XIRRUS®
High Performance
Wireless Networks™

The Changing Role of Wi-Fi in the Enterprise

Paul Kersse
Area Vice President
Xirrus, Inc.

Agenda

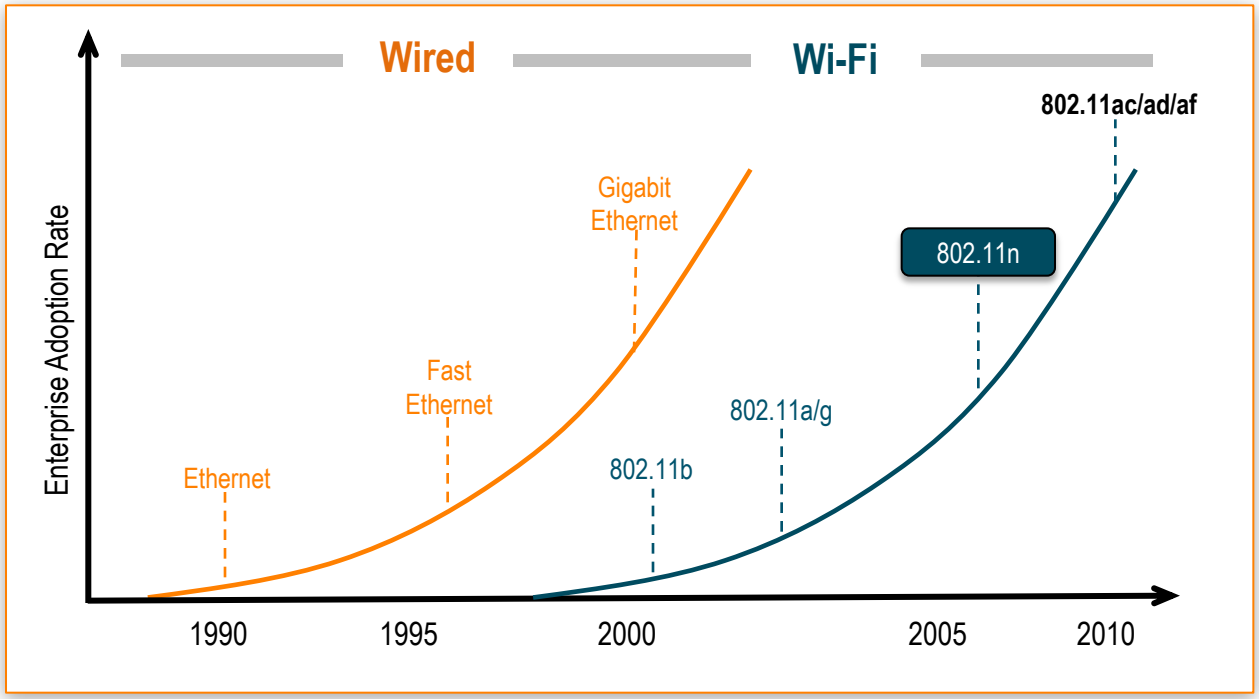
- Introduction – Ethernet market dynamics
- Wi-Fi Basics
- Capacity Planning – Wired vs. Wi-Fi
- The Xirrus Approach
- Things to Consider
- Q&A

Ethernet Market Dynamics

- The ethernet switching market is a $20B worldwide market
- It is 10x the Wi-Fi market
- It is still slightly growing depending on quarter
- Cisco still has over 70% ethernet switching market share
- It is still Cisco's #1 revenue and margin producer
- The #2 share is HP with 10%
- No other vendor has more than 2% market share
- Most of them make Wi-Fi equipment also
- Aruba just launched a LAN access switch
- In 3 years, most devices will NOT have an ethernet port
- We think this is crazy!

