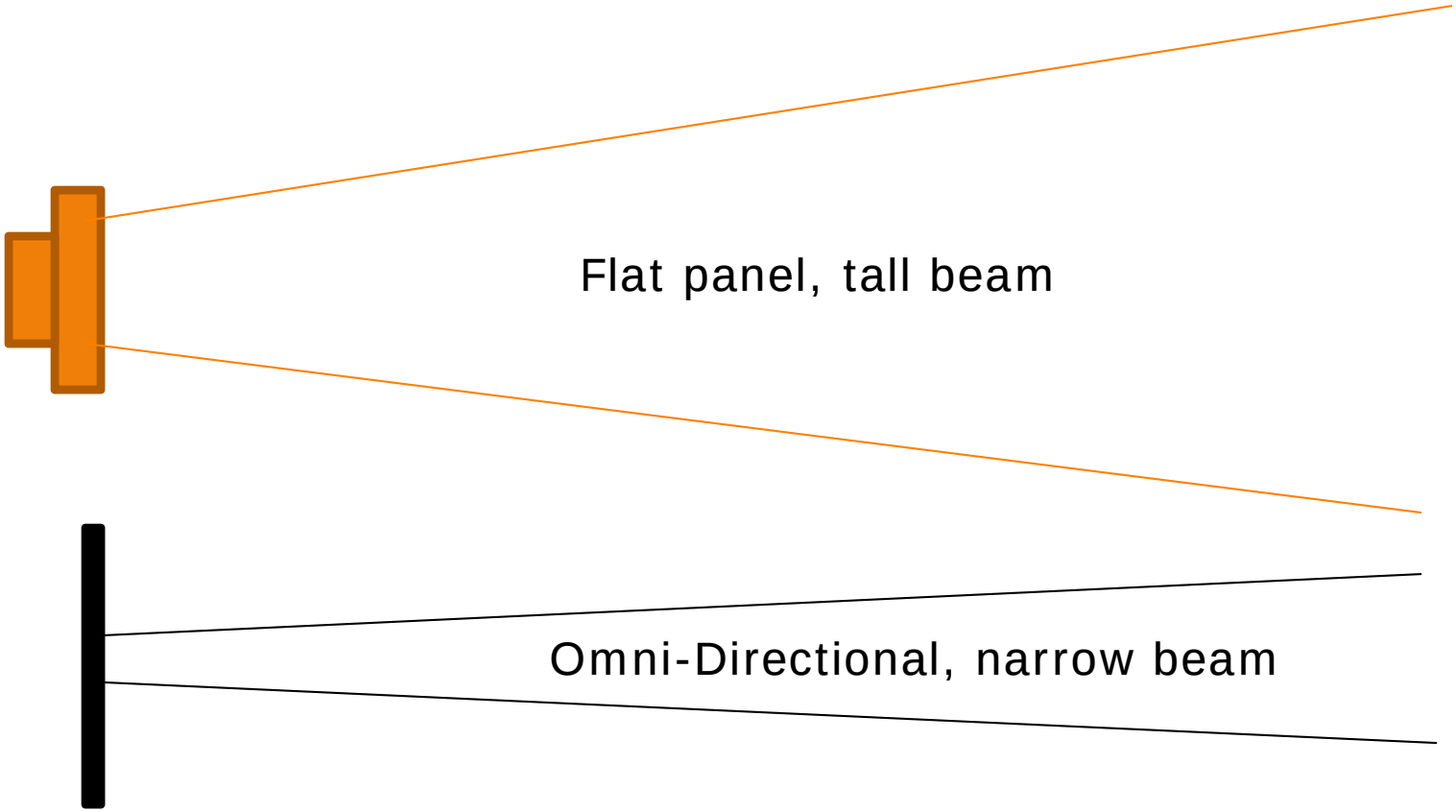
Horizontal beam in narrow pattern, power concentrated

