Zonerider Networks

Advanced Manual for Installing

Wireless and Wired Hotspot

Broadband Systems

Introduction

Zonerider is an innovative fixed wireless broadband company, pushing the frontiers of this exciting technology further; we intend to be at the leading edge of Worldwide Wi-Fi development

Our unique and proprietary developed Wifi Hotspot service allows any business or hospitality organization a cost effective and hassle free way to charge members and guests for using wireless broadband on premises.

We empower property owners and managers to provide their building occupants and visitors with low cost, secure and robust wireless broadband Internet access.

The way we do this is by a simple and secure patent pending windows based software program called the Zonerider Gateway. This is easily available free from our website and the download size is a mere 0.5 mgb.

As a young fast growing company, our strategy is to work with marketing partners having key relationships with potential clients.

Typical Zonerider Agents will be IT Consultancy firms to the Hotel and Hospitality industry, property consultants and managers, or service providers to: developers, owners and operators of, hotels, student housing, serviced apartments, apartment buildings, business centres industrial estates, social housing and other multi-occupier commercial and residential space.

Site survey

Before conducting a live permanent installation; it is always important to gather as much information, as possible of the site. The following equipment may be required to carry out an effective survey.

- Digital camera
- Note pad and pen
- Questionnaire
- To scale floor plan or site plan – always a good thing

Checklist

When doing a live installation before starting to install any wireless equipment, one needs the following equipment:

- Access Points or Routers (AP):
- If using high gain antennas
    - Fixtures
    - connectors
    - Antenna (8dbi, 16bi, parabolic grid, or yagi)
- Drill (cordless for outdoor work) with 5mm diameter bit (Hammer drill when working outside on rooftops and chimneys etc)
- 5mm screws and wall plugs
- Outdoor or indoor AP enclosures

We suggest you use Enterprise Grade Wifi Access point or Wifi Routers That are Power over Ethernet

Power-over-Ethernet (PoE) or "Active Ethernet" eliminates the need to run 110/220 VAC power to Wireless Access Points and other devices on a wired LAN. Using Power-over-Ethernet system installers need to run only a single CAT5 Ethernet cable that carries both power and data to each device. This allows greater flexibility in the locating of AP's and network devices and significantly decreasing installation costs in many cases.

Power-over-Ethernet begins with a CAT5 "Injector" that inserts a DC Voltage onto the CAT5 cable. The Injector is typically installed in the "wiring closet" near the Ethernet switch or hub.

Some Wireless Access Points and other network accept the injected DC power directly from the CAT5 cable through their RJ45 jack. These devices are considered to be "PoE-Compatible" or "Active Ethernet Compatible".

Our Favorite is the
D-link DWL-3200ap http://www.dlink.com/products/?sec=0&pid=396

To summarize; the most important enterprise features to look out for are:

- Power over Ethernet (POE)
- Wireless Distribution System (WDS) Repeating

We also like the
D-link DWL G710 Range Extender http://www.dlink.com/products/?sec=0&pid=357
The DWL-G710 Wireless Range Extender is capable of repeating the signal of virtually any 802.11g wireless router or access point out on the market today. At the same time, the DWL-G710 can still communicate with other 802.11b/g wireless client devices.

On site requirements
The Zonerider system is designed to operate as a Windows based Hotspot internet access service. The system is simply IP based, this means that no matter what type of data feed is drawn from the Wide Access Network (WAN), the service is fit to work as a Wireless Local Access Network (WLAN) and all variations of data will work with the Zonerider system.

For Example:
- ADSL SDSL XDSL...
- Satellite
- Ultra wide band
- Data over energy cables
- FHSS
- Cable
- Leased line

Installing the Zonerider Hotspot Gateway on a PC

What you need to begin.

• One internet (Ethernet, category 5 cable)) connection; for **Internet connectivity** and one Wired or Wifi interface (Embedded i.e. Centrino, PCMCIA card, USB plug-in) for **Guest or Zonerider connectivity**.
• A PC with Windows 2000 (latest service packs), XP, XPSP2 or 2003 server
• Any Wireless Access Point or Wireless Router
• A Zonemaster password if you have not yet registered. Note! After registration you need to allow up to 1 hour for our systems to recognise your password.

See figures 1 and 2 below

Fig 1: Basic Wifi setup

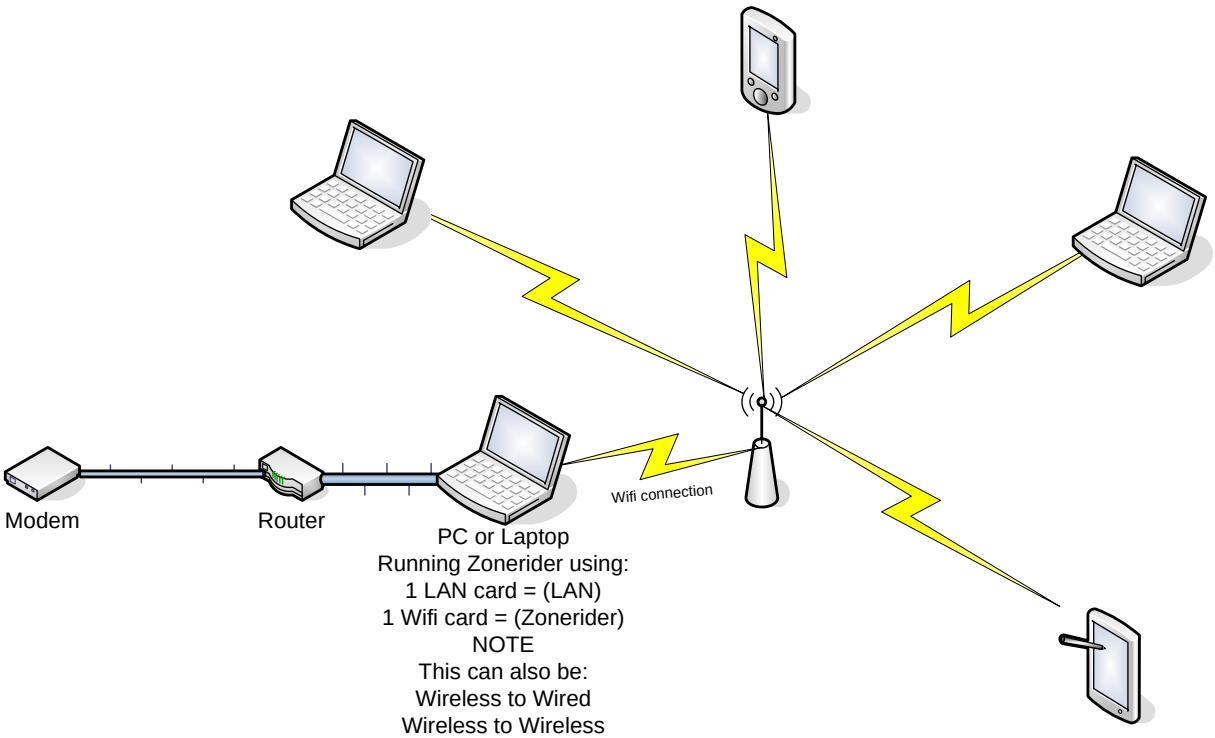
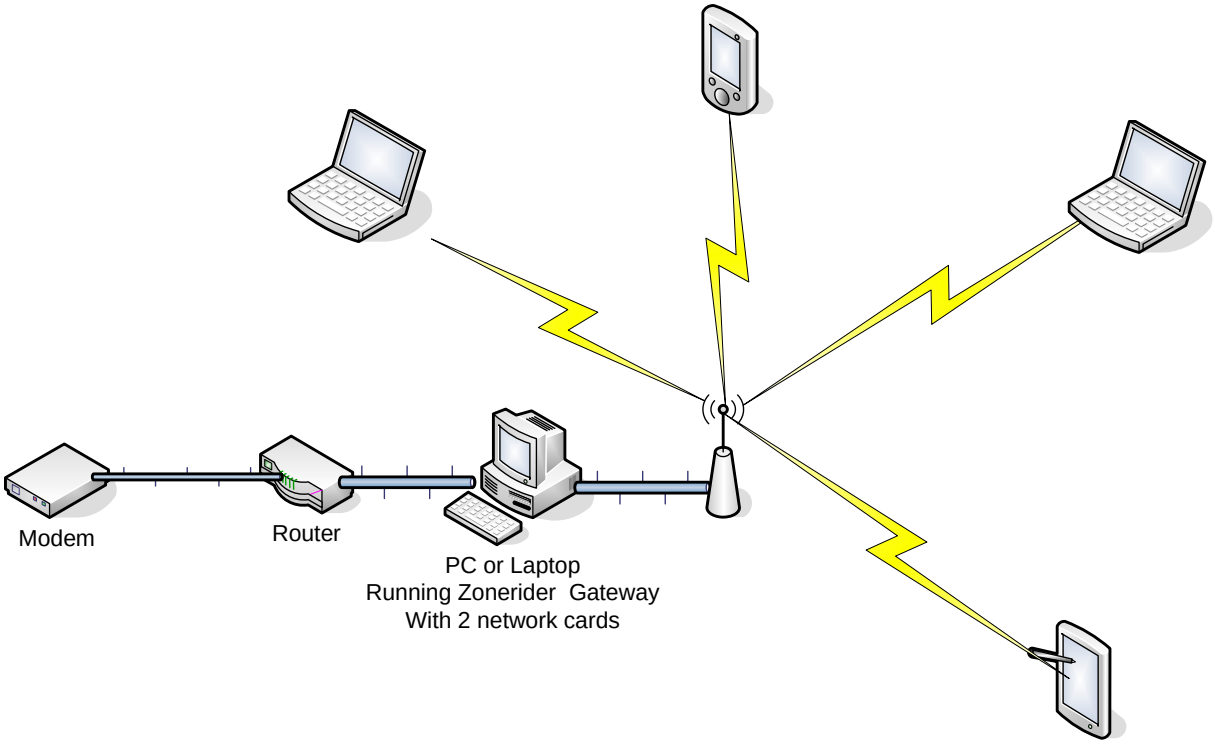