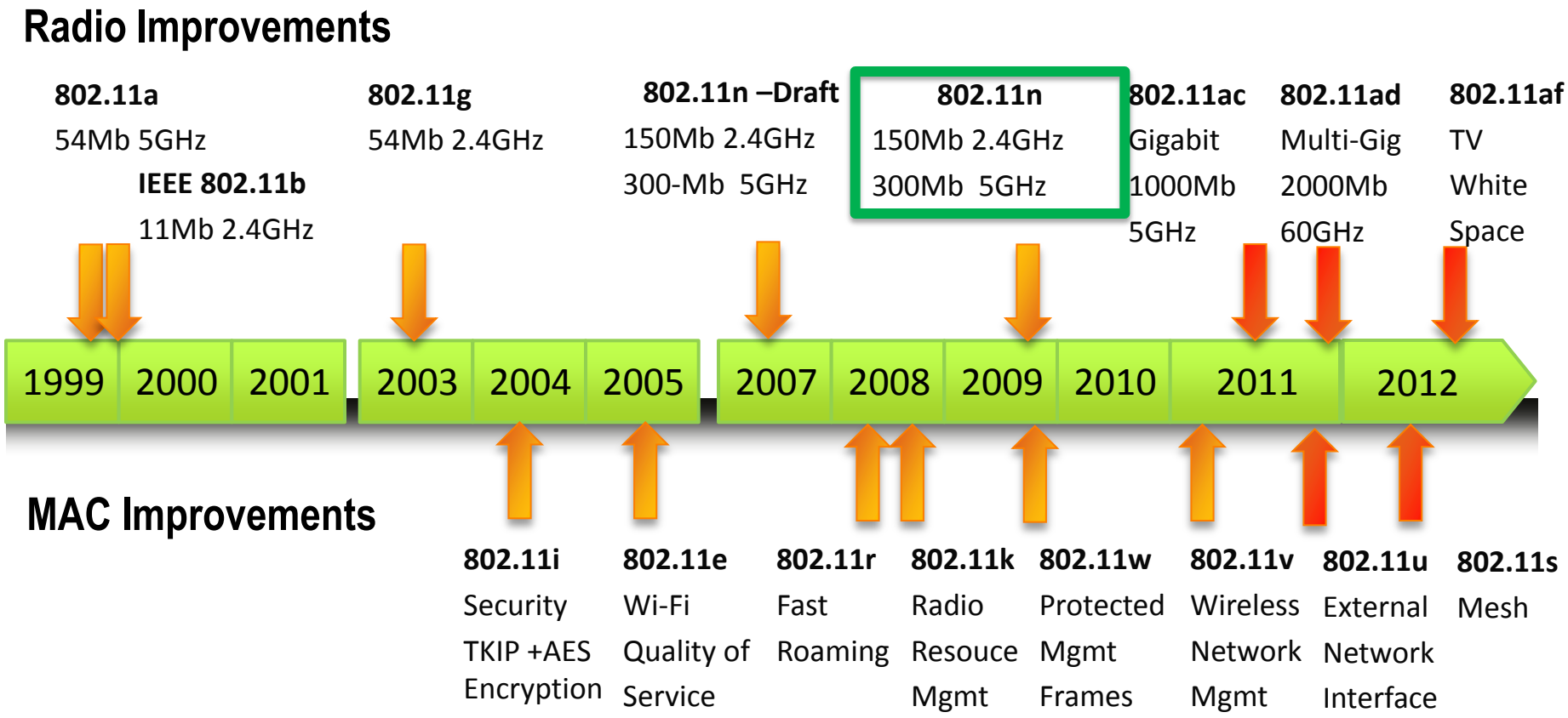
Wi-Fi Basics: The Technology Curve

802.11n effectively put Wi-Fi performance on par with Wired



….then why do we keep buying ethernet switches?

