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Today's challenge on Wireless Networking

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Agenda

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- How Popular is Wireless Network?
- Threats Associated with Wireless Networking
- Wireless Security – the Revolution
- Layered Wireless Security Approach
- Maintaining Good Health - Wireless Assessment

How Popular is Wireless Network?

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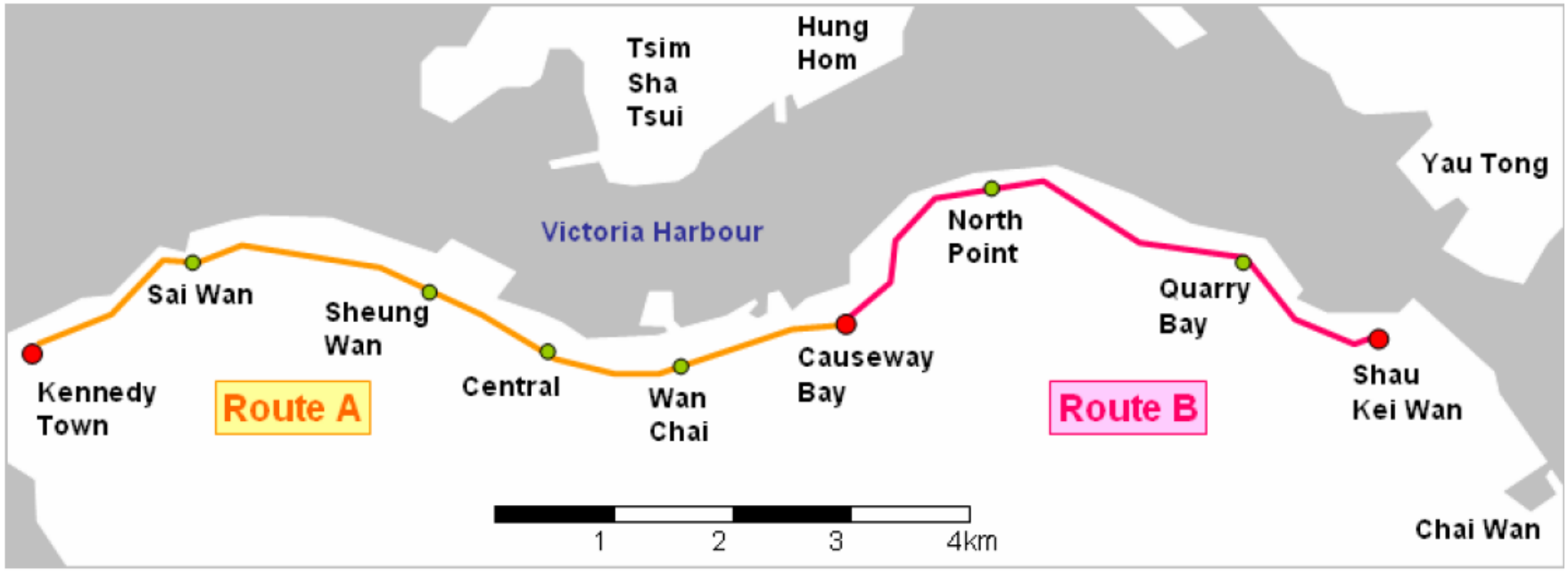
War Driving 2007 – PISA



War Driving Route

How Popular is Wireless Network?

