2018 ACE SCHOOL & RUS SYMPOSIUM
TERMINUS
CONNECTING POINTS OF OPPORTUNITY

Indoor/Home Networking

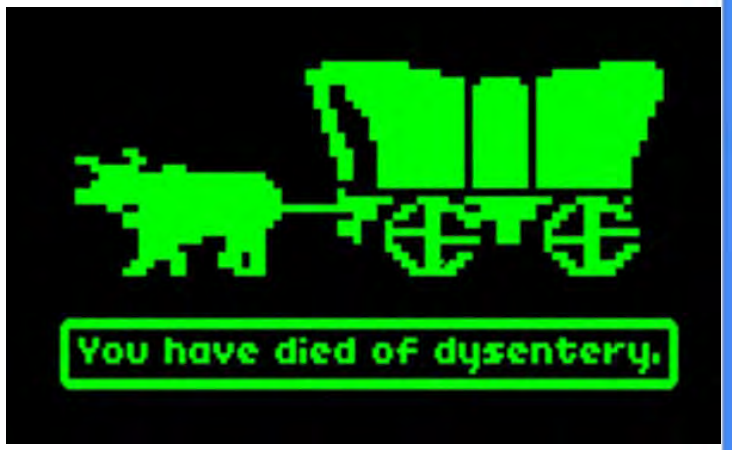
Speaker:

Howard Gorter

EVP, Engineering Operations

Palmetto Engineering & Consulting

Xennial/Oregon Trail Generation



- Born Late 70's/Early 80's
- Remember Land Lines & Pay Phones
- Grew up half Analog, half Digital technology.
- Played Oregon Trail…and died of Dysentery.
- First to do Research papers Online & with a Card Catalog.
- The last to experience youth without social media
  - Or online games…or cell phones
- Last to use Cassette Tapes, First to use Scour/Napster
  - Don't forget CD clubs!

Networking From a Kid’s Perspective

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The Moving On-Premise Target

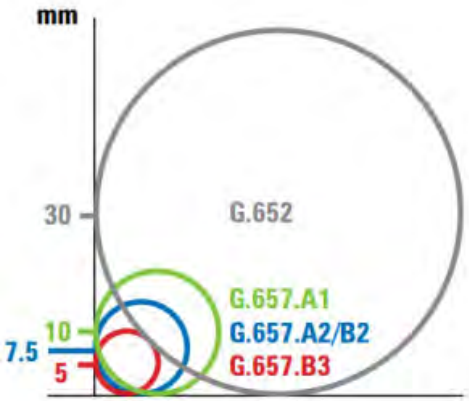
- ONT's coming inside More and More
  - Moving from a basic ONT to a full featured Residential Gateway
  - Moving from Residential Gateway to a Smart Home Center
- Battery Backup may not be as critical, Customer Choice
  - Landline is less critical or may not exist at all
- Flexible Fiber Entrance Options
  - Able to get the Fiber inside much easier
  - Microduct/Pushable Fiber
  - Ultra Bend-Insensitive Fiber

The Indoor Advantage

- No Grounding Problems from the Plant Side
- No Weather Concerns
- Better WiFi Access
  - More Centralized AP placement
  - Better Cloud Access
  - Hub of Access & Services
- RG & Smart Home Features
  - Path to Smart Home Center

Getting Fiber into the Home/MDU

- Pushable Fiber & Microduct
  - Drops or In Building/MDU
- 5-mm Ruggedized Ultra-Bend Insensitive Fiber cables
  - G.657.B.3 – 5mm bend radius or less
- 900um Low Visibility Fiber
  - G.657.B.3 – 2.5mm bend radius
  - Invisible, Thin, Clear, White,
  - Can be painted, caulked, hidden



Family: Staying Connected

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The Future of Carrier Class WiFi

- Manageable as a Service
  - Custom Service Differentiation
- Customer Support Enhanced
  - CSR's have visibility into Wi-Fi Performance
- Mesh AP's & Extenders available for coverage problems
- Device quantity and Congestion will Increase
- New Standards:
  - WiGig – 802.11ad
  - 802.11ax