Fig 2: Basic Ethernet (wired, cat5) setup



Wifi Hardware

Below are just a few examples of Wifi interfaces

PCMCIA Wifi card
suitable for Laptops as it has a nice snug fit

USB Plug. (great for laptops and desktops, highly recommended)

Internal Wifi card (These are very secure and give great range because of the external antenna, if you want you can also extend range by attaching higher grade antennae and cable pigtails.

Step 1
Connect the PC by Ethernet or Wifi to the access point or router and navigate to the settings by web or the vendors' Access Point software and set network identifier (SSID) to **zonerider** (all lowercase).
Leave all DHCP settings disabled. (Zonerider takes care of that)

Step 2
Make sure your broadband is connected.
(If the broadband connection to the PC or laptop is from an Ethernet port on the one Wireless Router, or Modem Wireless Router you need to manually set the PC's IP address in the routers subnet
i.e.
*Router IP=**192.168.8.1***
then
*PC IP=**192.168.8.x***
*Mask=**255.255.255.0***
*Gateway=**192.168.8.1***
DNS settings as advised by the ISP or the gateway (192.168.8.1)

Advanced Network Topologies

One root Access Point multiple Repeaters (simplest but not always the best)

Place one access point within range of the Zonemaster Computer set the Access Point to WDS or AP-Repeater mode. Check manufacturer's manual on how to do this.

Repeaters will typically be installed where signal from root (base-unit) or backhaul repeater drops to a fair or poor signal. Example. Average 6 floor hotel with 150 rooms will require 1 root plus 5 repeaters, one for each floor, most Multi Dwelling or Multi Occupied Units (MDUs MOUs) will have "comms rooms" or communications rooms situated on each floor, or typically, hotels will have a utility or power closet on each floor typically in the hallways, by the elevator or near the stairwell.

The Agent needs to determine the total number of units required to achieve the coverage required by the customer.

This is usually established through the site survey with distance measured out by the Agent. To a degree this can be determined by knowing and relating to site dimensions, the typical coverage achieved using a mid gain antenna (5-8db), allowing for interference and attenuation etc.

When using repeaters, it is always best to follow these rules:

Same brand hardware (Netgear may not necessarily repeat with Belkin)
Same Network name (also known as SSID)
Same Network Channel
Both devices set in AP/repeater mode (root AP and repeater AP)

Fig 3: Wifi plus repeaters

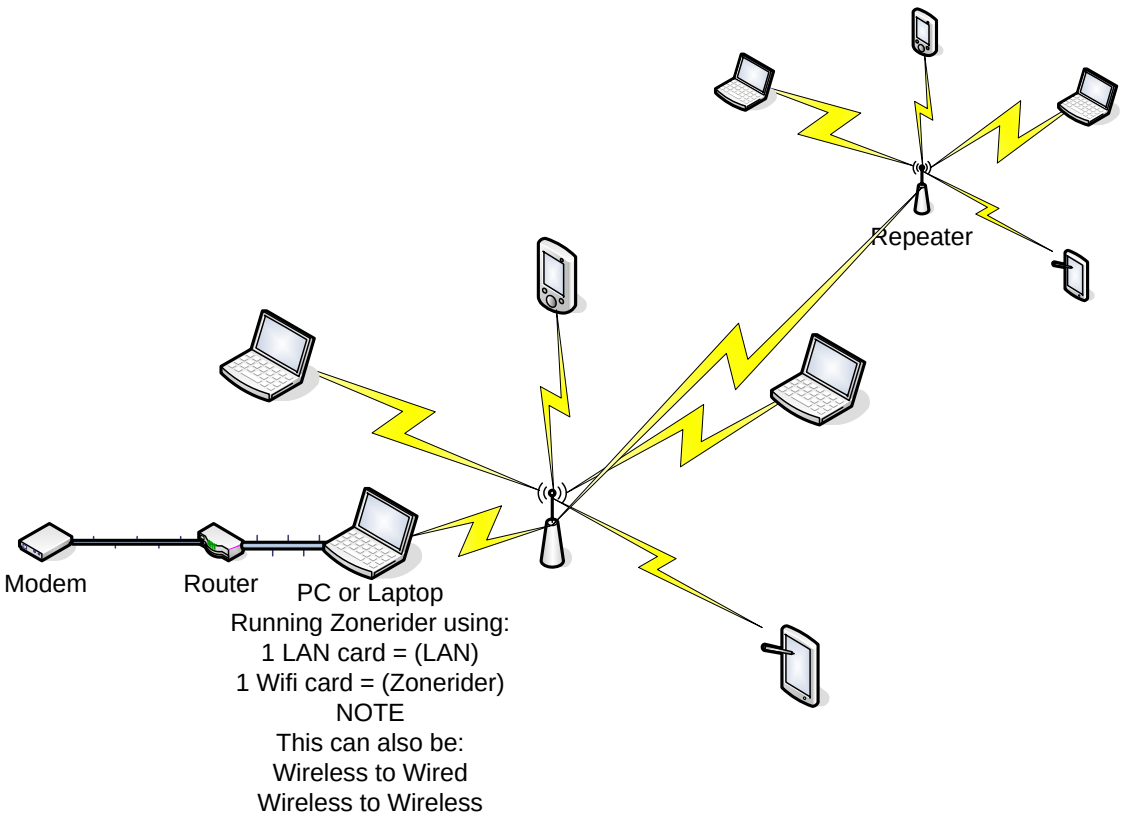


Fig 3.1: Multiple Repeaters
Some Wifi hardware allows you to repeat the same frequency up to six times; we recommend a maximum of 2 or 3 for quality of service.