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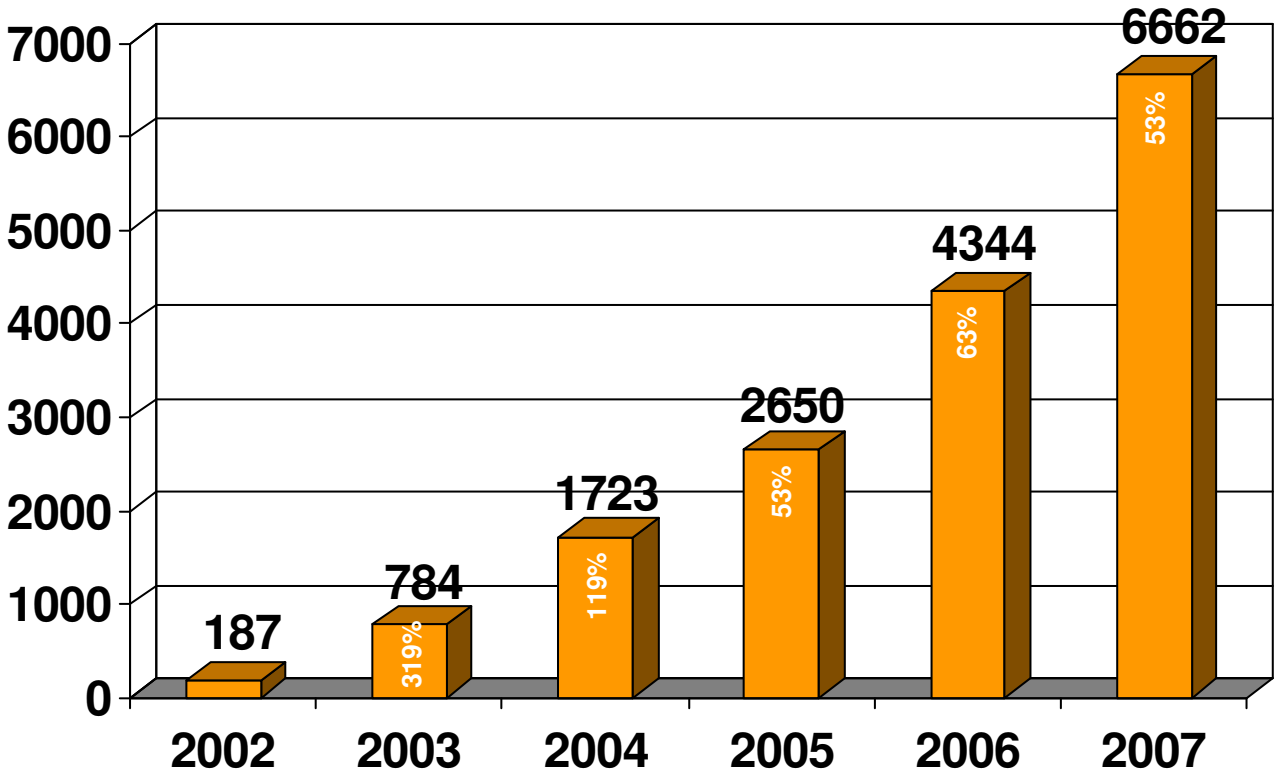
War Driving 2007 – PISA



No. of APs discovered

How Popular is Wireless Network?

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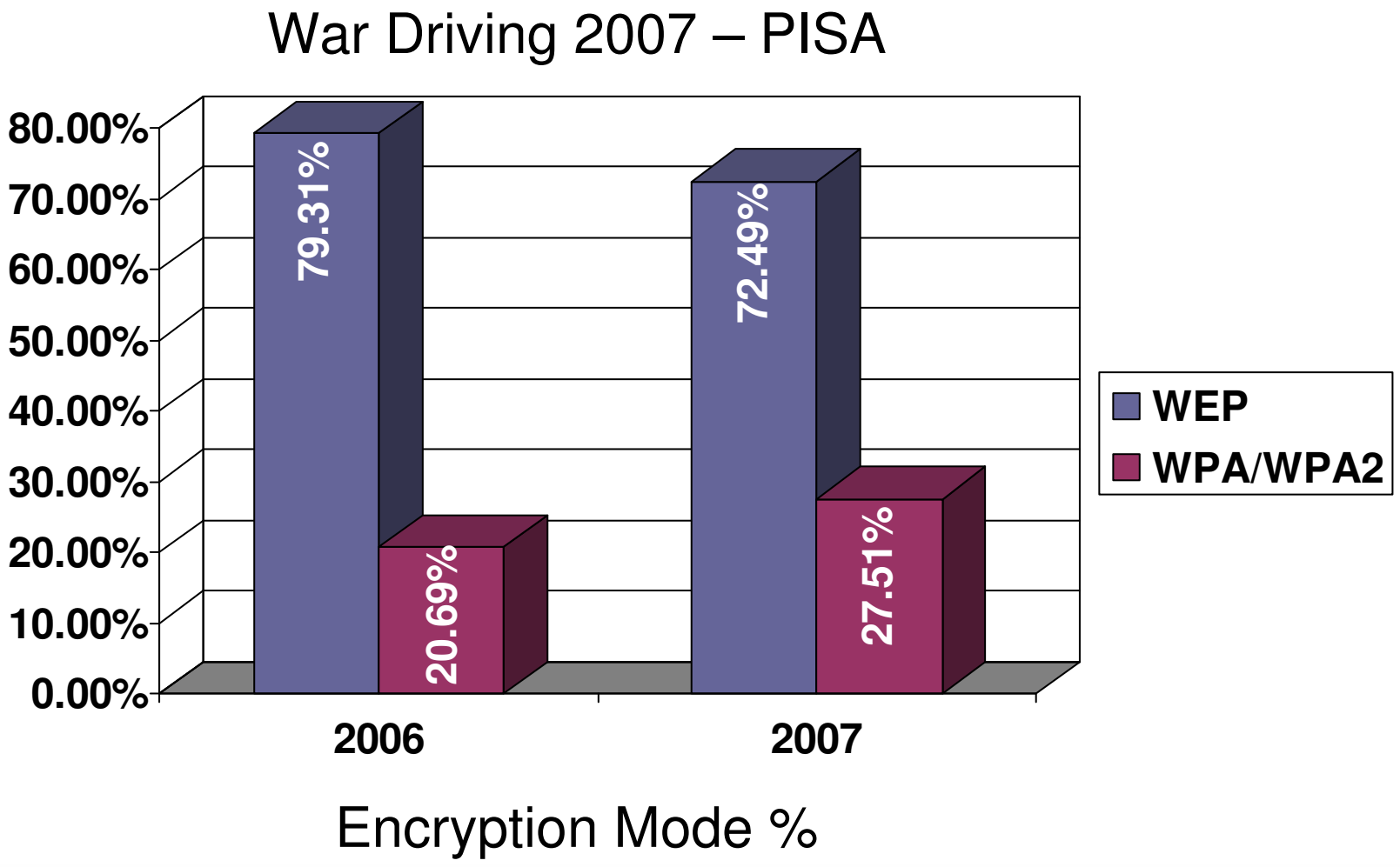