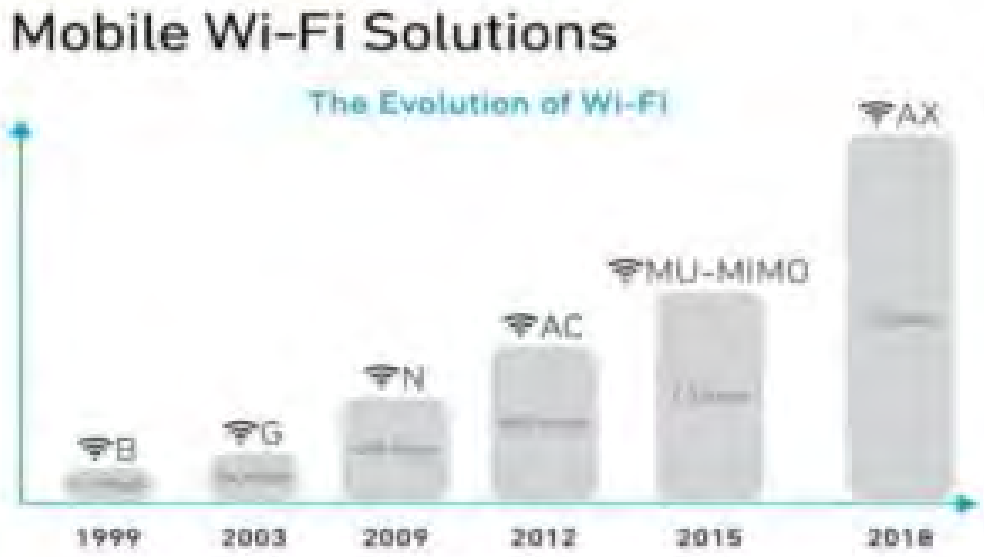
WiGig - 802.11ad

WiGig™ CERTIFIED by Wi-Fi Alliance

- Known/Promoted as WiGig
  - Standardized in December 2012
- 60Ghz band
  - 57-66Ghz – 9Ghz of spectrum!
  - Can achieve up to 8Gb/s speed!
- Uses Beamforming & 8x8 MU-MIMO+
- Range – about 30 feet
  - Generally in the same room
- Cost and Range are limiting Adoption
  - $350-$400+
  - TP-Link Talon & Netgear Nighthawk X10

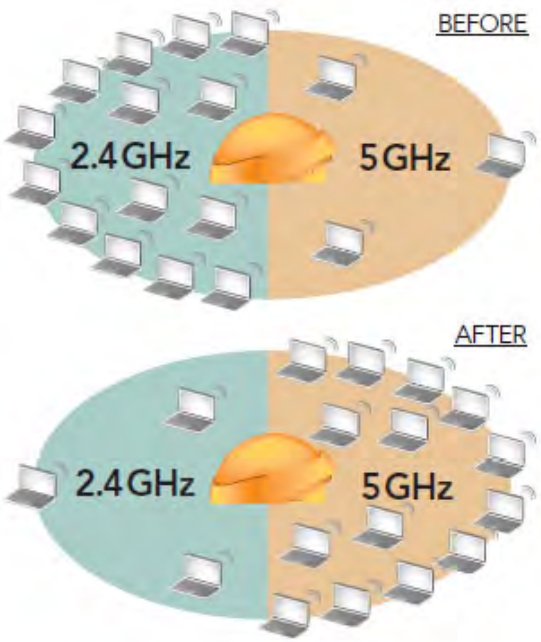
802.11ax

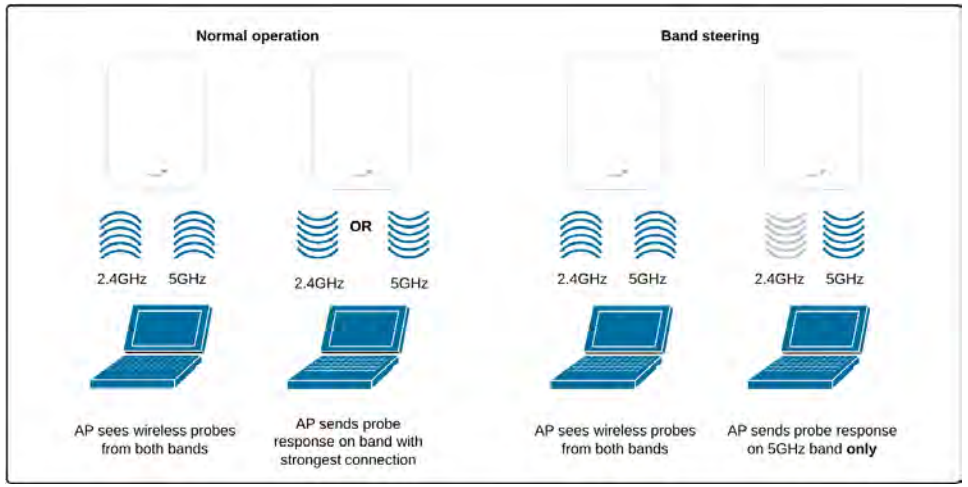
- 6th Gen WiFi Standard
  - Designed for High-Density/IOT Environments
  - Redesigned for Congestion, like LTE
  - Both 2.4 & 5Ghz – 802.11ac is 5Ghz only
- Increased Speed/Channel Capacity
- Full Duplex MU-MIMO
  - 802.11ac is downlink only
- Better Power Usage/Battery Life
- OFDMA – Uplink & Downlink
  - Reduces Congestion
- Final Standard Q1 of 2019