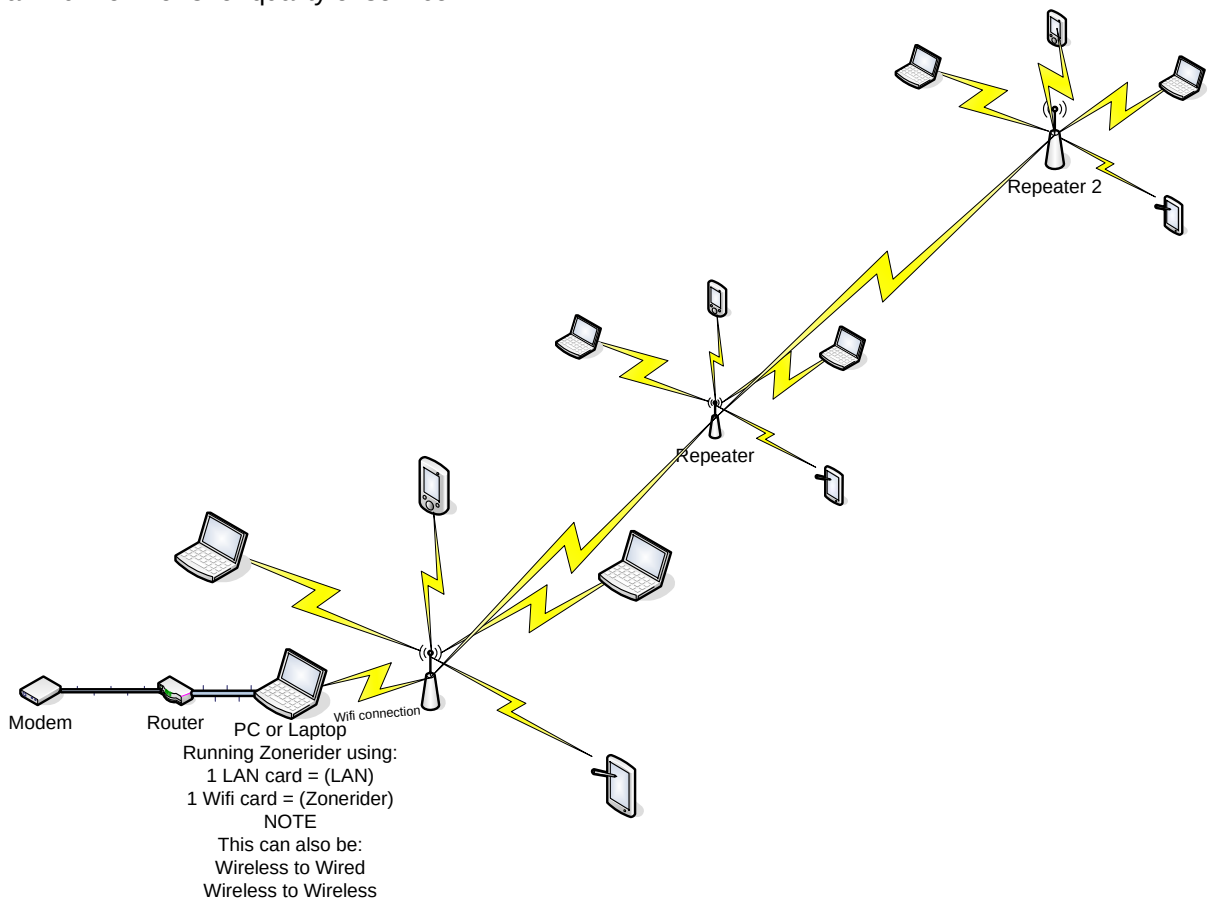


Fig 4: One Hub, multiple wireless access points / routers (Our Favorite)
From a second Ethernet LAN card run another wired connection to a multiport hub or switch. From the hub/switch run Ethernet wires to as many access points placed around the premises. (If needed you can run repeaters from each of these access points as per **Fig 5**)

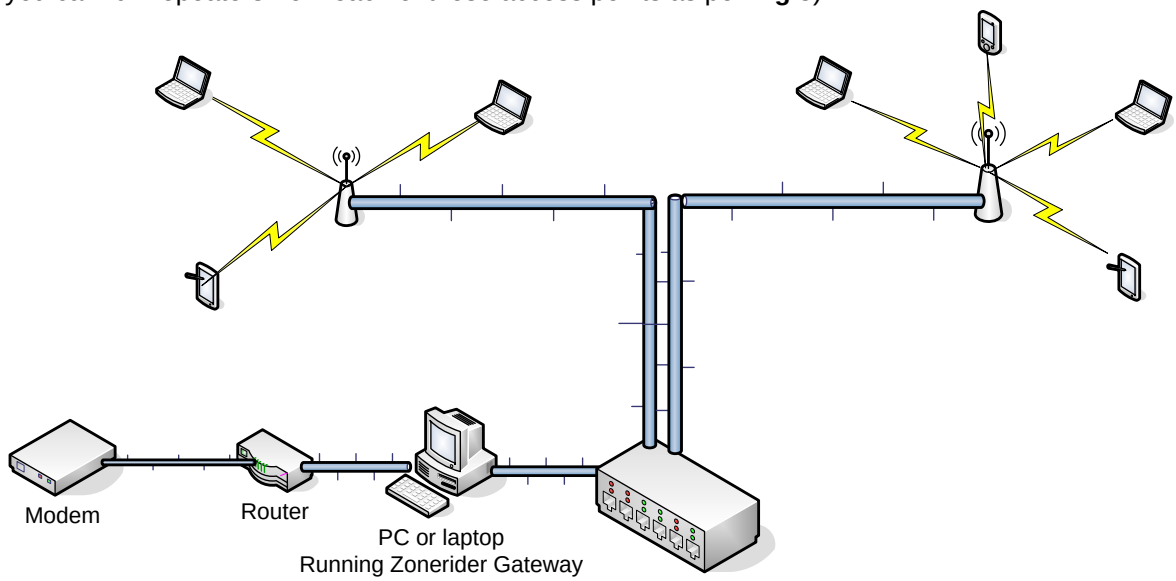


Fig 5: Hub and Repeater

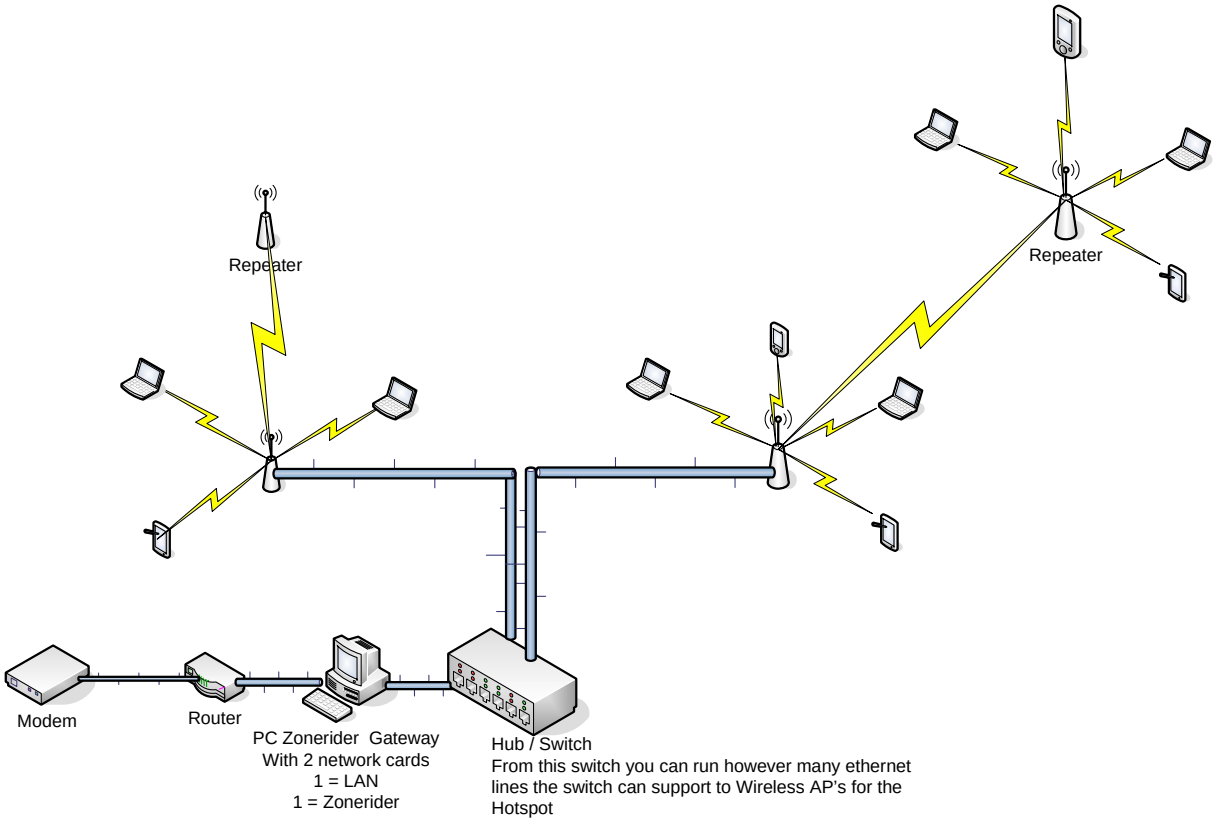


Fig 6: Bridged LAN cards to Hubs and Repeaters

Connect the Zonerider computer to the internet.