How Popular is Wireless Network?

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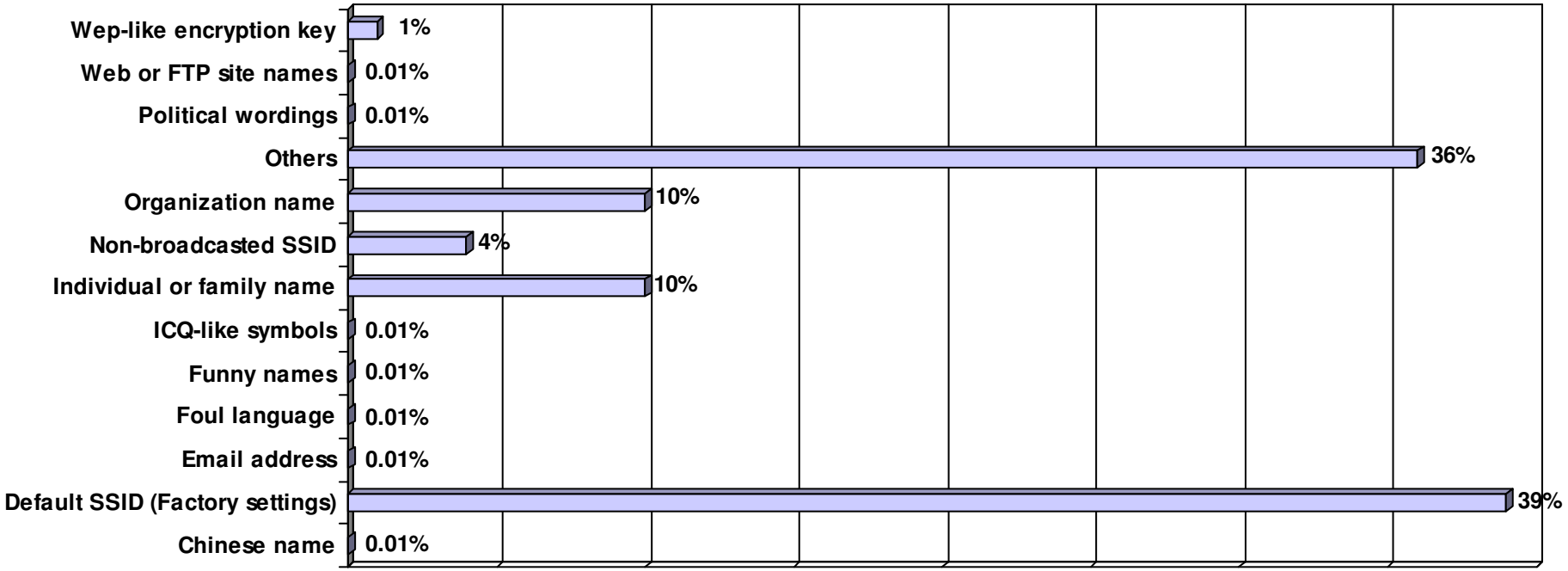