Antennas – Omni-Directional



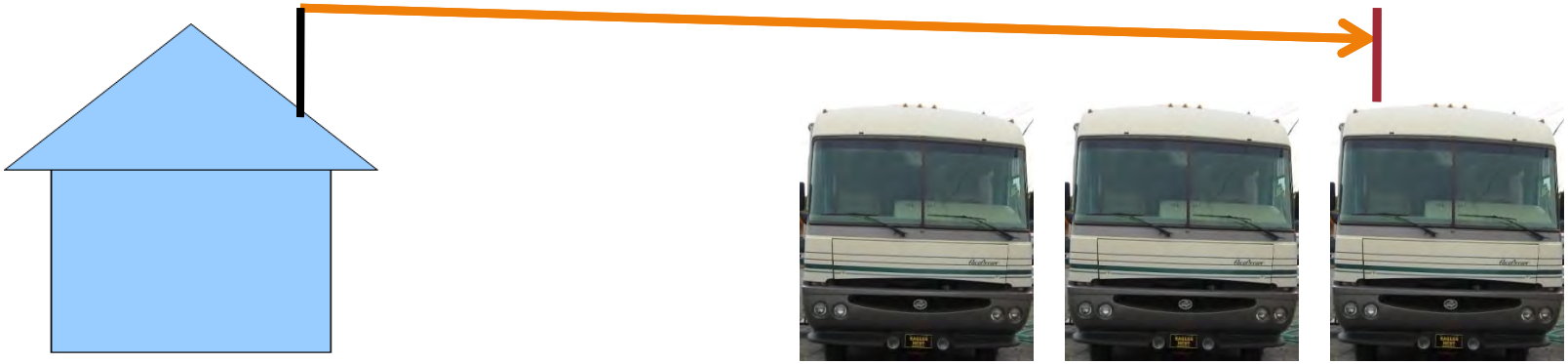
Horizontal beam in all directions, power spread out

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

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.

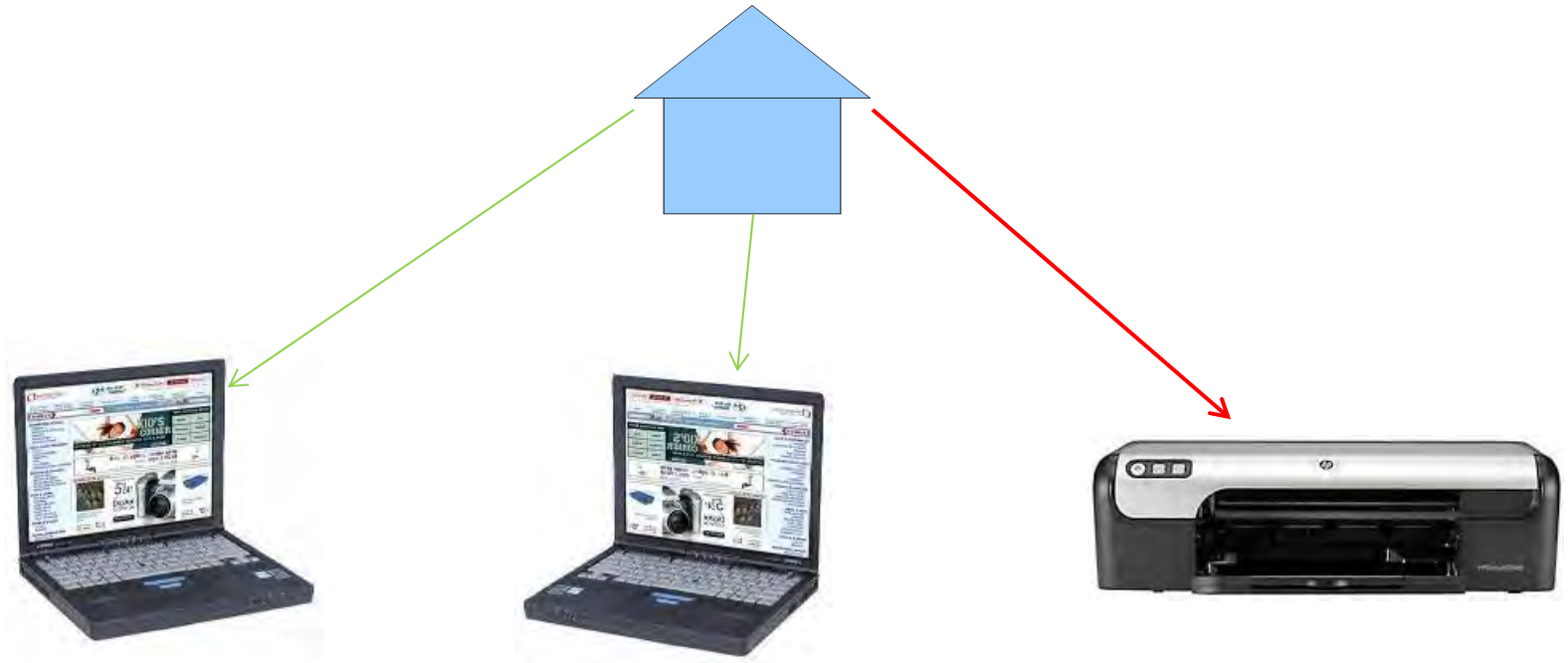
External Antennas – Issues

- Most laptops have no provision for an antenna extension to the in-built Wi-Fi
- To use just an antenna as an extension to you wireless PC connection, the connection (PC, PCMCIA card) needs a external antenna connector.
- Most antenna connections are pretty frail. Repeated connection of the antenna cable will take it's toll on the PC/modem connections.
- The cable used to connect your antenna will lose signal over long lengths. Larger cables have less lose but are harder to run.