Plug in as many Ethernet LAN cards or multiport LAN cards as you need. Assign one Ethernet LAN connection point to the internet and create a bridge between the rest of the cards or ports. Enable internet connection sharing for the bridged cards (see setting up internet connection sharing) Run Ethernet wires from the bridged ports to as many access points on the premises)

You can also run cable from each Ethernet card to a switch and run Ethernet from the switch to the access points and repeat from these access points

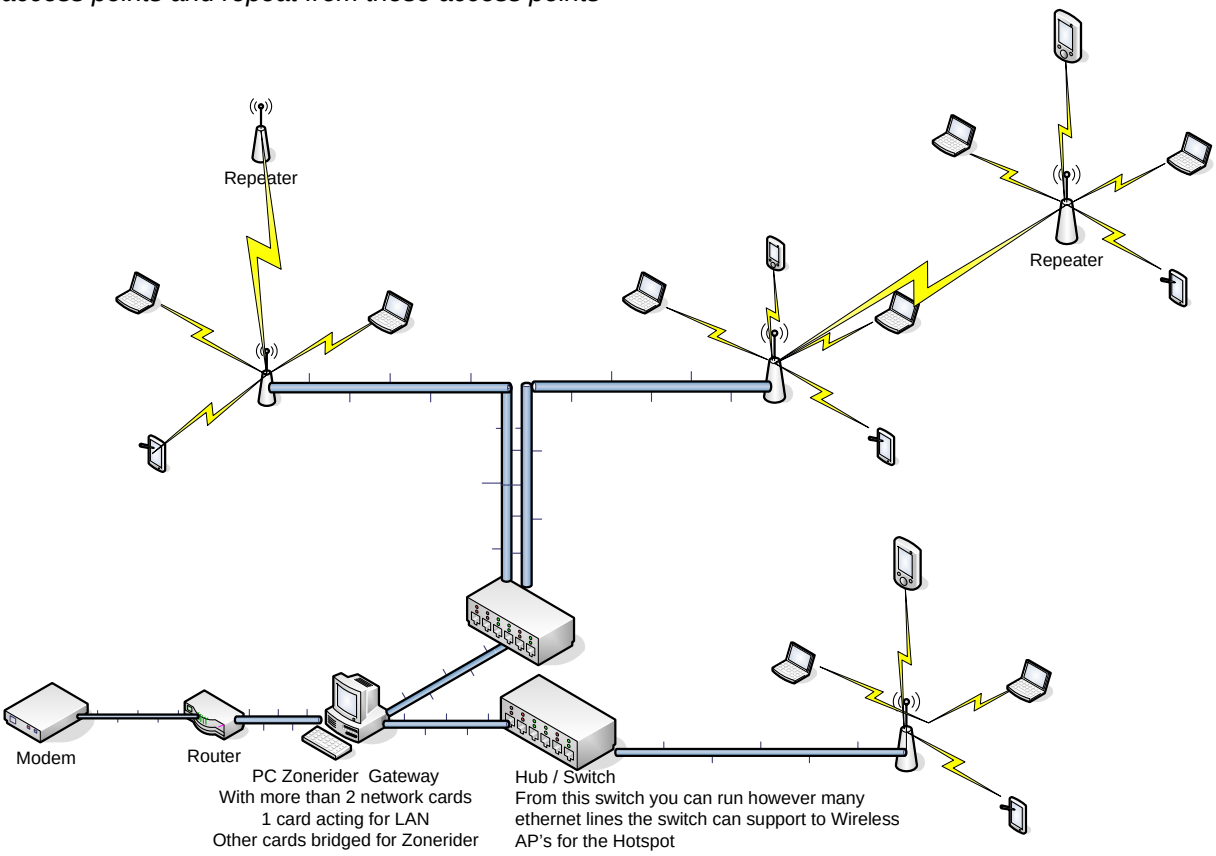
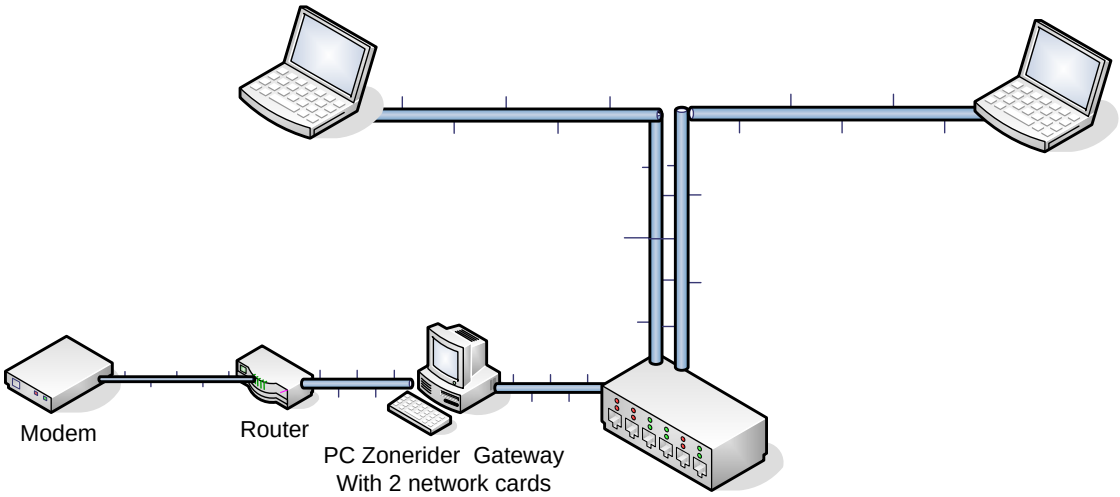


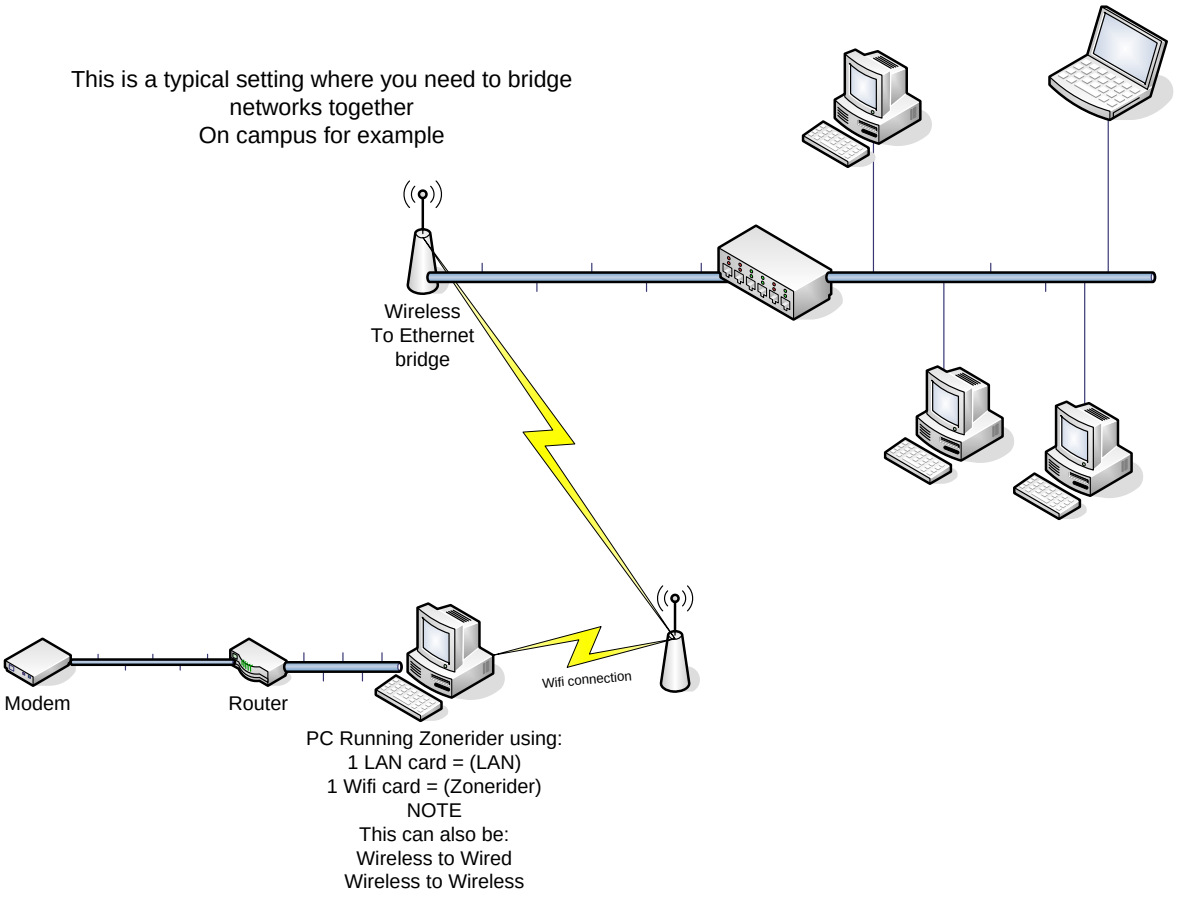
Fig 7: Wired Only

Zonerider can also be used for
Hardwired Hotspots like High speed
internet Access in Hotels