SSID Analysis

Wireless Security – the Revolution

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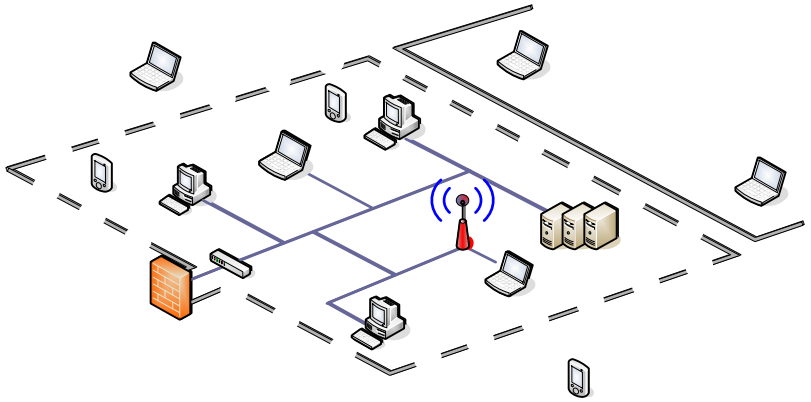
Traditional Network Environment

Protection focused on Network Entry Point (Outside-In)

- Firewall
- VPN
- 2-factor logon

Less worried on internal

- Bounded by Physical Protection
- Less likelihood on internal security incidents
- End point security for road runners
- Standardized H/W, O/S, applications



As Wireless Network Deployed
The Network Becomes Boundaryless

Physical boundary have been removed

- No more walls to protect your NETWORK
- Radio signal leakage
- Insufficient planning
- Mis-configurations

Wireless Networking is Invisible!

Wireless Security – the Revolution

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WiFi Encryptions – How secure they are?

- WEP (Wired Equivalent Privacy)
  - Shared Key: 64 or 128-bit WEP Key (24-bit IV included)
  - Packet encrypted by RC4 streams
  - Security weakness
    - Short Key size (2^{20} RC4 keys)
    - IV collisions or altered packets
    - Can be cracked within hours

- WPA2 (WiFi Protected Access)
  - Created in response to serious weaknesses found in WEP
  - Personal
    - 8 to 63 character Pre-shared Key
  - Enterprise
    - 802.1X authentication / Radius (individual has their own password)
  - TKIP or AES encryption
    - Technically more secure

Threats Associated with Wireless Networking

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Identity Theft

- Spoofing – Mac Address, SSID etc.
- Breaking encryption
  - 50% successful rate with 40,000 packets
  - 95% successful rate with 85,000 packets
  - 104-bit WEP key can be break within 3 seconds with 40,000 packets
  - Hacking tools on wireless client WEP Cracking, not AP anymore
    - The Café Latte Attack
    - WepOff

Threats Associated with Wireless Networking

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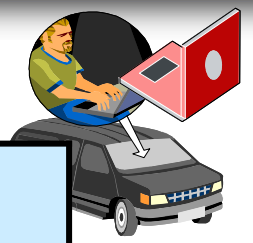

Network Configuration	Approximate Cracking time
Shared + DHCP	~ 6 minutes
Shared + Static IP	~ 6 minutes
Open + DHCP	~ 6 minutes
Open + Static IP	~ 6 minutes

Probing & Association with target victim

Send numerous ARP Requests to victim

Collect sufficient ARP Respnonses for WEP Cracking

Threats Associated with Wireless Networking

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Denial-of-Service Attacks

- Aim to prevent legitimate users from accessing network resources – loss of production
- DoS on perimeter of Network (e.g. F/W, Mailserver etc.)
  - Single point of attack, single point of protection
  - Most F/W and Anti-Spam can block malicious connections
- How about multiple point of attacks = multiple point of protection
  - Jamming Wireless Signal in a matter of seconds
  - Your internet connections still works…….but you users can't access it.
  - Heavy workload to IT Support
  - Again, No trace at all

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How easy to crack WEP?