Wi-Fi Band/Client Steering

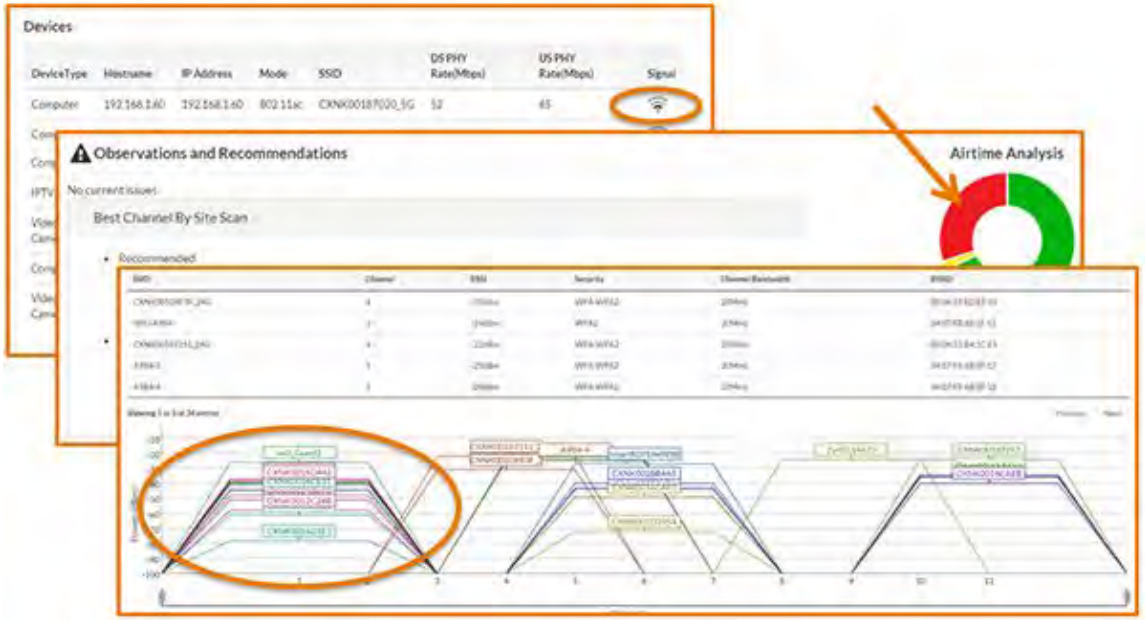
- Not a standard 802.11 feature
  - Steers clients between 2.4/5Ghz bands
  - Steering based on configuration & functionality
- Uses Same SSID on 2.4/5Ghz Bands
  - Also matching security & network settings





Supporting Wi-Fi Connectivity

- Measuring & Monitoring Wi-Fi
  - Tx/Rx Rate
  - Throughput & Connectivity
  - CPU, Memory Utilization
- RF Environment:
  - Client Signal Strength
  - Channel Utilization
  - Noise Floor
  - Co/Adjacent Channel Interferers
- Assisting CSR's with Troubleshooting



Extender/FemtoCells & DAS

- Major Carriers have FemtoCell options:
  - T-Mobile – Cell Spot v2
  - Sprint – Magic Box
  - AT&T – MicroCell
  - Verizon – 4G LTE Network Extender
- DAS – for stadiums & larger office buildings

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The Heart of the Indoor Network

- A managed Access Presence in the home
  - Brings Carrier Class Wi-Fi to the connected home
    - Complements Gigabit connectivity with extraordinary speed / coverage
    - Extends the network throughout the home, brings service to all devices
  - Wi-Fi Lowers cost of rewiring homes
    - Accelerates FTTH and IPTV deployment
    - Manages IOT & Device Proliferation
  - Leverages Software for new revenues and lower support cost
    - Deliver managed in-home services and new applications
    - Leverage remote Wi-Fi monitoring and troubleshooting capabilities
- Creates a strong service provider brand in the home
  - Control and manage the customer experience

Indoor/Home Networking

Questions?

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