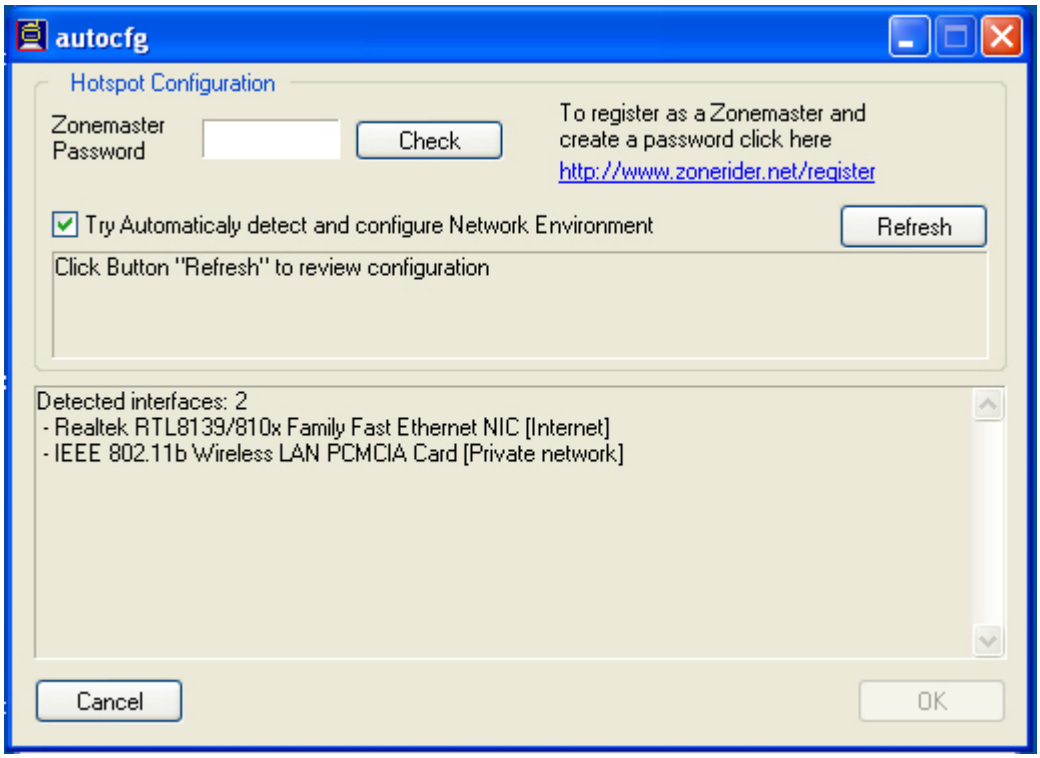
Hub / Switch
From this switch you can run however many ethernet lines the switch can support to Wireless AP's for the Hotspot

Fig 8: Wireless to Ethernet Bridge



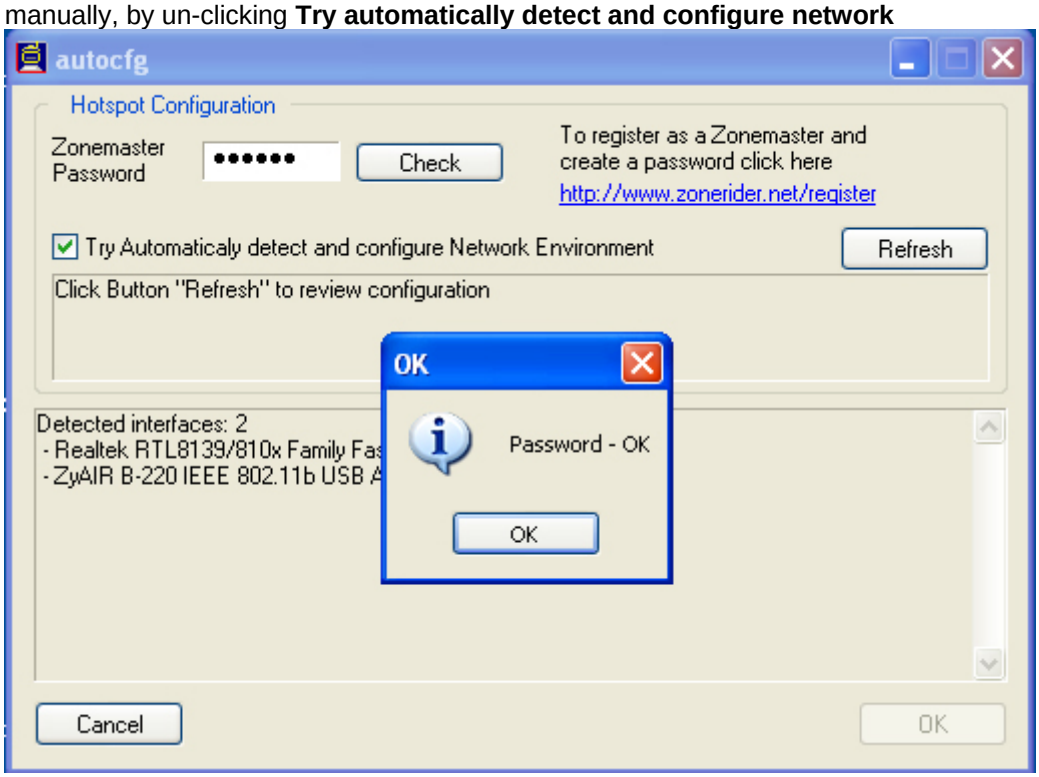
Installing the gateway

Begin by double clicking on the Zonerider Gateway setup file.



Key in your **Zonemaster password**, and **Check** the settings. You need to register as a Zonemaster to get the Zonemaster password. If this information is OK you will be able to press the **OK** button.

If your PC is having difficulty recognising the correct Data interfaces, you can assign the interfaces manually, by un-clicking **Try automatically detect and configure network**



To change your password you will need to contact Zonerider direct and reinstall the Zonerider Gateway