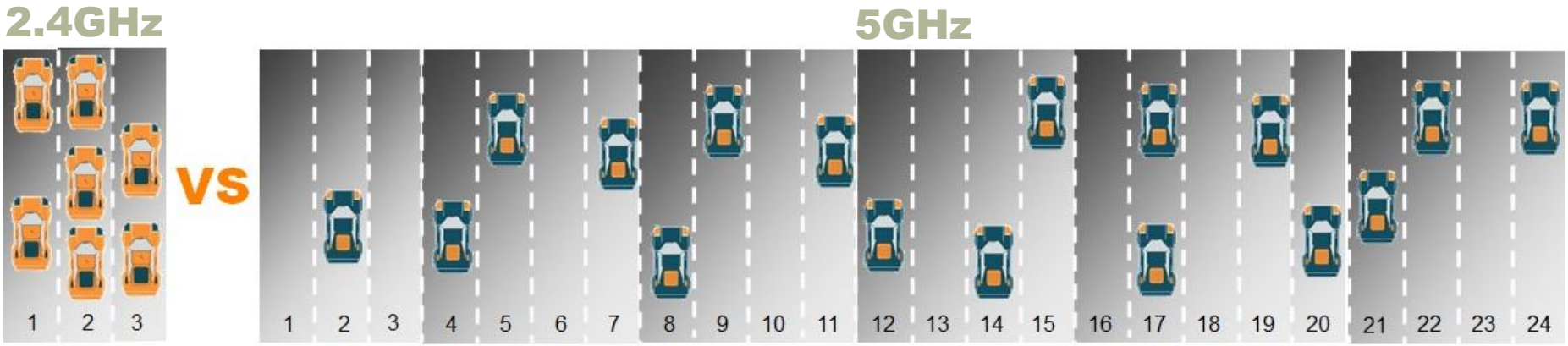
Wi-Fi Basics: Radio – The Building Block



Wi-Fi is about Math – It's not About Marketing

Wi-Fi Basics: Bands & Channels

- **Two frequency bands are used in Wi-Fi**
  - 2.4GHz – used by 802.11b/g/n clients
    - 3 non-overlapping channels
    - Limited bandwidth, prone to interference
  - 5GHz – used by 802.11a/n clients
    - 24 non-overlapping channels (differs by geo region)
    - 8X the bandwidth, Less potential for interference



Wi-Fi Basics: Clients

Traditional Wi-Fi Solutions

- **Thin APs with 2 Fixed State Radios**
  - 1 - 2.4Ghz
  - 1 - 5Ghz
- **Centralized Controller**

Traditional Access Point Evolution

- **1st Generation**
  - Single Radio, omni antenna, independent
  - 2.4GHz channel only, 802.11bg
  - This is most likely in your house and works fine there!

- **2nd Generation**
  - Dual Radios, omni antennas, dependent
  - One 2.4Ghz radio and one 5Ghz radio, 802.11abg
  - Relies on centralized controller

- **3rd Generation**
  - Still dual Radios, omni antennas, dependent
  - Still one each 2.4GHz and 5GHz radios, 802.11abgn

Capacity Planning – a lost art in Wi-Fi

Project Specifications: 150 devices, 20% growth

Wired Design

48 Ports
10/100/1000

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10/100/1000

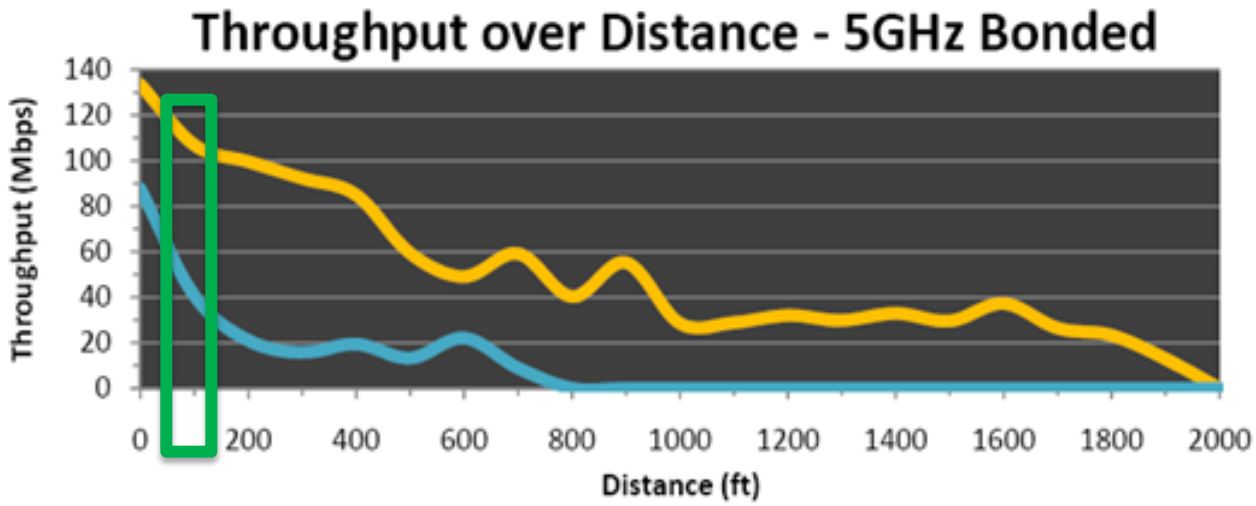
Total Bandwidth = 196,608Mb
192 Ports (150 Used)
1 Device Per Port
1 Gb per Device

