Wireless Security

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Think About Network Architecture

- Two basic choices:
  - Wireless network is equivalent to internal LAN
  - Wireless network requires firewall/VPN access to internal resources
- Deciding factors:
  - "Visitors" needing regular access
  - Wireless architecture/hardware limitations
  - Wireless client limitations

Basic Wireless Security

- MAC Address Filtering
  - Useful on small networks
  - Can be a pain at the enterprise level
  - MAC addresses can be spoofed!
- Client Isolation
  - Can wireless clients attack each other?
- Antenna positioning
- Antenna power settings

Wireless Encryption Options

- Static WEP
  - Easy to configure, easy to crack
- WPA w/ Pre-Shared Keys (WPA PSK)
  - Roughly the same as WEP
- 802.11i (aka "WPA2", "Enterprise WPA")
  - Higher levels of security, pain to configure

About 802.11i

- Uses 802.11x network authentication:
  - Can use passwords, certificates, token cards…
  - Need a RADIUS server on the network
- AES for data encryption:
  - Replaces weaker RC4 from earlier standards
  - Session keys regularly regenerated to help prevent brute-force attacks

Lots of Different Pieces

- RADIUS Server
- Certificate Authority
- Loading Client Certificates
- Configuring Wireless Profiles on Clients
- Wireless AP Configuration

RADIUS Server Options

- Personally, I use FreeRADIUS (on Unix) but mostly for historical reasons
  - Active user support community
  - Fairly complex configuration
- List of other RADIUS Servers for Unix:

  http://wiki.freeradius.org/Other_RADIUS_Servers
- Windows: use Microsoft IAS or Cisco ACS

FreeRADIUS Notes

- Critical files in **`${INST}/etc/raddb`**:
  - **`radiusd.conf`** – General server config
  - **`eap.conf`** – Wireless security config
  - **`clients.conf`** – Define APs, shared secrets
  - **`users`** – Text database for user accounts
- Can also store users in MySQL, LDAP, …
- Use "**`radiusd -X`**" for debugging

Your Own Private CA

- Use OpenSSL to create your own root cert
- Use fake root cert to sign:
  - Certificate for RADIUS server
  - Per-user certificates
- FreeRADIUS supplies **`CA.certs`** script– this script is broken, use my version
- *Think very hard about certificate lifetimes before deployment!*

Loading Certificates (Windows)

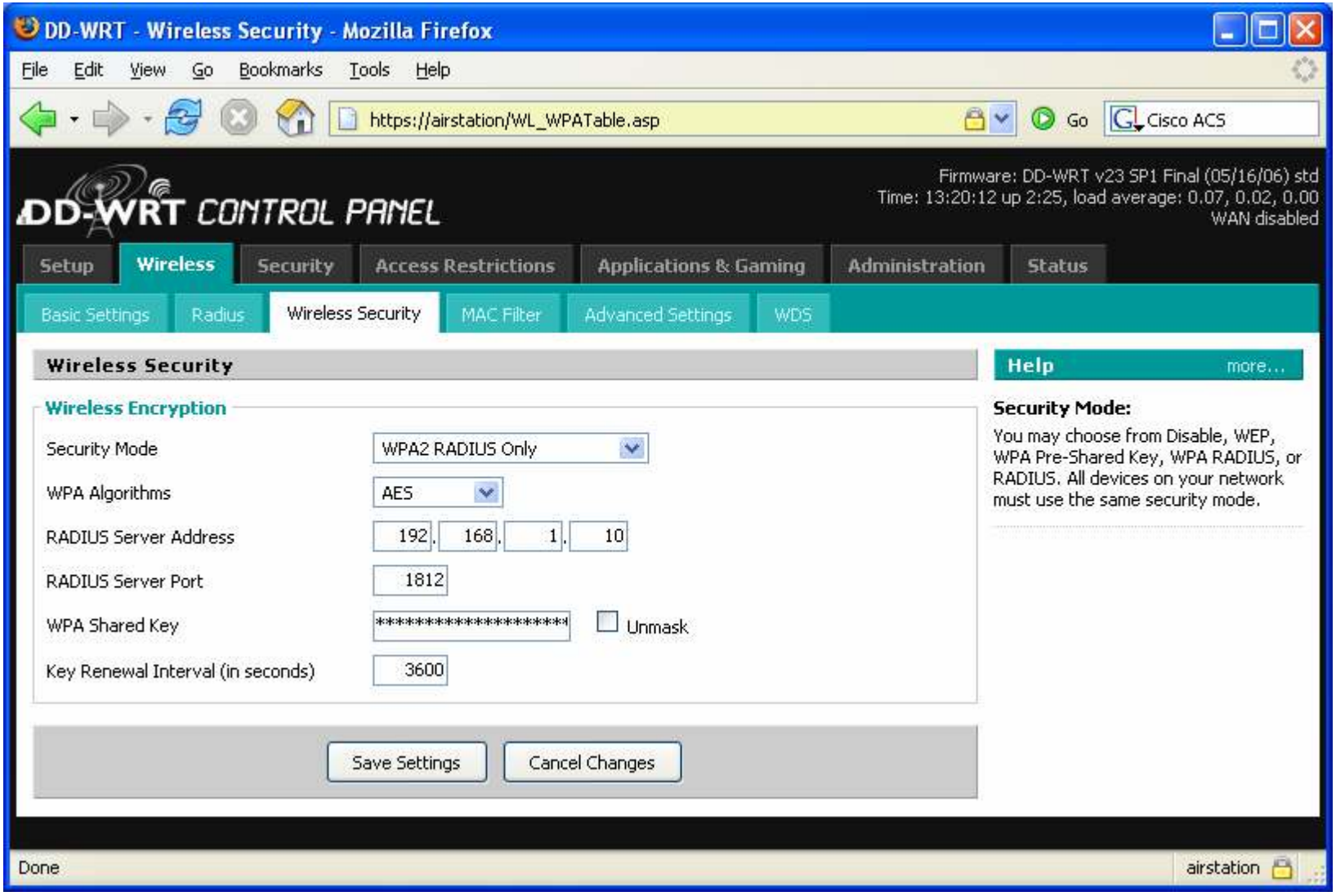
- Copy root public key and user cert to client
- *Start…Run…*`mmc` (Microsoft Management Console)
- *File…Add/Remove Snap-in…* and add the "Certificates" snap-in
- Expand folders to "Trusted Root Certification Authorities"
- Right click, choose *All Tasks…Import*
- Use the wizard to import CA root public key
- Can also use `mmc` to import user cert, or just right-click user cert file and choose *Install PFX* which opens the same wizard
- *Do not* "enable strong private key protection" option on user cert

Oh heck, how about a demo instead???

Access Points and DD-WRT

- All (consumer grade) access points suck!
- It's mostly due to crappy, unstable firmware
- DD-WRT is free Linux-based firmware image that runs on many different access points:
  - Admin access via HTTP, HTTPS, and/or SSH
  - Built-in Firewall and [P|S]NAT support
  - PPTP and OpenVPN support
  - RIP/OSPF/BGP routing, VLANs, QoS, IPv6
  - SNMP, NTP & Samba clients, Kai, UPnP, SIPatH

DD-WRT Wireless Security



Useful URLS

- Software:

  http://www.freeradius.org/

  http://www.dd-wrt.com/wiki/index.php/Main_Page

- Good HOW-TO Article (parts 2&3 of 3):

  http://www.linuxjournal.com/article/8095

  http://www.linuxjournal.com/article/8151

- More info on XSupplicant (Unix Clients):

  http://www.tldp.org/HOWTO/html_single/8021X-HOWTO/