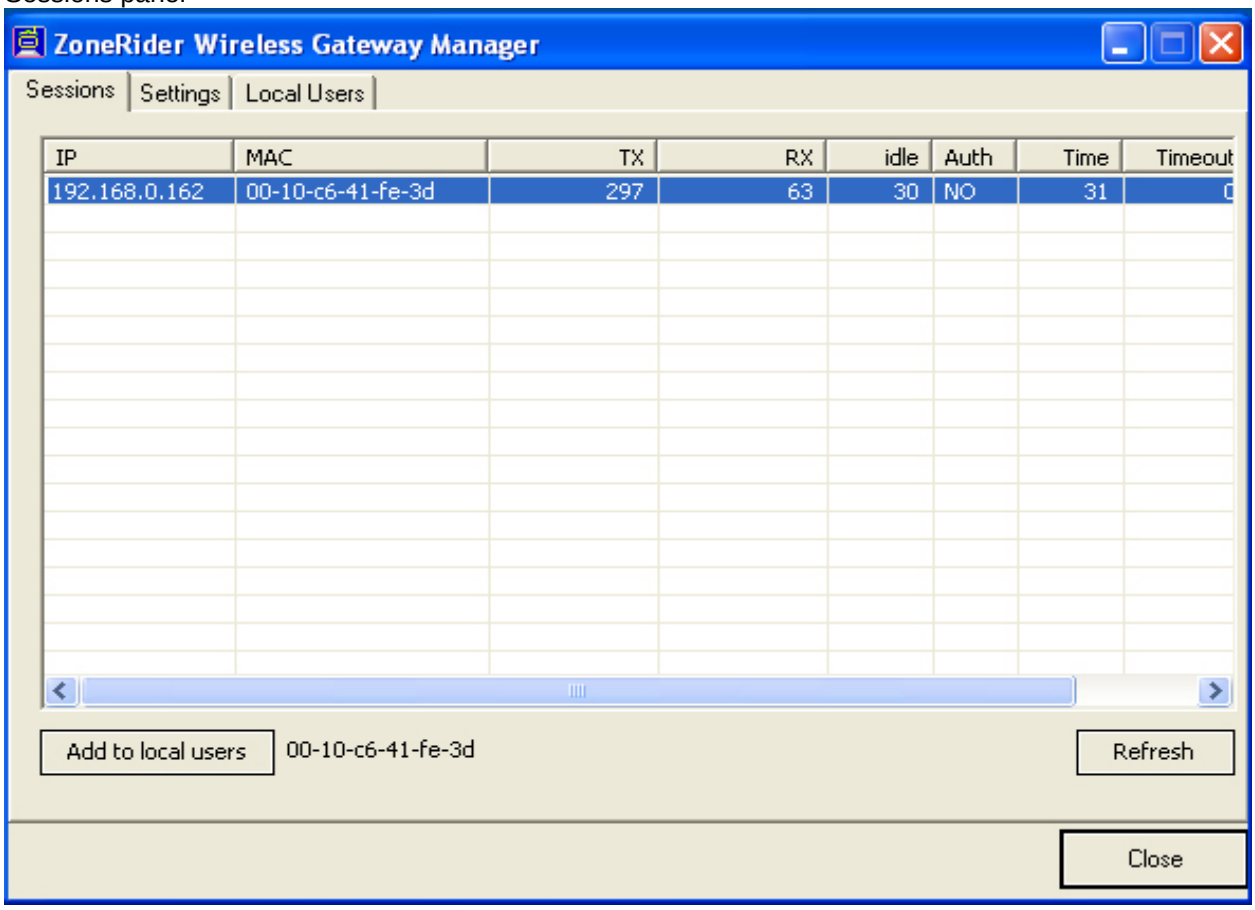
Congratulations your service should be working and ready.

It is always suggested to test with a wireless device, to ensure the service is running as normal. See the troubleshooting guide in the FAQ on the website or use the Zonemaster forum

Using the Gateway

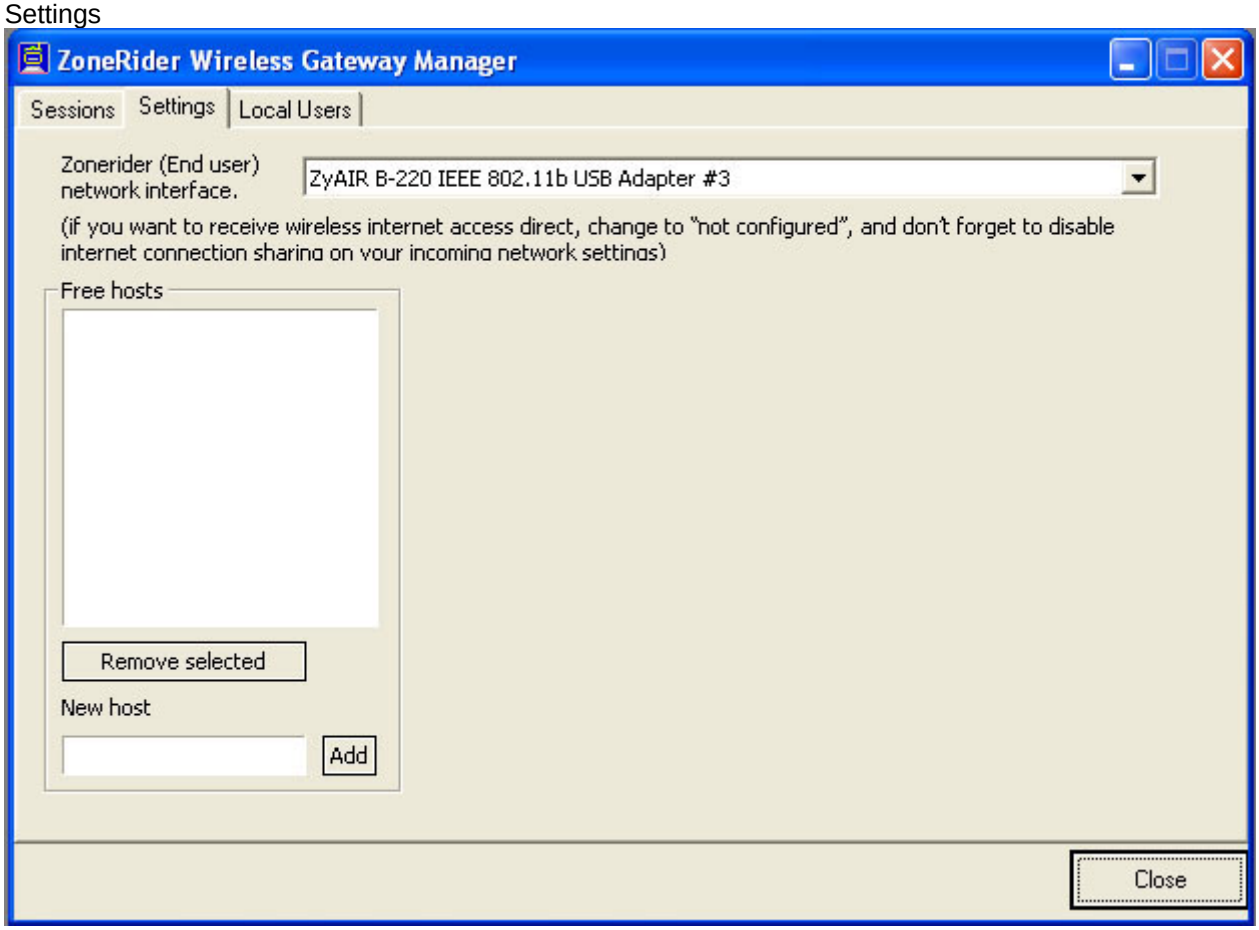
once installed the Gateway will always be running, as part of the operating system. If you want to view sessions of end users in real-time, you can launch the gateway by clicking on the start programs field, double-clicking the desktop icon, or double-clicking the house icon in the systems tray

Sessions panel



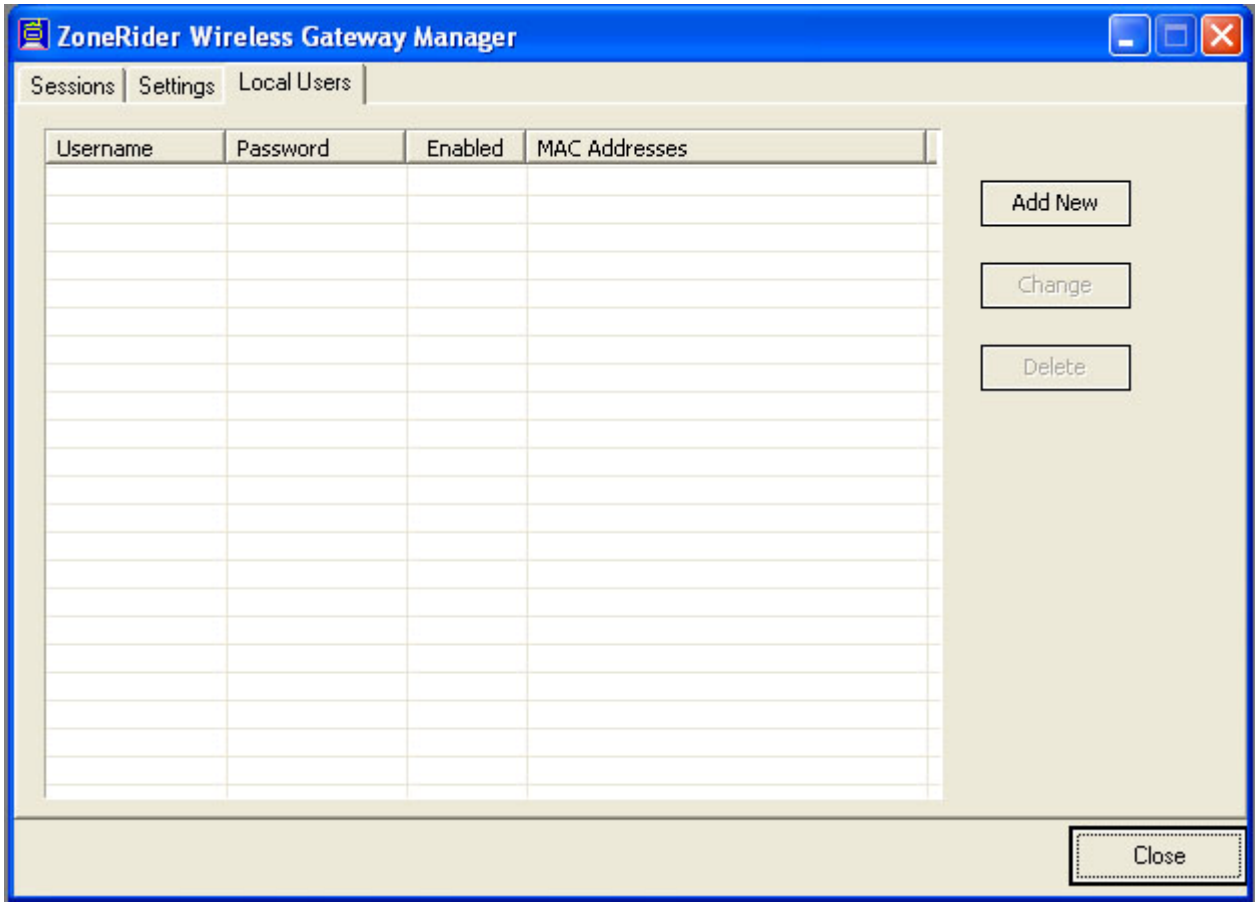
From here you can see in real-time end users status, To allow access for that account without the user running into the sign on page, just highlight that user session and click **Add to local users.** This is important if you want connection for VoIP, Games Console, Printers, File servers, Etc...