1. Setup equipment
   - a Computer
   - WiFi card that supports monitoring mode and packet injection
   - Market available tools e.g. Backtrack CD
2. Find the target (SSID)
   - Airdump-ng
   - Net Stumbler
3. Capture Data from Air
   - Airmon-ng
   - Airodump-ng
4. Wait……..or make the network busy
   - Aireplay-ng
   - Packetforge-ng
5. Crack WEP key with Captured Data
   - Aircrack-ng

Threats Associated with Wireless Networking

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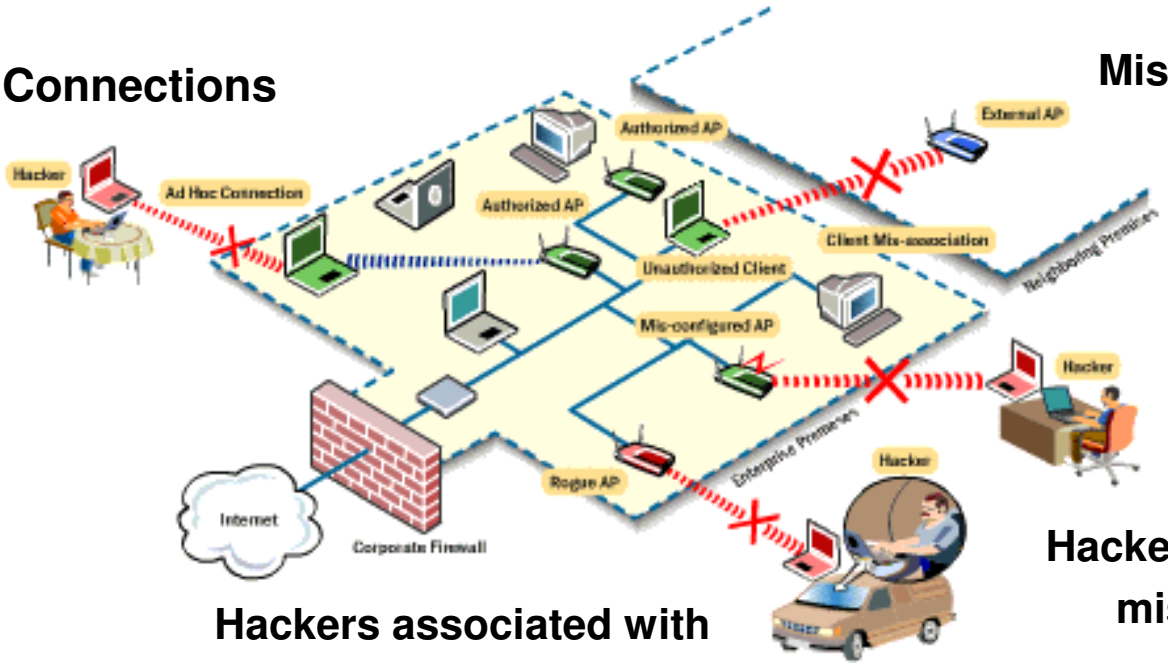
Scary enough!? What more is coming!

Ad Hoc Connections



Mis-association with external APs

Hackers associated with Rogue APs

Hackers associated with mis-configured APs

New Wireless Security Approach

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New Wireless Security Approach

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1) Securing Wireless Devices

- Reconfigure from default settings (SSID, Admin login, Password etc.)
- Establish set Channels of operations – off channel traffic as suspicious activity

2) Secure Communications

- MAC address filtering
- WPA-2 encryption……and keep updates
- VPNs
- Personal Firewall
- End-point security