External Antennas – Issues cont

- Remote antennas will mean large hole to pass the antenna ends through the side/roof of you rig.
- External antennas have attached cables with larger (than CAT-5 cable) ends on them that will have to be routed into the RV
- There is a length limit on antenna cables that when exceeded you loose the benefit of the antenna. (Like 9’-15’)
- In other words, connecting an external antenna to a Wi-Fi adapter in a laptop is not a good solution.

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 CPE (Customer Premises Equipment) 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 CPE.

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

10.10.0.1

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

This part of the address indicates a node

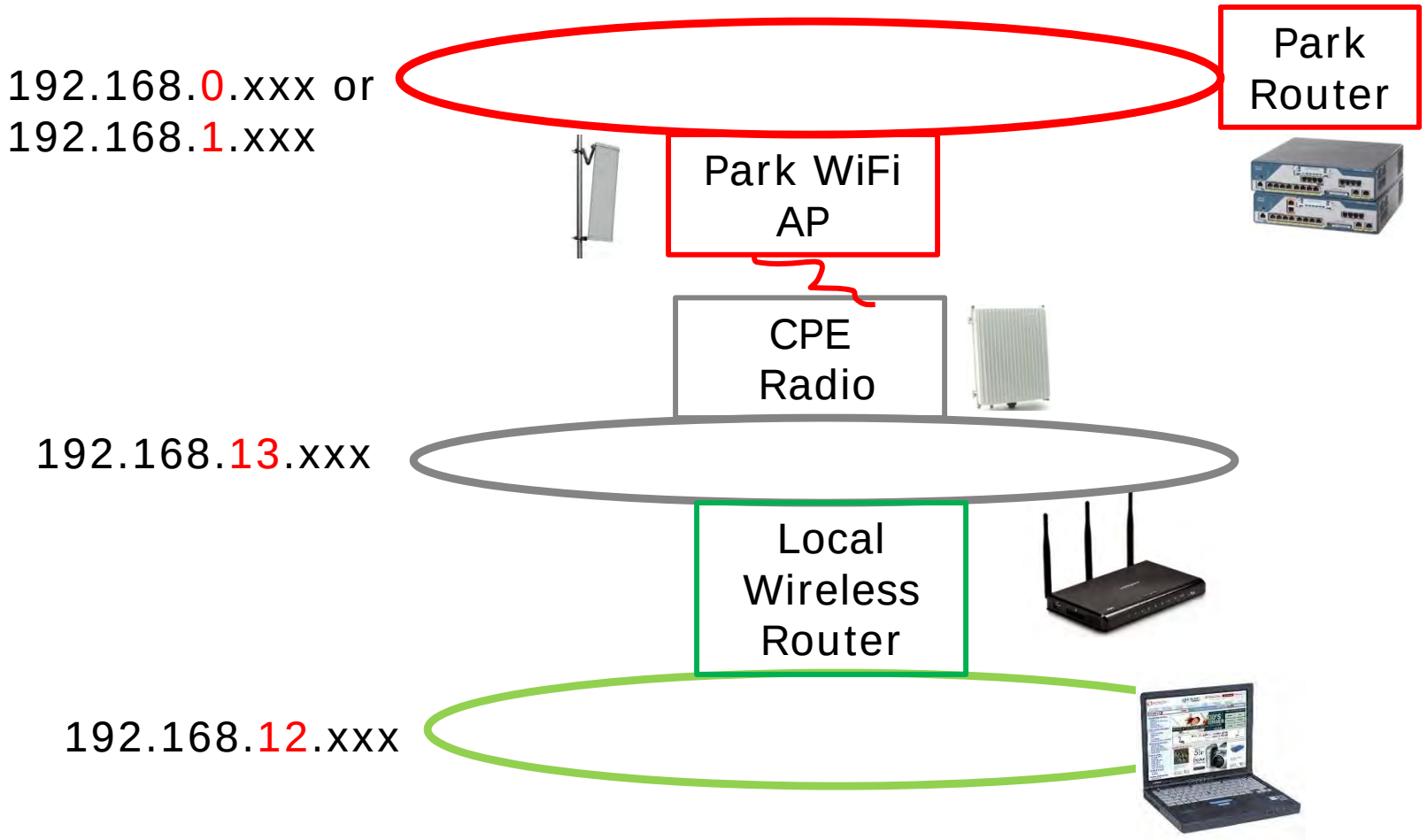
This part of the address is unique for each device on the network

