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innovative solutions in a wireless world

The Mobile Enterprise

Evolution, Technologies and Strategies

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Agenda

- Enterprise Mobility
  - Evolution, Values and Technologies
- Mobile and Wireless Challenges
  - Security, Mobility, Deployment and Management
- Strategies for Success
  - Best Practices for IT

Who moved my cheese?

Enterprise Mobility
Evolutionary Path

- Enterprise Mobility is not new but evolving
- Started in *vertical* markets more than 10 years ago in backend areas (Wal-Mart, UPS/FedEx, warehouses)
- Penetrating horizontal markets and moving into the enterprise *front edge* ("carpet environment")

Productivity
(Verticals)
Mid 1990's

In back-rooms,
"Blue-collar computing",
Inventory control, PoS

Leisure/Convenience
(Consumer/Home)
Early 2000's

In homes and SOHO's,
Mobile computing around
the home/office

Business Transformation
(Enterprise/Horizontal)
Mid 2000's

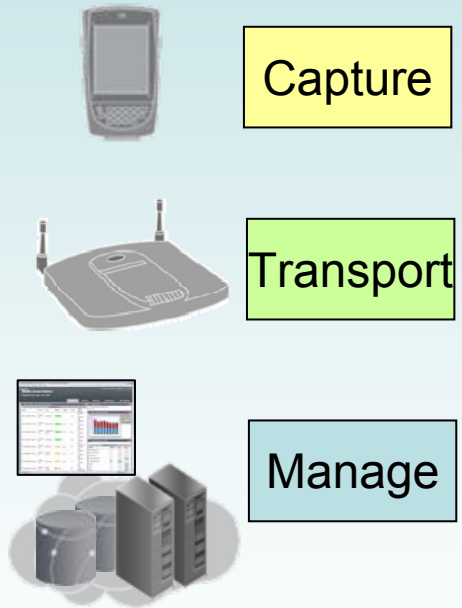
In enterprises,
Professional workforce
always connected

Cisco acquires
Aironet - 1999

Enterprise Mobility

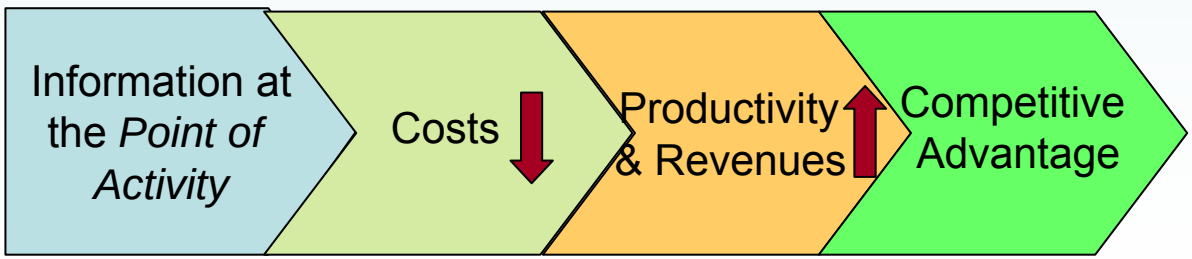
Definition

- Definition: Capturing and delivering *information* at the point of *activity*
- Enterprise Mobility involves data *capture*, instantaneous *movement/transport* and *management*



Enterprise Mobility
Survival of the Fittest

- Essential to enterprises interested in providing on-demand services *inside/outside* the firewall at the point where it matters the most - *point of activity/decision*
- Mobility enhances enterprise *productivity* by providing relevant information at the right time at the right place
- Without it the enterprise will lose its agility and competitive advantage and will not survive



Enterprise Mobility
Examples

- Healthcare/Hospitals
  - Tracking essential assets, e.g., personnel, equipment, specimen
- Insurance Agents
  - Faster claim processing, e.g., at accident site

- Sales Force
  - Access to critical business information at customer site
- Building Inspection
  - Faster building permit processing

- Field Technician
  - Access to user manuals, schematics and troubleshooting
- Tele-worker/Road Warrior
  - Always connected to their enterprise, more productive