New Wireless Security Approach

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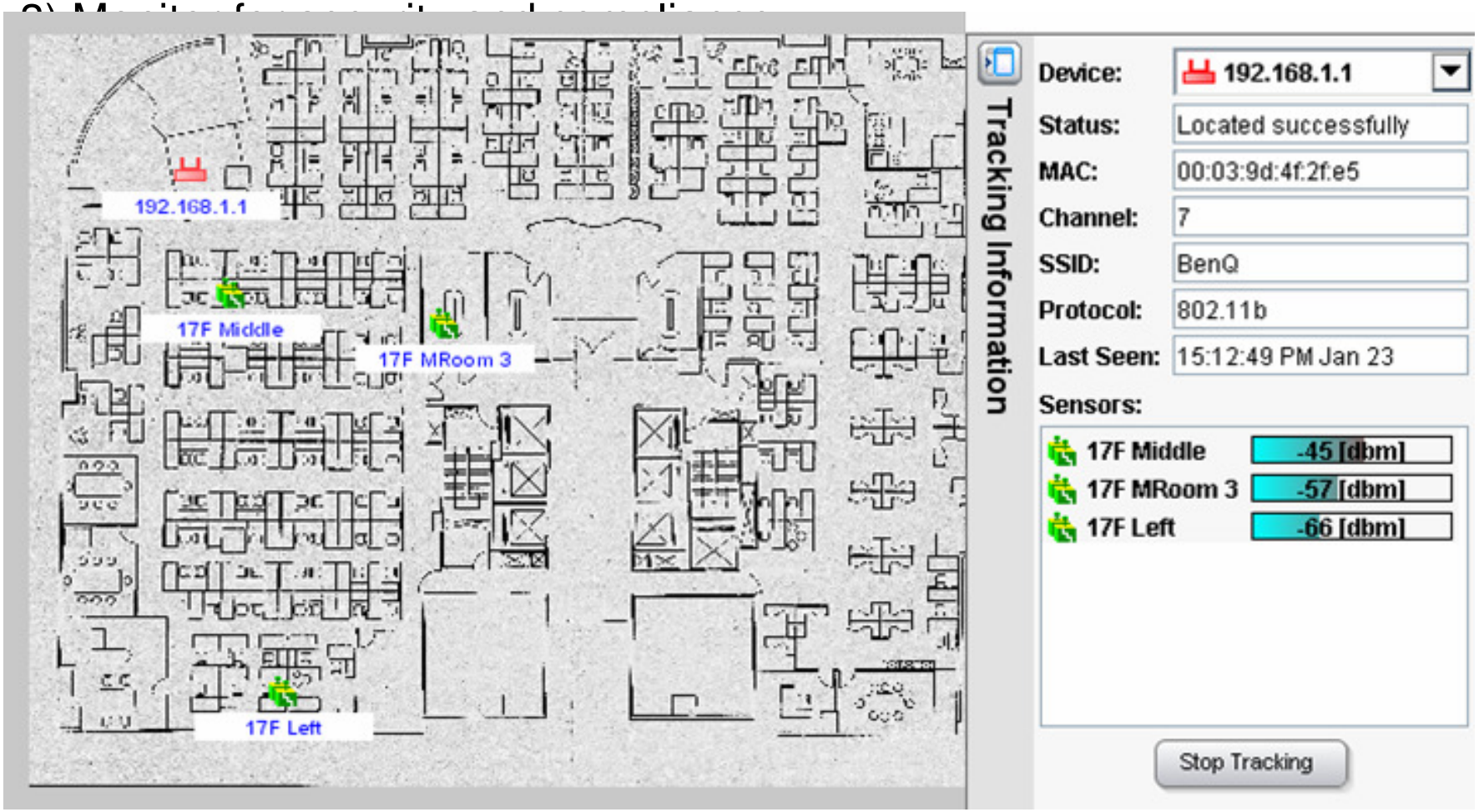

Maintain Good Health – Wireless Assessment

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Common Mis-concepts

- I do not deploy wireless networking
- I do not allow my users to use wireless

How can you be sure?

10 Steps on Wireless Assessment:

1) Review existing security policies
2) Review the system architecture and configurations.
3) Review operational support tools and procedures
4) Interview users
5) Verify configurations of wireless devices
6) Investigate physical installations of access points
7) Identify rogue access points
8) Perform penetration tests
9) Analyze security gaps
10) Recommend improvements

Maintain Good Health – Wireless Assessment

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BackTrak

- Free suite
  - Snort
  - ntop
  - db_auto
  - kismet
  - unicorns
- No Installati
- What it can
  - Foot-pri
  - Analysis
  - Scannin
  - Wireless
  - Brute-fo
  - Crackin

References

PISA War Driving 2007

http://www.pisa.org.hk/event/war-driving-2007.htm

Network Stumbler

http://www.netstumbler.com/

The Café Latte Attack

http://www.airtightnetworks.net/knowledgecenter/ppt/Toorcon.ppt

AirDefense Network

http://www.airdefense.net

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http://www.airdefense.net

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End of Presentation