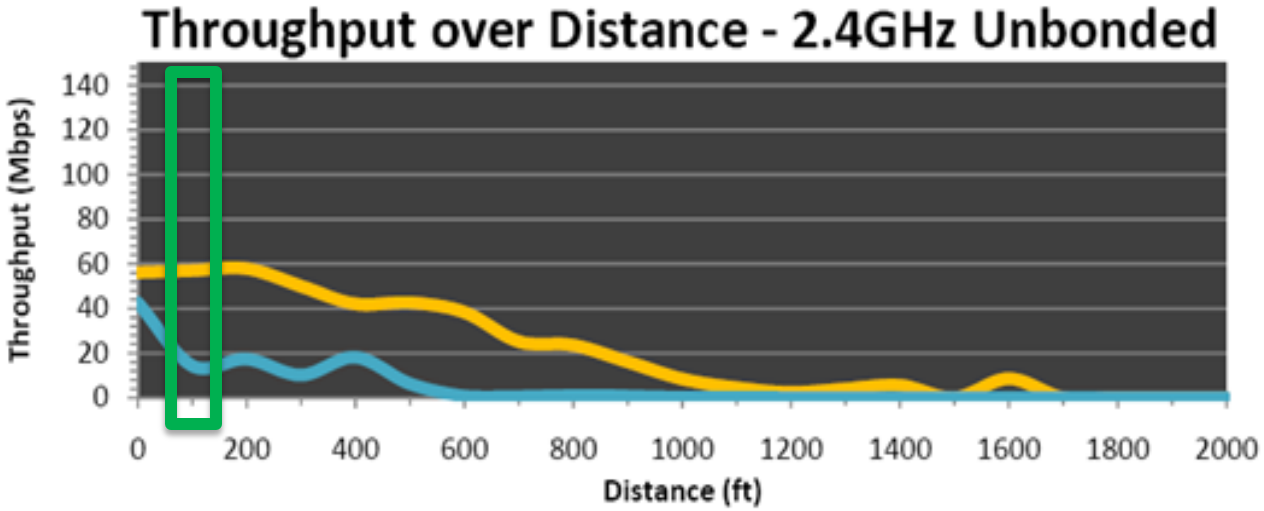
Traditional Wi-Fi Design

1 (2.4GHz)
108 & 112 (5 GHz)

Total Theoretical Bandwidth = 450Mb
2 Radios used
75 Devices Per Radio
3 Mb (theoretical) per Device

