IMPERIAL NETWORK SOLUTIONS

TEN TALK

Challenges of the Low-End Enterprise Market for Wi-Fi

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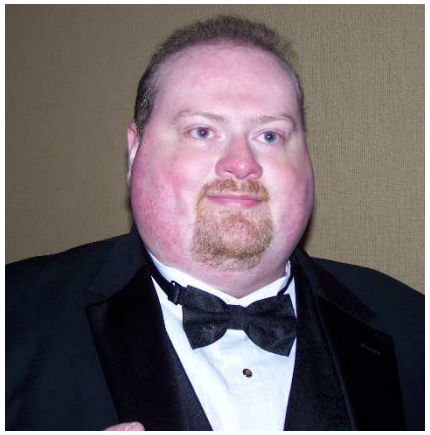
wirelessLAN PROFESSIONALS CONFERENCE

About the Presenter

Jason D. Hintersteiner

- Founder, President and Chief Technology Officer: Imperial Network Solutions LLC
  - Principal network designer, architect and troubleshooter for several hundred private networks across numerous venues
  - Well versed with numerous enterprise access point, switch, router, firewall, and controller technologies
  - Principal Instructor for EnGenius Certification courses
  - Served over 6 years as the VP of Technology and de facto CTO at Spot-On Networks, LLC



- Certifications
  - Certified Wireless Design Professional (CWDP)
  - Certified Wireless Network Administrator (CWNA)
  - EnGenius Certified Operator / System Engineer
  - TE Connectivity Fusion, Spectrum, and Prism
  - Ruckus Wireless Solutions Engineer (WiSE)
- Education
  - MIT: Bachelor of Science (BS), Master of Science (MS)
  - University of Connecticut: Master of Business Administration (MBA)

Challenges of Low-End Enterprise

What Properties are in This Market?

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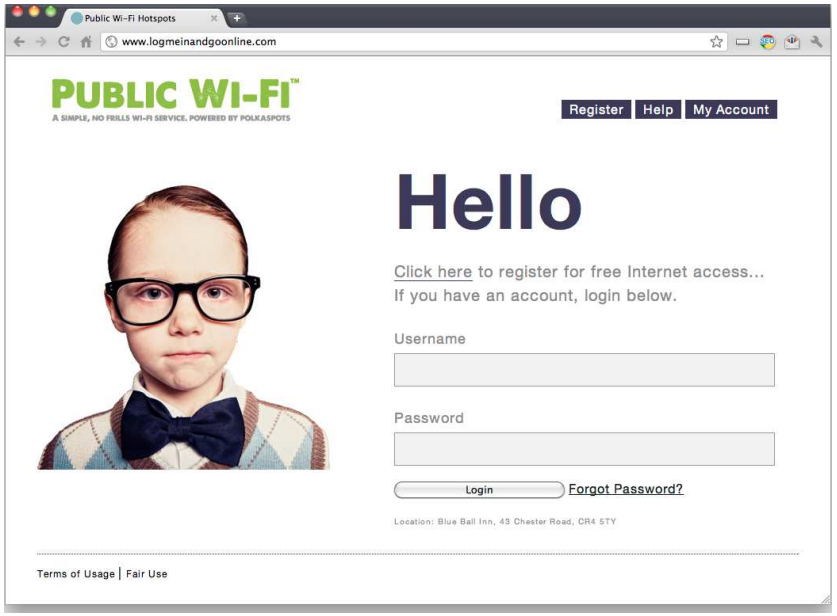
- Multi-Dwelling Unit (MDU) Residential
  - Apartment buildings
  - Condominiums
  - RV Parks
- Privately-owned Student Housing
- Assisted Living
- Budget Hotels
- Churches / Synagogues
- Small Private Schools
- Small Factories / Warehouses
- Small Businesses
- Who is the direct customer?
  - Property owners / managers
  - Electrical contractors
  - WISPs

Large and growing segment. Most have been burned by doing the "Best Buy" approach.

