

Access Point Configuration

Developed by IT +46

Based on the original work of:

Onno Purbo and Sebastian Buettrich

Goals

- Provide a general methodology to installation and configuration of access points
- Give a technical understanding to each setting
- Make the reader aware of the implications of each setting
- General Tips and Tricks

Table of Contents

- General tips before you start
- Installing hardware and firmware
- Configuring hardware (OSI model)
 - Physical layer (wireless)
 - Link layer (wireless)
 - IP layer (in the wireless box)
 - Application layer (in/out of the wireless box)

General Tips

- Read the manual and get to know the AP
- Consider the physical installation placement
- Plan the network (topology, TCP/IP settings).
- Have physical access (not online) to documentation and material
- Take notes of every step you take

General Tips

- Consider hardware needed (PC/laptop with wireless and Ethernet interfaces)
- Consider software needed:
 - TCP/IP software tools (ping, route)
 - Vendor specific software
 - Software to measure/detect wireless signals

Physical Installation: LEDS

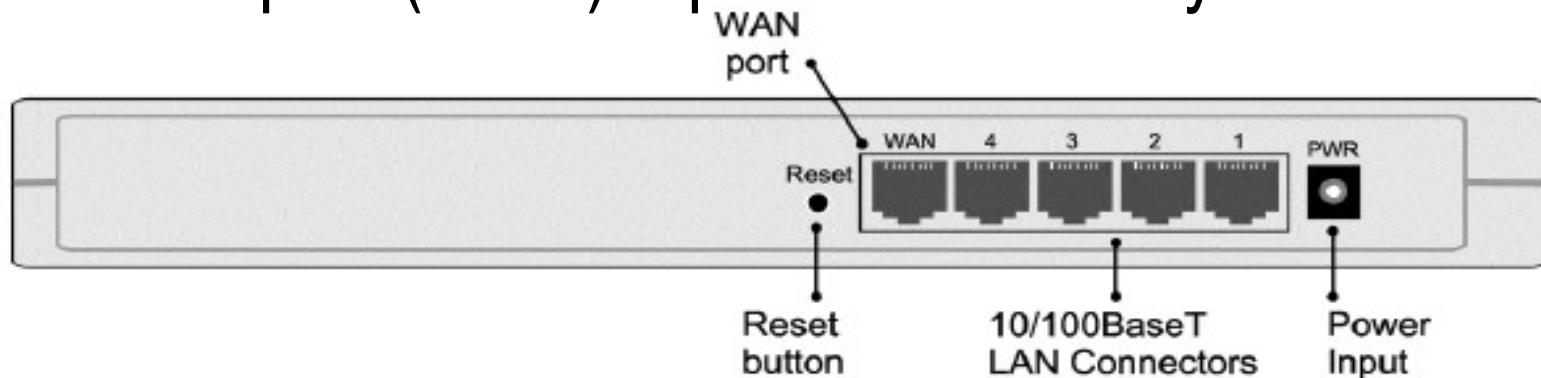
- Comes handy when troubleshooting
- Green/red diodes typically indicating:
 - Power to the access point
 - Active ports
 - Internal error
 - Internet connection (uplink)

Physical Installation: Interfaces

- Radio Interface (WLAN)
 - wireless connection to clients
- Ethernet Interface
 - WAN (to an Internet connection (upstreams))
 - LAN (connection to “same” LAN)

Physical Installation: Interfaces

- Power input (12 V, 6V ...): to DC power source
- Reset button: Used to restore default settings
- LAN Connectors (RJ45):
- WAN port (RJ45): uplink connectivity



Steps in configuring an AP

- **Reset** the device,
if you are uncertain if it is in default state.
- **Connect** your computer to it - wired or wireless
- First thing: **change the default** Admin password. Do it! **Now! :)**
- If your device can be more than a pure Access Point:
Set the Mode:
Access Point, Bridge, Client, Repeater, Gateway?

Update Firmware

- A software written into the ROM
- Permanent part of the device
- Vendors update firmware continuously
 - Offer the latest “stable” configuration
 - Fix reported bugs
- Keep your firmware updated

Connect your computer to the AP

- Wired
 - Ethernet cable via HTTP
 - Ethernet using vendor specific software (SNMP)
 - Serial cable using HyperTerminal (if serial port is available)
- Wireless (HTTP(S))

Configure Hardware (OSI model)

- Physical Layer
 - Channel, TX Power, Speed
- Link Layer
 - Mode, SSID, MAC filter, WEP/WPA
 - Beacon interval, RTS/CTS, Fragmentation
- IP Layer
- Application Layer

Physical Layer

- Channel
 - What frequency is idle?
- Transmit power
 - Regulations
 - What is your purpose? Large coverage or more capacity?
- Speed vs capacity, Speed vs Stability

Link Layer: Operational Modes

- Access Point Bridging (Access Point Mode)
- Gateway
- Point-to-Point bridge (Repeater mode)
- Point-to-Point routing (Wireless Bridge Link)
- Wireless Ethernet adapter (Wireless Client mode)

Link Layer: SSID

- SSID = Service Set Identifier
- The name “tag” of the wireless LAN
- Used to associate/connect to one network or another
- Case sensitive 32 alphanumeric characters
- Broadcasted or not?

Link Layer: Media Access Control

- Beacon Interval
 - Increase mobility
- RTS/CTS
 - Hidden nodes
- Fragmentation
 - Interference or poorly covered areas

Link Layer: MAC Filtering

- Allow only a limited set of known MAC addresses
- A weak security measurement
 - Clients can capture packets and find out which MAC addresses that are granted access
 - It changes its own MAC address to one of the accepted ones and “fools” that access point

Link Layer: WEP and WPA

- WEP: Weak encryption protocol but frequently used
 - 64bit or 128 bit keys (hexadecimal)
 - Same key for AP and client
 - Update keys on a **regular** basis
- **Remember!** WPA2 is the follow up on WEP
 - addresses the weaknesses of WEP

IP Layer

- IP layer is not a part of the “access point”
- “Non-pure” access points includes functionality for routing and NATing.
 - IP address/Netmask
 - Gateway/Routing Table
 - DNS for DHCP

Application Layer

- Password of Access Point
 - Change the default password
 - Choose a strong password
 - Prevent “hijacking” of your access point

Conclusions

- Follow the general guidelines for setting up wireless devices
- Remember general steps (concepts) in setting up an access point or wireless router
- Focus on understanding what each parameter does and how they depend on each other.
- “Concepts” are not specific vendor or interface – the important part is to recognize the basic settings, even if they come under different names and in different colors.