Basics – Router

The purpose of a Router is to connect two IP nodes 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 node address

Basics – Router LAN IP Range

Since the park Wi-Fi will often use 192.168.0.n or 192.168.1.n ranges, it is good for you to use an IP node that is much higher, like 192.168.11.n

Note: some routers like the WIFIRanger use a default local IP address scheme that takes care of the issue of having the same IP address as the Park AP.

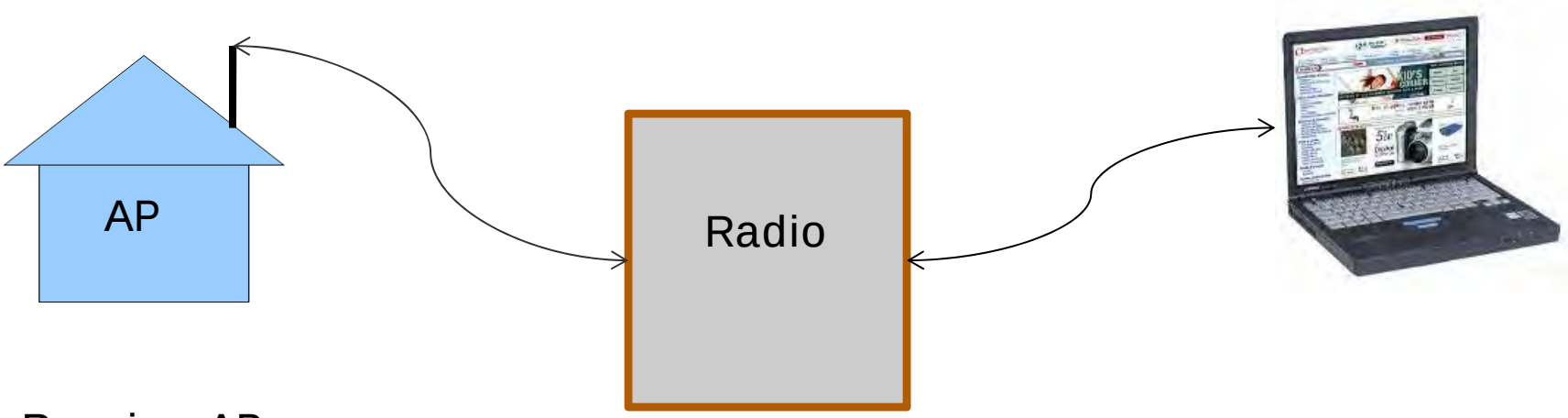
Repeaters

One way to solve the problems with Park Wi-Fi is the use of a Repeater.

Simply, a Repeater receives the Park Wi-Fi and then sends it to your PC. Generally, the Repeater can be positioned so that is can communicate with the Park Wi-Fi better than your PC.

Some devices sold as a Repeater may not solve RV Wi-Fi problems.