Enterprise Mobility

Main Technologies

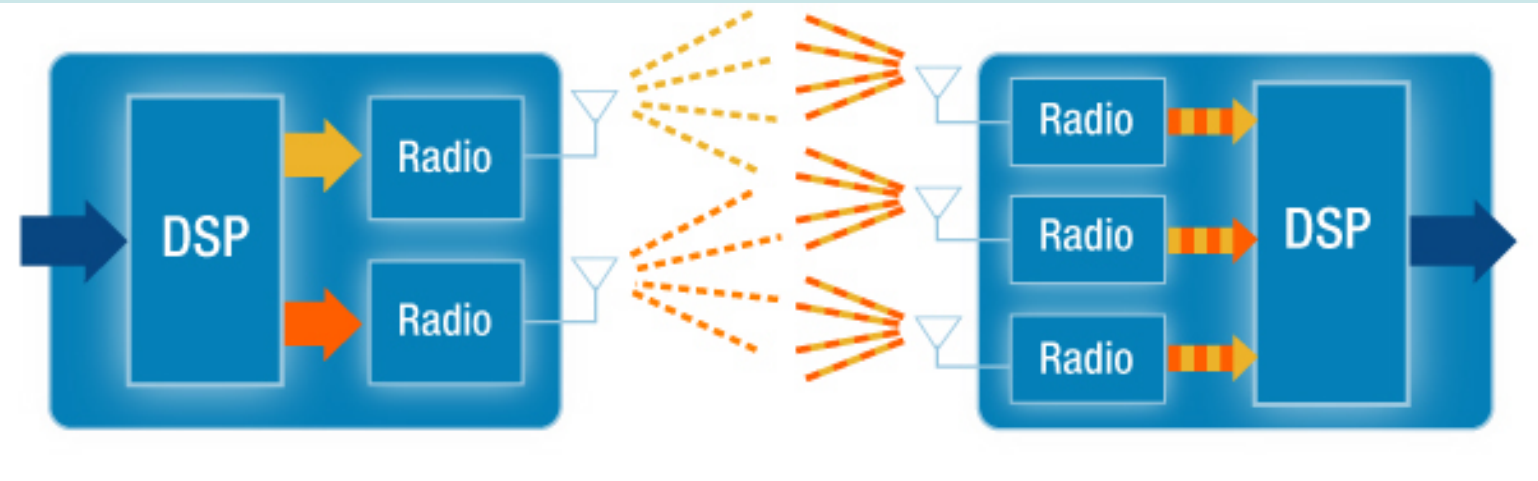
- WLAN - WiFi (802.11x)
  - The dominant technology for access and infrastructure
  - Moving from 802.11a/g to 802.11n for better coverage and capacity (up to 600 Mbps)
  - Dual mode smart phones (“WiFi inside” in over 50% of smart phones, more than 300 WiFi handsets)
- WMAN - WiMAX (802.16x)
  - For campus and indoor coverage
  - Affordable but licensed spectrum cost hurdle
  - Future: Enterprise owned private networks in unlicensed bands 3.65 and 5 GHz
- RFID, M2M – for data capture

Enterprise Mobility
Technologies - MIMO

- MIMO is an acronym that stands for **M**ultiple **I**nput **M**ultiple **O**utput.
- It is an antenna technology that is used both in transmission and receiver equipment for wireless radio communication
- Motivation: current wireless systems
  - *Capacity* constrained networks
  - Issues related to *quality* and *coverage*
- MIMO exploits the *space* dimension to improve wireless systems capacity, range and reliability
- MIMO-OFDM – the corner stone of future broadband wireless access: WiFi – 802.11n, WiMAX – 802.16d/e, LTE