Capacity Planning – Actual Throughput per Radio





Capacity Planning – a lost art in Wi-FI

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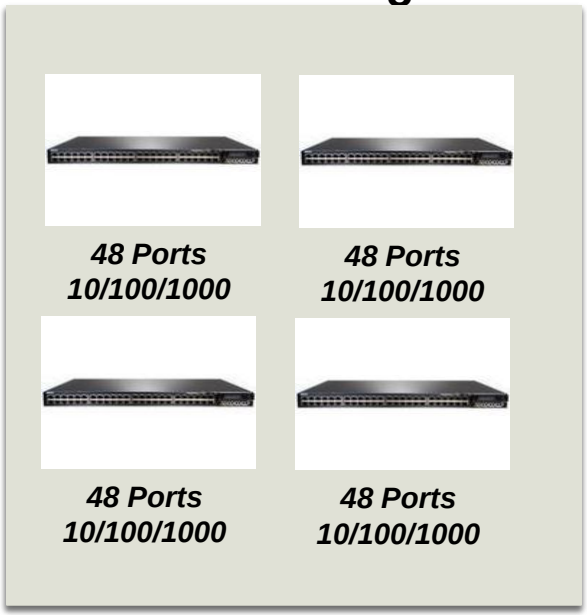
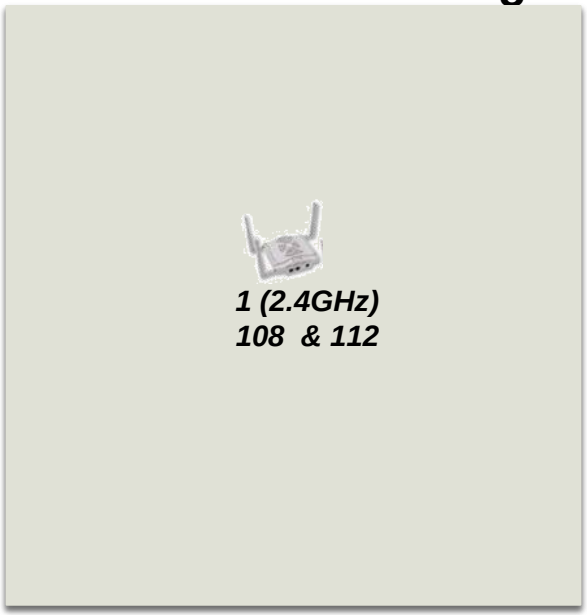
Wired Design



Total Bandwidth = 196,608Mb
192 Ports (150 Used)
1 Device Per Port
1 Gb Per Device

Traditional Wi-Fi Design

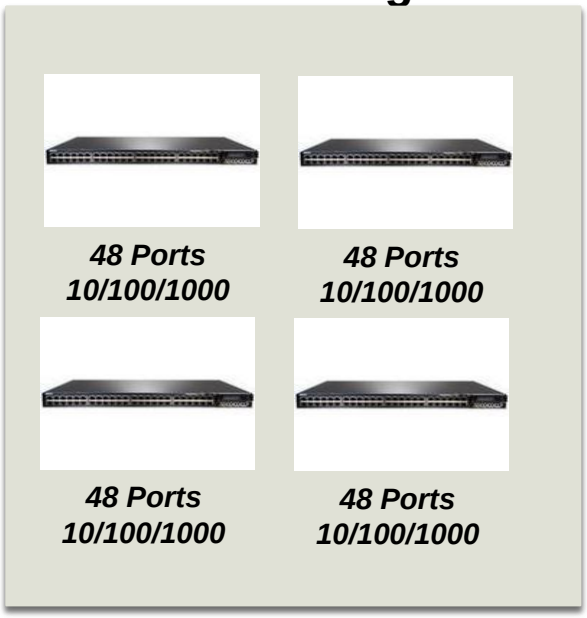


Usable Bandwidth = 60Mb (20Mb + 40Mb)
2 Radios used
75 Devices Per Radio
.4 Mb Per Device

Capacity Planning – a lost art in Wi-FI

Project Specifications: 150 devices, 20% growth

Wired Design



Total Bandwidth = 196,608Mb
192 Ports (150 Used)
1 Device Per Port
1 Gb Per Device

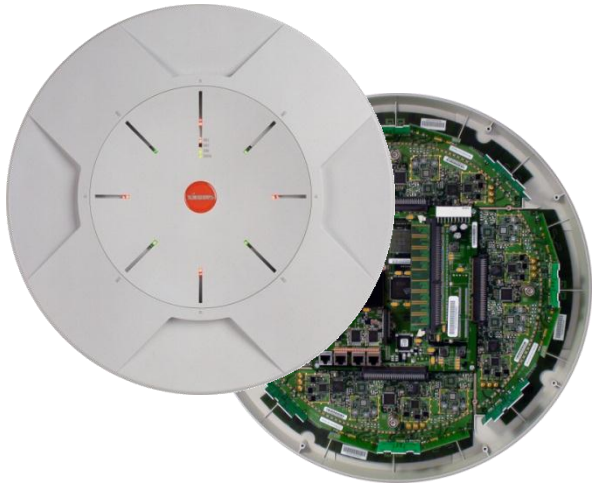
Traditional Wi-Fi Design

Usable Bandwidth = 300Mb (60Mb + 240Mb)
9 Radios used (3 Unused)
17 Devices Per Radio
2 Mb Per Device