Settings



From here you can make sure your settings are correct, (for softAP users) if you want to regain wireless access direct through your wireless interface, just select not configured in the pull down menu above.

Local Users



From here you can allow free access for friends and family just by simply creating usernames and passwords, note by doing this, the end user will run into the sign on page.

After installing the software or enabling Internet Connection Sharing you can allow more that 254 concurrent users on your network.

To do this:
Go into your Zonerider Network IP properties.

The IP address should read
IP 192.168.0.1
Mask 255.255.255.0
Gateway none specified

Just changes the mask to
Mask 255.0.0.0

Save these settings.

To set up Network Bridge

Step 1.Open Network Connections.

Step 2.Under LAN or High-Speed Internet, hold down the CTRL key, and then click each of the adapters that you want to include in the bridge.

Step 3.Right-click one of the connections that you have selected, and then click Bridge Connections.

Caution

- If Internet Connection Firewall (ICF), Windows Firewall, or Internet Connection Sharing (ICS) are not enabled on your network, do not set up Network Bridge between the public Internet connection and the private network connection. Setting up Network Bridge between the public Internet connection and the private network connection creates an unprotected link between your network and the Internet, leaving your network vulnerable to external attacks. When ICF, Windows Firewall, or ICS are enabled, this risk is mitigated.

Notes

- To perform this procedure, you must be a member of the Administrators group on the local computer, or you must have been delegated the appropriate authority. If the computer is joined to a domain, members of the Domain Admins group might be able to perform this procedure. For more information, see Default local groups and Default groups.

- To open Network Connections, click Start, click Control Panel, and then double-click Network Connections.

- Connections that run ICF, Windows Firewall, or adapters that provide shared Internet connections cannot be a part of the Network Bridge and do not appear under LAN or High-Speed Internet. Similarly, the Bridge Connections menu command is available only for adapters that you can add as connections to Network Bridge.

- You must select at least two private network connections in order for Bridge Connections to create a bridge.

- You can create only one Network Bridge on a computer, but the bridge can accommodate numerous network connections.

- Network adapters that previously appeared under LAN or High-Speed Internet, appear under Network Bridge when you add them as connections to the bridge. Network adapters that provide Internet connectivity, such as DSL and cable modems, cannot be bridged and always appear under LAN or High-Speed Internet.

- Only Ethernet, IEEE-1394 adapters, or Ethernet-compatible adapters, such as wireless and Home Phone line Network adapters, can be a part of Network Bridge.

- Network Bridge with a wireless or IEEE-1394 connection supports traffic using Internet Protocol version 4 (IPv4) only.

- You cannot create Network Bridge on a computer running Windows 2000 or earlier versions of Windows.

- Windows Firewall is not included in the original release of the Windows Server 2003 operating systems.

- Internet Connection Sharing and Network Bridge are not included in Windows Server 2003, Web Edition; Windows Server 2003, Datacenter Edition; and the Itanium-based versions of the original release of the Windows Server 2003 operating systems.

- Internet Connection Firewall is included only in the original releases of Windows Server 2003, Standard Edition, and Windows Server 2003, Enterprise Edition.

Using Antennas to direct signal, and reduce noise

Radio frequencies are best received when there is less noise than signal. This is called the “Signal to Noise Ratio”

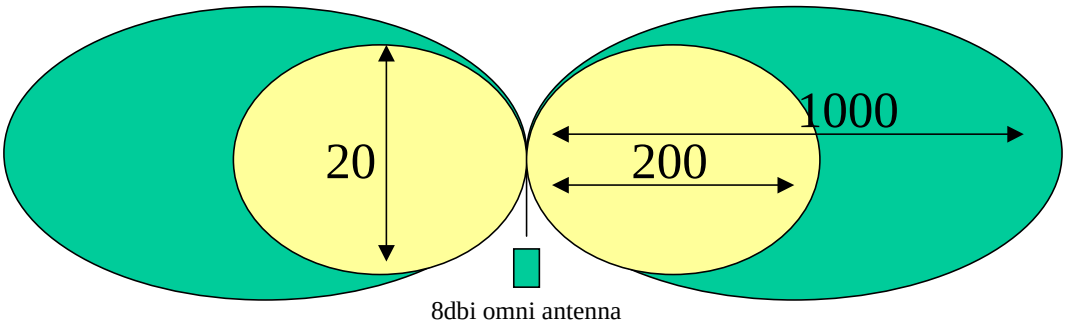
As a rule Antennas do not increase or amplify the signal/data-throughput. An antenna will only direct the radio signal towards an area that is more effective, and where there is less risk of interference from other radio frequencies. This looks like the signal is being amplified because users can access the Hotspot in larger areas or at further distance.

Example
If you did not fit an antenna on your access point the frequency will be too noisy and unless you were in close proximity to the radio you will get very little signal.

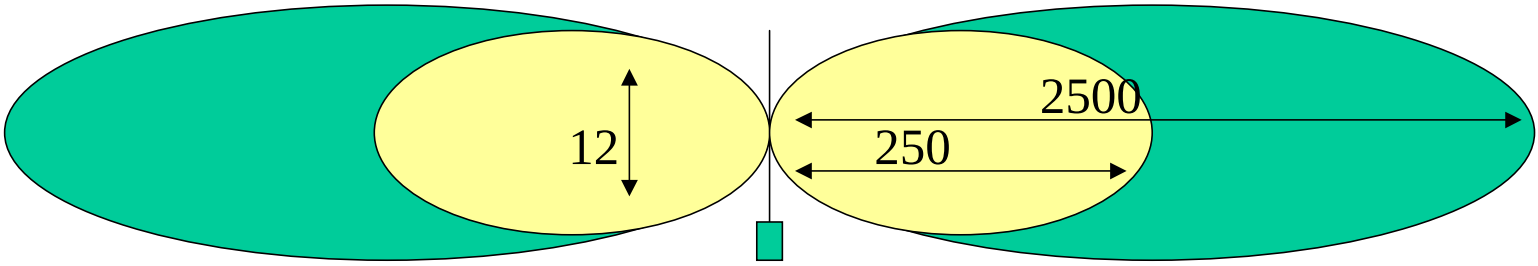
Antennas are measure in its dbi or dbm. As a rule the higher the dbi (also called the gain) the flatter the signal as in examples below.