Enterprise Mobility

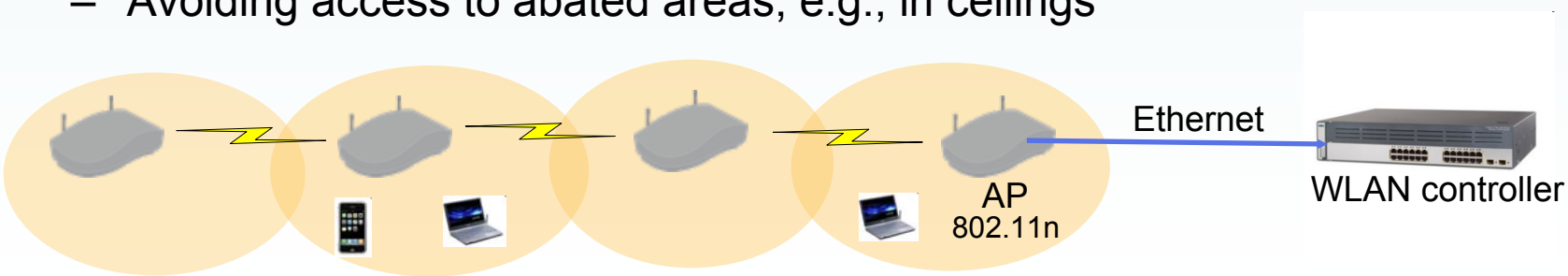
How MIMO Works



- Multiple data streams transmitted in a single channel at the same time
- Multiple radios collect multipath signals
- Delivers simultaneous speed, coverage, and reliability improvements

Enterprise Mobility
Cost Effective Infrastructure

- The first wave of mobility provided wireless **access** to mobile computing devices
  - This could potentially reduce significantly the number of Ethernet ports and switching equipment
- New high speed multiple-radio AP's are capable of creating wireless infrastructure backbone using mesh links
- Using wireless backhaul links between AP's and WLAN controller will also result in
  - Reduction in labor costs and materials (less pulled cables)
  - Avoiding access to abated areas, e.g., in ceilings