Challenges of Low-End Enterprise

Network Type: Public / Semi-Public

- Public Access Network
  (resident, guest, patron, consumer, etc.)
- Controlled Access
  - Free or paid
  - CALEA compliance
  - Client device isolation
  - Content filtering
  - Client isolation
  - Bandwidth control
    and restrictions (SLA)



Challenges of Low-End Enterprise

Network Type: Staff

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- Network as operations infrastructure
  - Isolate from the public network population
  - Full access to facility resources
  - More frequently, the justification for a network project
  - Sometimes integrate with corporate IT (VPNs, Firewalls)
  - WPA2-AES Personal (rarely Enterprise)

Challenges of Low-End Enterprise
Network Type: IoT / Security / Multimedia

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- Operations Infrastructure Add-Ons
  - Video Surveillance
  - Access Control
  - Multimedia (i.e. SONOS, AppleTV)
  - Smart-Home (temperature / lighting control)
  - ***Real-Time Video / VoWi-Fi / RTLS: Extremely Rare***

Drives the need for multiple SSIDs, VLANs, sophisticated security, client isolation, and handling of multiple types of networks simultaneously

Challenges of Low-End Enterprise

Cause You Know It's All About the BYOD

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- Most devices are "uncontrolled"
- New devices emerging constantly
- Devices consume more data
- Devices more likely to have malware
- Must accommodate the worst devices
  - Bad wireless chipsets
  - Weak client transceivers
  - Inadequate wireless antennas
  - Roaming aggressiveness or stickiness
  - Many devices still 2.4 GHz only
  - Dual-band devices: Support for DFS?

Drives the need to track users, isolate users, provide ubiquitous coverage, and facilitate AP to AP roaming

Challenges of Low-End Enterprise

More Data! More Devices! More!

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Capacity Driving Growth

- *Design for Coverage: Maximize the area of coverage using the fewest APs*
- *Design for Capacity: Maximize the number of active devices in a given area*
- More bandwidth per device
- Multiple simultaneous devices per user
- BYOD and "The Internet of Things" = number of devices explodes over time

Drives the use of more APs and maintaining stricter control over AP placement, antenna pattern, channel, and power settings

Challenges of Low-End Enterprise

Designing for Tomorrow, Not Today

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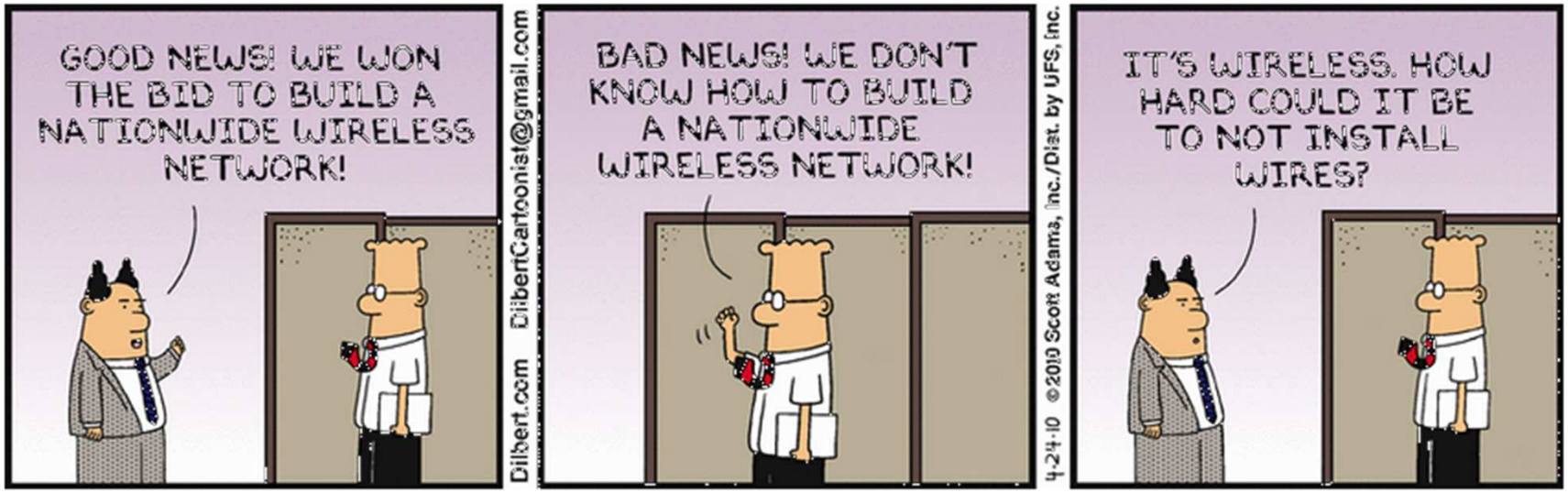
- Shrinking Wi-Fi product life cycle
- Customer expectations increase while install-base remains static
- The expected life of a network is ≥ 5 years: today's latest and greatest APs will be paperweights that are ≥ 2 generations old
- Infrastructure is key
  - APs and switches can be upgraded
  - Cabling is forever!