Repeater - Single Radio



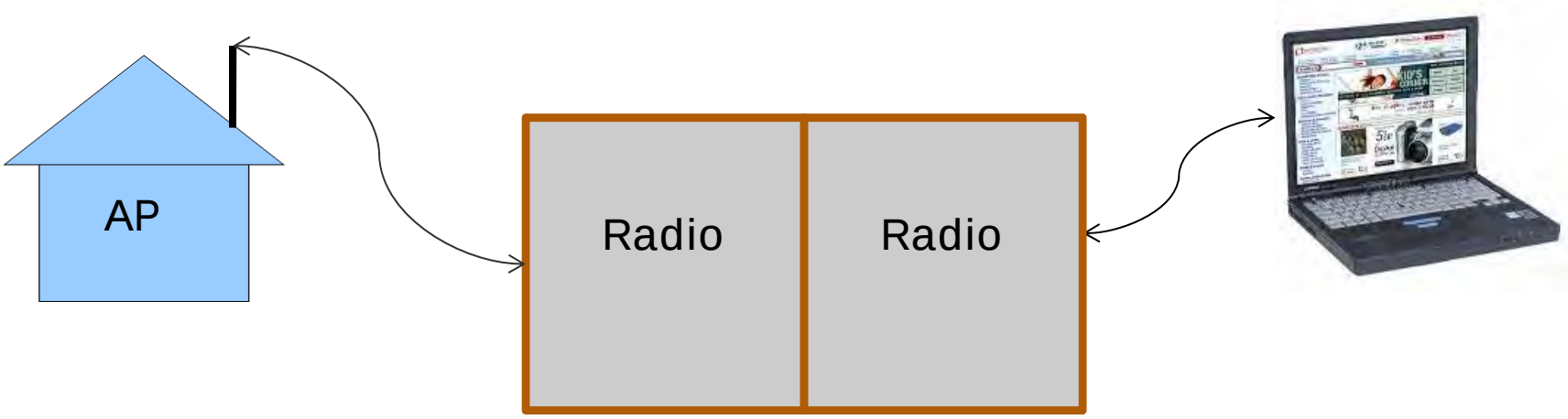
Receive AP

Transmit User

Receive User

Transmit AP

Repeater - Dual Radio



Receive AP		Receive User	
	Transmit AP		Transmit User
Receive AP		Receive User	
	Transmit AP		Transmit User

Park Repeater

Parks often use Repeaters to extend the Park Wi-Fi from the office to the extents of the park.

Many Repeaters used for Park solutions have two radios in them, often working at different frequencies.

One frequency from the park office, the other to the end users.

This radio uses 5 GHz for the park office and 2.4 GHZ for end users.

If parks are using repeaters, you probably don’t need assistance in receiving the Park Wi-Fi.

Repeater – Some examples

Let’s look at some of the devices being offered for the repeater function.

Repeater - Range Extender

Many electronic stores will sell a Range Extender to RVers to solve your reception problems.

They do receive and retransmit signals like a repeater.

These Range Extenders are located inside the RV just like your PC. The same reception issues (interference, range to Park Wi-Fi) that affect your PC will also affect this Range Extender

Repeater - Pepwave Surfer

The Pepwave Surf has been positioned by some as Range Extender.

Just viewing the Wi-Fi aspect of the Go, is it an internal device and relies on a radio of up to 200-400 mw mw for the extended range.

The Surf is located inside the RV just like your PC. The same reception issues (interference, range to Park Wi-Fi) that affect your PC will also affect the Go.

The Surf has a single radio to handle both the transmissions between Park Wi-Fi and the end users.

Repeater - WFR Home

The WFR Home is a repeater.

Just viewing the Wi-Fi aspect of the Go, is it an internal device and really is full expanding Wi-Fi internally.

The Home's antenna are internal to the Home and therefore a little limited in range.

The Sky has 79 mw of radio power. The single radio handles both the transmissions between Park Wi-Fi and the end users.

* can add air-card

Repeater – WFR Go

The WFR Go has been positioned by some as Range Extender.

Just viewing the Wi-Fi aspect of the Go, is it an internal device and relies on a radio of up to 1000 mw for the extended range.

The Go is located inside the RV just like your PC. The same reception issues (interference, range to Park Wi-Fi) that affect your PC will also affect the Go.

The Go has a single radio to handle both the transmissions between Park Wi-Fi and the end users.

* can add air-card

Repeater - WFR Sky

The WFR Sky is a repeater. It preferably mounts on the batwing TV antenna on the roof because the Sky gets its power from the TV antenna coax.

The Sky's antenna are internal to the Sky and therefore a little limited in range. But the Sky is mounted above the RV roof and therefore solves the interference problem and some of the range to Park Wi-Fi.

The Sky has 400 mw of radio power. The single radio handles both the transmissions between Park Wi-Fi and the end users.

Repeater – a variation

Let’s look at some other devices that can create the repeater function.

Repeater – WFR Mobile

The WFR Mobile is not a repeater. It acts as a Customer Premises Equipment (CPE) device.

The Mobile is a radio mounted on the roof that delivers the signals it captured via a CAT-5 cable to inside the RV to your PC.

The Mobile has a single radio to handle only park Wi-Fi transmissions with a 600 mw radio.

The Mobile is half of a repeater.

Note a Ubiquiti Bullet radio and antenna is a simple equivalent.

Repeater – WFR Mobile expanded

Multiple devices can be connected to the WFR Mobile by the addition of an Ethernet hub or switch.

The limitation to this arrangement is that all the devices need to cabled to the hub/switch.

This is not quite a repeater.

Repeater – WFR Mobile & Router

If you connect the CAT-5 cable of the WFR Go to a wireless router, you make a repeater.

The Mobile does the communication with the park Wi-Fi. The wireless router does the communication with your PCs.

This arrangement is the equivalent of a repeater.

The wireless router can be a WFR Go, Cradlepoint, or Surf SOHO which also add an air-card

Discussion