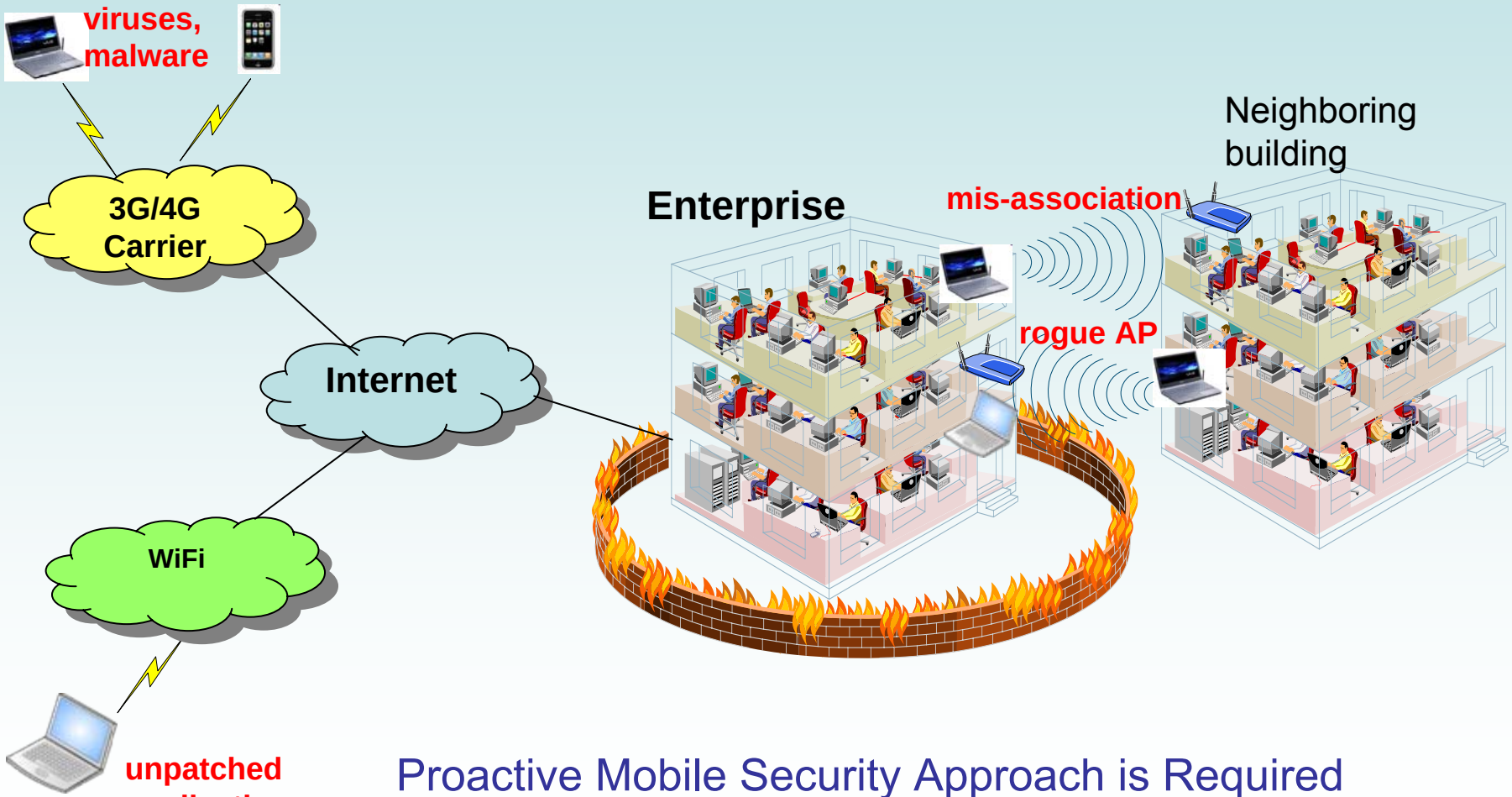
Mobile and Wireless Challenges

While mobile and wireless are great technology enablers they pose new and generally unaddressed challenges to IT:

- Security
  - How to secure the Enterprise network, mobile devices and applications?
- QoS
  - How to provide adequate coverage & capacity for multimedia services in a fluctuating signal environment?
- Deployment
  - How to deploy multitude of heterogeneous devices with different capabilities?
- Monitoring/Management/Maintenance
  - How to manage a network with assets that are not visible?

End-to-End Security Vulnerabilities

Corporate Network, Mobile Device, Applications

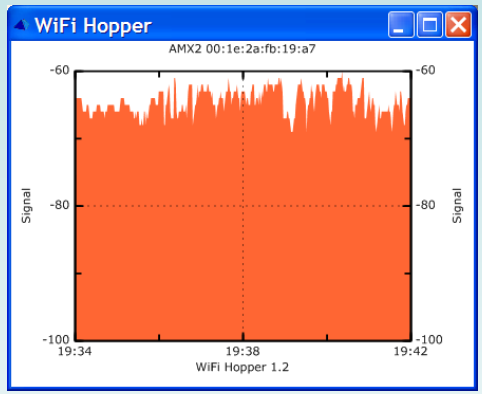


Proactive Mobile Security Approach is Required

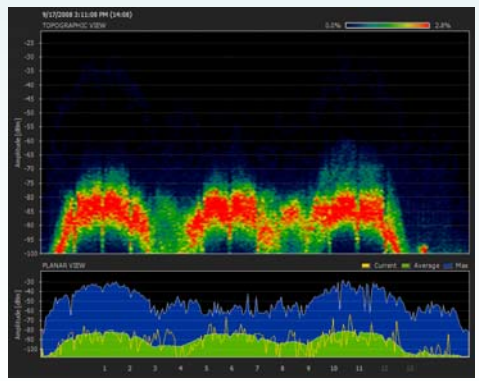
Mobile and Wireless Challenges

The Wireless Channel / QoS

- The wireless signal/channel is fluctuating in time (random/environmental changes)
- Intermittent coverage holes
- RF signal can leak out of your premises
- Interference (unlicensed band 2.4, 5 GHz)
- Possible capacity limits when using video streaming, VoIP, etc.
- Invisible wireless network – hard to manage



Signal strength varies dynamically



2.4 GHz “busy” spectrum

Strategies for Success
Best Practices for IT

1. Applications and Services
   - Identify the main end-user needs and services (e.g., video streaming, VoIP, e-training, RTLS - location tracking, etc.)
2. Device Strategy
   - What kind of devices you are going to support (e.g., notebooks, dual-mode phones, embedded devices, tags), interfaces (802.11a/b/g/n)
3. Architecture Planning
   - Plan for a modular/scalable architecture to accommodate future traffic needs (# of users and new demands, mobile cloud)
   - Flexibility in adding more AP's, controllers and backhaul links
   - Redundancy (no focal point of failure)