Drives robust low-voltage infrastructure and a conservative design for both 2.4 GHz and 5 GHz

Challenges of Low-End Enterprise

Low Voltage Cabling Infrastructure

Source: http://www.dilbert.com



- Is there existing cabling infrastructure?
- Is it possible to run cabling where it is needed?
- Do you use CAT5e or future proof with CAT6a?
- Running cables is hard and expensive…
  - "I love the design, but put the APs in the hallways."
  - "Why can't we do security cameras wirelessly?"

Challenges of Low-End Enterprise
Lamborghini Performance, Kia Price

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- Customers ALWAYS have a limited budget, and ALWAYS want more than they can afford
- Customers must be educated to understand the ***value*** of the network services and have ***realistic expectations*** regarding the ***options*** and ***tradeoffs*** in equipment and technologies

- Cannot afford APs from vendors “A”, “A”, “C”, or “R”, though don’t need all the fancy features

Drives the technology chosen and the requirements that can be successfully implemented

Challenges of Low-End Enterprise

Other Challenges

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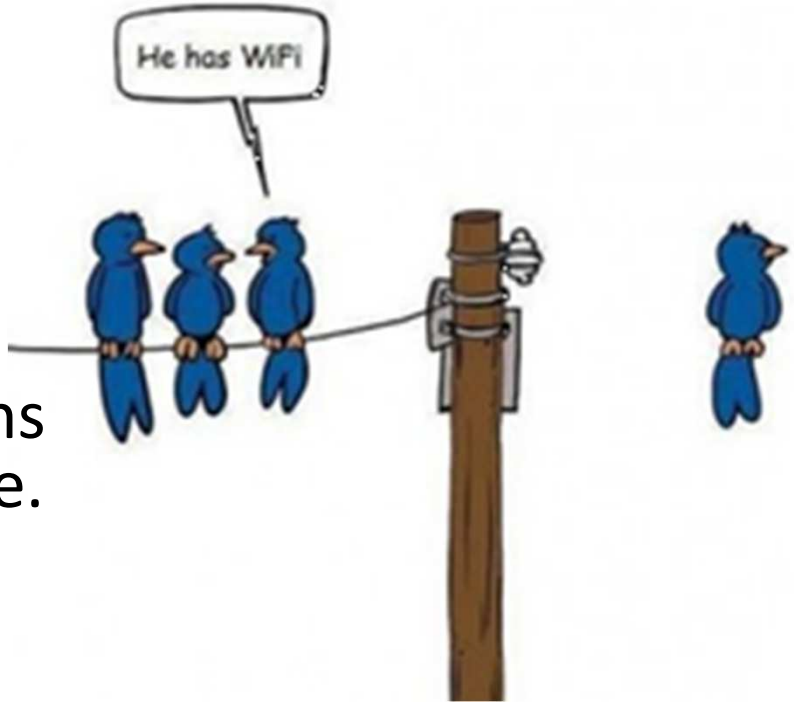
- AP technology
  - Don't always have the luxury of using a controller
  - Don't need my APs certified by the Wi-Fi Alliance
  - The simple and reliable AP wins the race
- Site surveys, or lack thereof
  - Predictive modeling: Sometimes
  - Pre-deployment: Site walks focus on cable paths, not RF
  - Post-Deployment: Troubleshooting only, but most problems are "simple" (i.e. power, channel, placement)
  - Packet Analysis: Never
- Consumer-grade "business class" bandwidth
  - Cable Modem / FIOS / uVerse / DSL
  - Extremely rare to see synchronous fiber feeds

Challenges of Low-End Enterprise

Conclusions

- This section of the market has some unique and some non-unique challenges
- Large and growing market segment
- Most of the enterprise solutions are not geared to the needs (i.e. simplicity) or constraints (i.e. cost) of this segment



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