Xirrus Presents a New Approach

Access Points

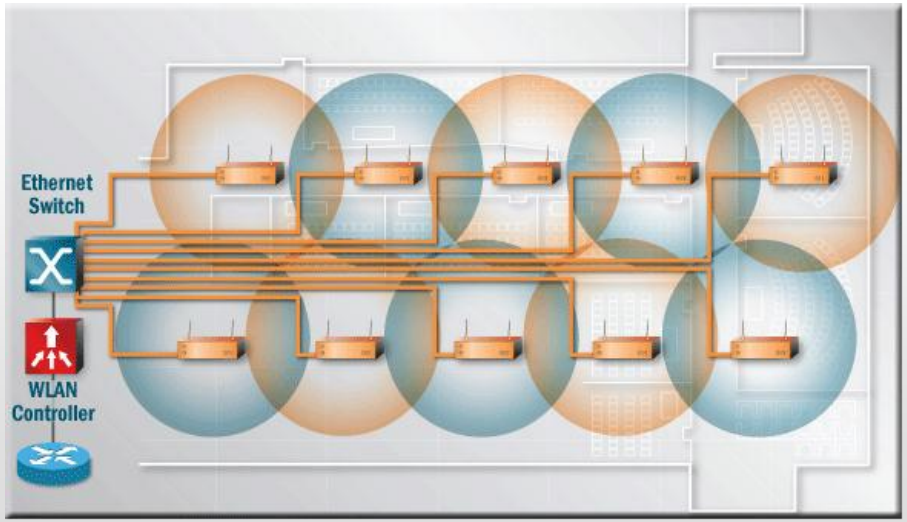
Wi-Fi Array



Arrays Address Capacity and Density Like Cellular

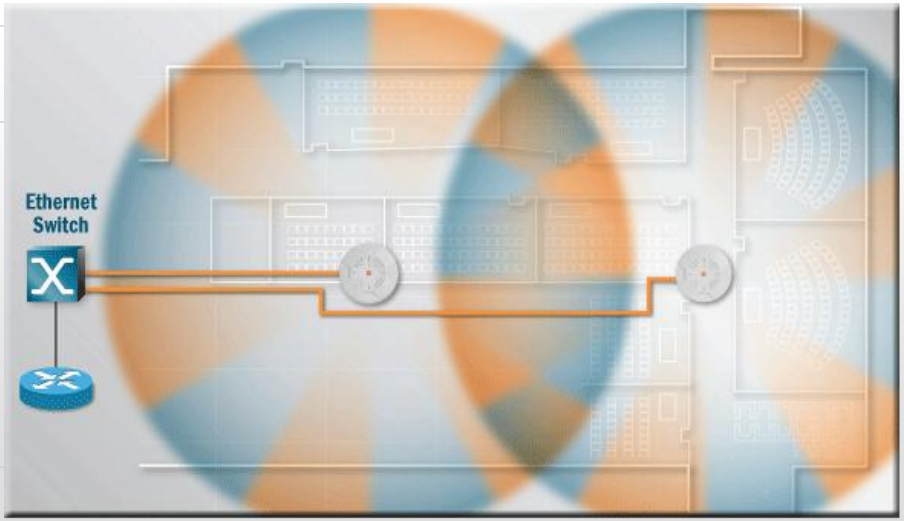
Thin APs + Controller

- Short to medium range
- 1 or 2 radios per cell
- Centralized switching in the core