Strategies for Success

Best Practices for IT

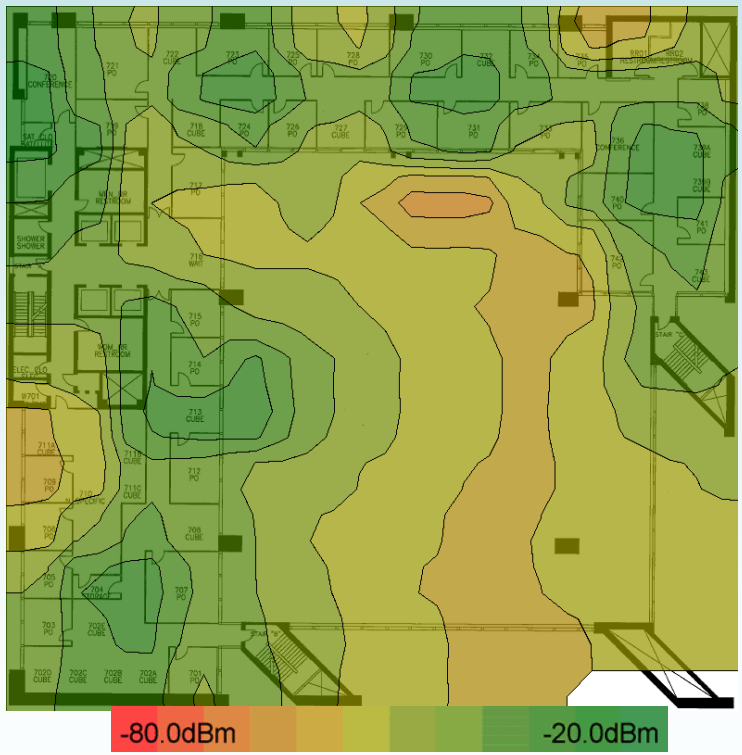
4. Proactive Security and intrusion detection & prevention
   - Monitor the "air" for any rogue/modified AP's in the enterprise
   - Identify, locate and disable rogue AP's
   - Make sure your devices do not associate with neighboring WLAN's
5. Central mobility management – Mobility as a Service (MaaS)
   - For better control all mobile data backup/restore, SW patching and virus & malware scanning should be centrally managed (minimal user intervention) → reduce end user responsibilities
6. Role-base policy management
   - Define policies for personnel/devices access, location based services, application distribution/maintenance

Strategies for Success
Best Practices for IT

7. Application distribution – The Enterprise "App Store"
   - Only enterprise-approved applications will be allowed to be installed per user/device type
8. Risk Mitigation of lost/stolen/compromised devices
   - Try to locate device and/or wipe its data
9. Plan for Mobility
   - Plan/validate your WLAN for adequate coverage, capacity and QoS for good user experience
10. Enterprise visibility (tracking your assets)

Plan for Mobility
WLAN Coverage/Capacity/QoS

- It is important to ensure that there is good *coverage* and *capacity* throughout the enterprise
  - For good user experience
  - Security (prevent mis-association)
- In conference rooms and areas where you expect dense video and VoIP traffic add capacity AP's
- Pre/post deployment site survey will help in the RF design/validation of the WLAN



RF Site Survey of a floor
in a high rise building constructed
from metal and glass

Enterprise Visibility

- Seeing what is not visible – it is hard to manage something you cannot see
- Asset tracking
  - What do you have?
  - How many do you have?
  - Where is it?
  - What is its status?

- Success stories in hospitals, manufacturing, logistics
- Technologies: 3G/4G, WiFi, RFID, GPS

Summary and Takeaways

- Wireless/mobility could increase efficiency and productivity (reducing costs and increasing revenues) resulting in agility and competitive advantage – necessary for *business continuity*
- Wireless/mobility pose new challenges to IT (security, QoS, deployment, management)
- Plan for scalability and robustness: coverage, capacity, mobility
- *Proactive* security - intrusion detection and prevention
- Define policies regarding users/devices/applications
- Centralized device management for monitoring, maintenance and enterprise visibility

Thank You!

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