Access Point Configuration

Developed by IT +46

Based on the original work of:
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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 which MAC addresses are granted access
  - It changes its own MAC address to one of the accepted ones and "fools" the 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.