Multi-Radio Array

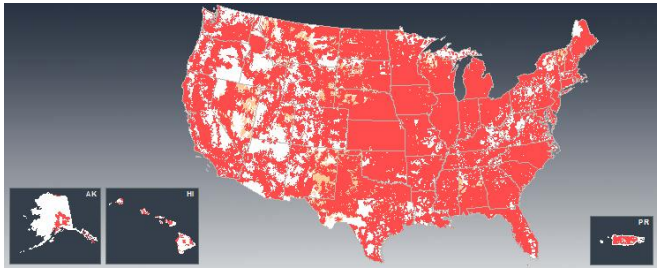
- Longer range
- Many radios per cell
- Distributed switching at the edge



Learning From Cellular Network Evolution

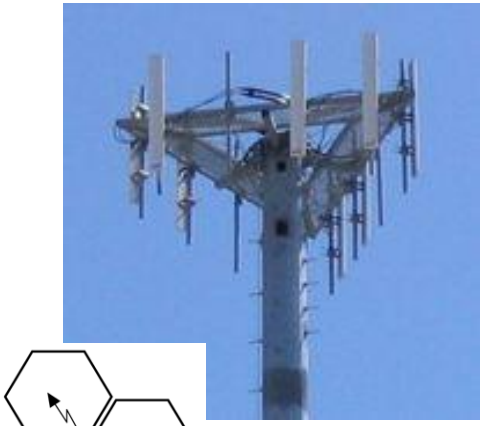
From the first cellular networks of the 1980's to today…

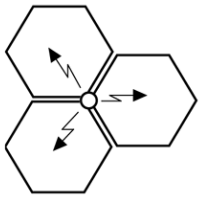
- Coverage expanded significantly
- Capacity increased significantly
- Device densities exploded



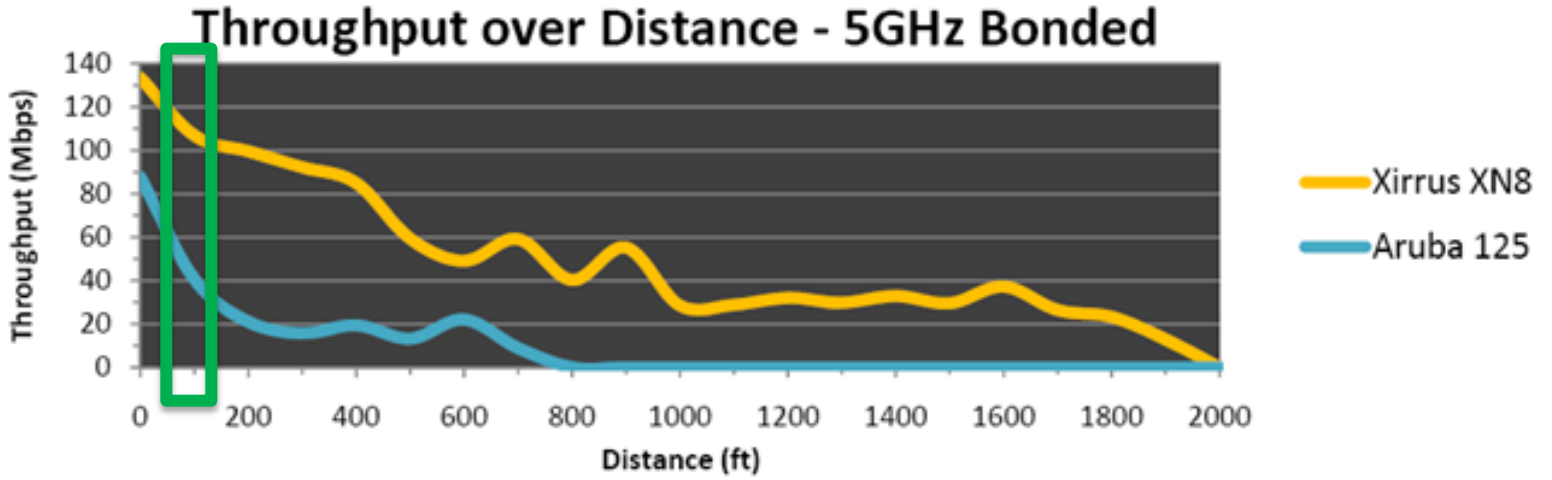
To handle the growth, cellular providers…