Typical Distances achieved:

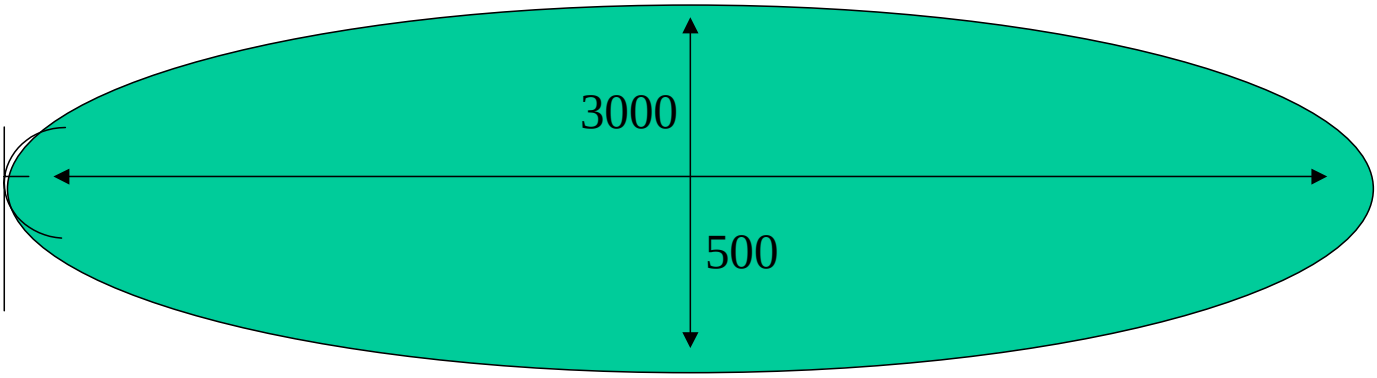
Side view of area of radio coverage in meters, center lobe indictates indoor coverage outer lobe indicates outdoor coverage, or open distance like partition walls and obstacles with lease antennuation



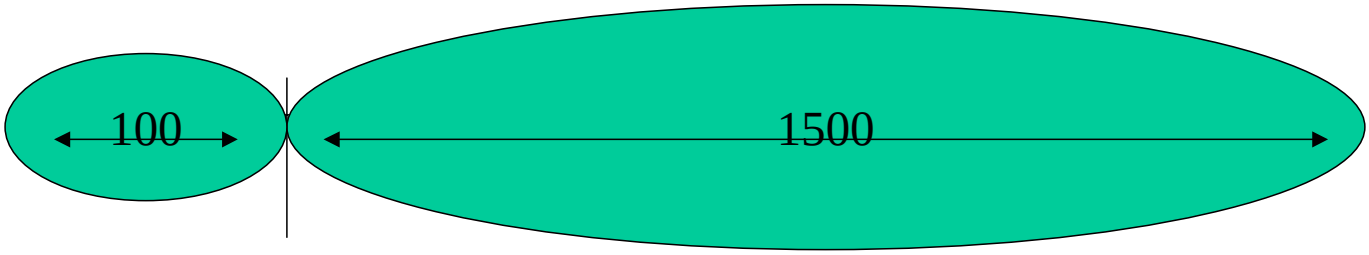
8dbi omni antenna



14dbi omni antenna



Outdoor 24dbi parabolic grid. Notice how the lobe density reached highest at a distance of 3km
This is why the grid needs to be placed as a tower pointing down from high altitude to its target area



18dbi Yagi. Recommended as a directional with coverage to forecourts and public areas.

The following is a list of materials or objects listed in order of high to low attenuation.
Attenuation relates to impedance and/or distortion of signal through signal being or resisted.

Concrete – high
Metals – high plus slight refraction (lifts, air-conditioning, stairwells, racks)
Water – medium (water-logged wood, fish tank, rain)
Wood – medium (partitions, trees, furniture)
Glass – low
Air – Zero

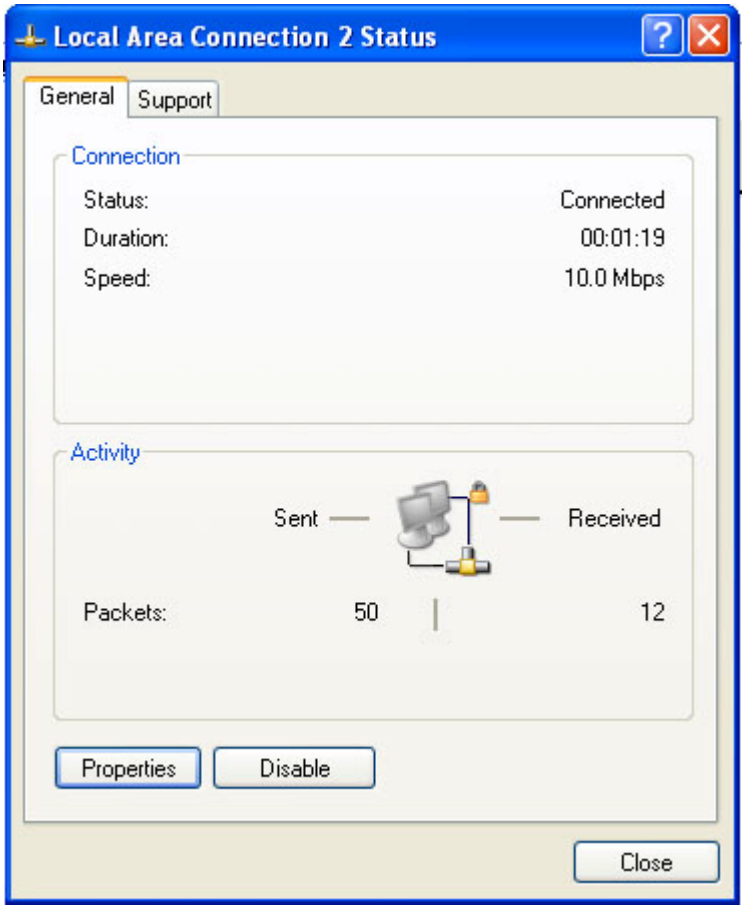
Avoid putting systems where use will not be practical, for instance, close to an obstruction, or physically remote from prime coverage areas e.g. stairwell, lifts, car park.

Setting up Internet Connection Sharing

This is required in Win2K before installing the Zonerider Gateway

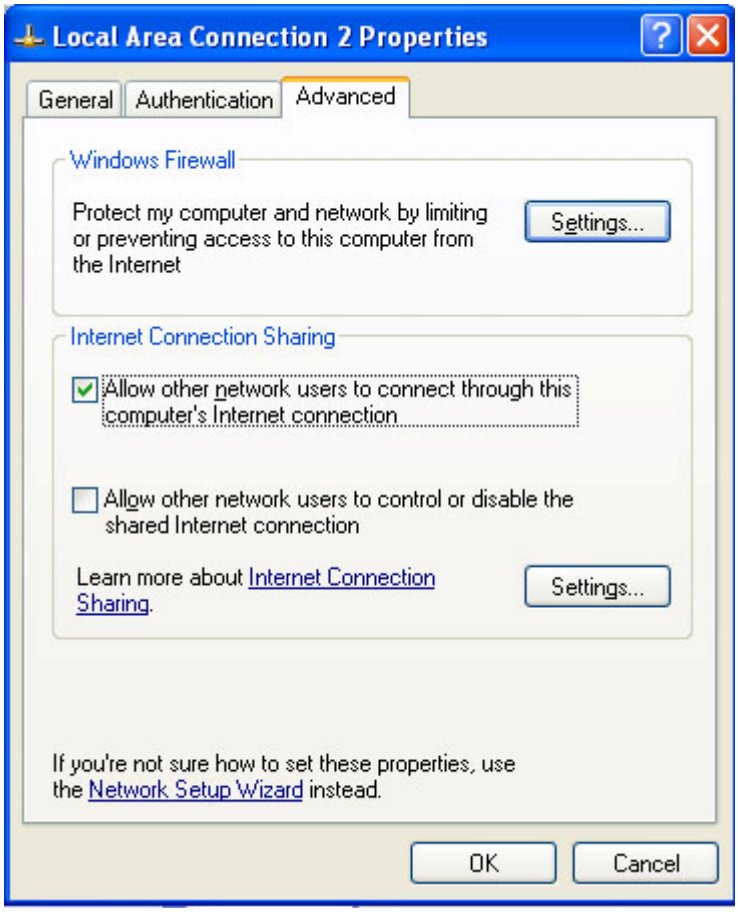
Step 1
Internet Connection Sharing (Note this example using XP for Win 2000 the ICS option will not show until you have set up the network as described in setting up your Zonemaster Network)

Go to your ISP broadband internet settings. This is the first connection that comes in from your Ethernet, cable, wireless, or USB modem.



Click on the **Properties**

Click on **Advanced** tab



Select **Allow other network users to connect through this computers internet connection**

DO NOT select "Allow other network users to control or disable the shared internet connection"

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To do this:
Go into your Zonerider Network IP properties.

The IP address should read
IP 192.168.0.1
Mask 255.255.255.0
Gateway none specified

Just changes the mask to
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Save these settings.