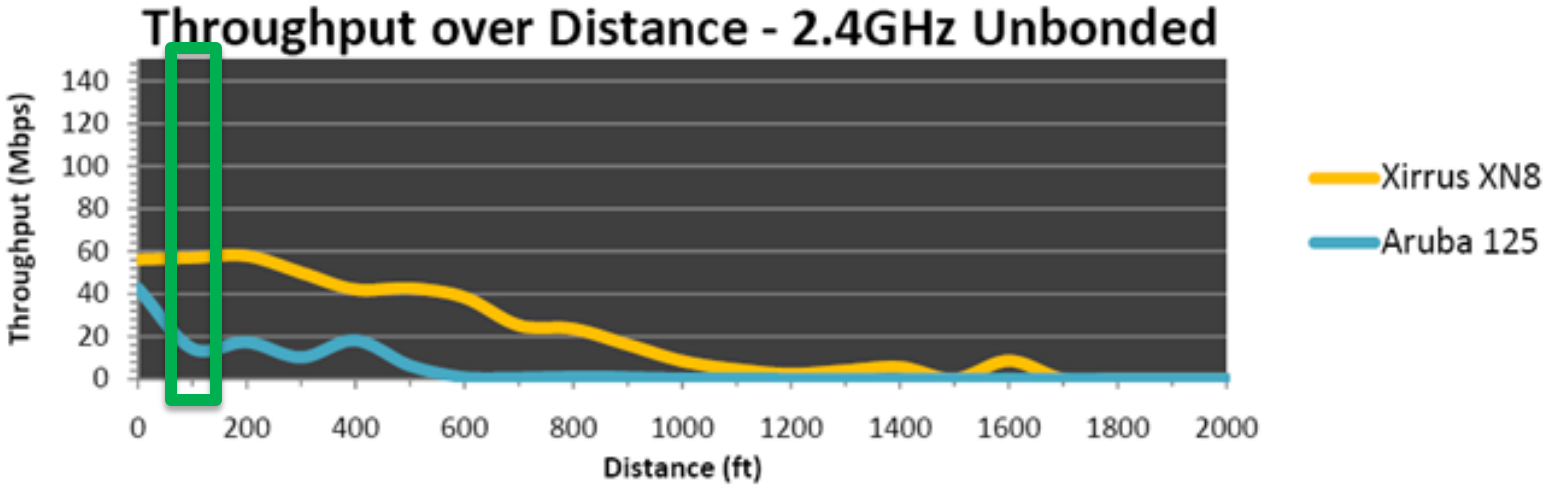
- Increased radios per base station
- Moved from omni to directional antennas
- Utilized additional channels of spectrum





Results - Increased throughput per radio

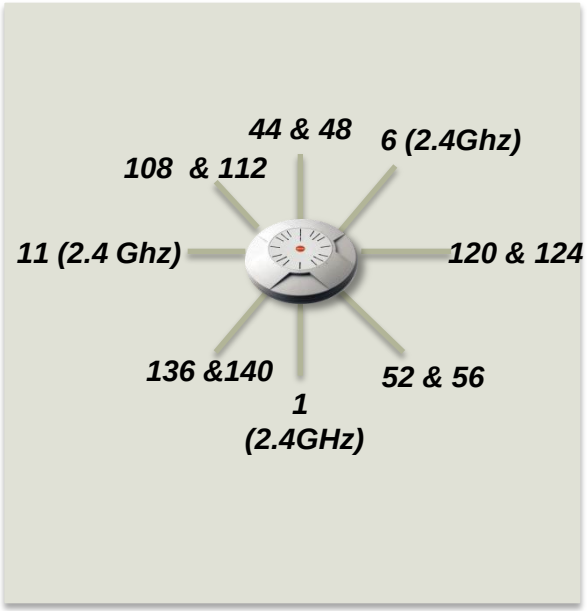




Wi-Fi Capacity Planning with Xirrus

Project Specifications: 150 devices, 20% growth

Xirrus XN8



Usable Bandwidth = 680Mb (180Mb + 500Mb)
8 Radios, all used
19 Devices Per Radio
4.5 Mb Per Device

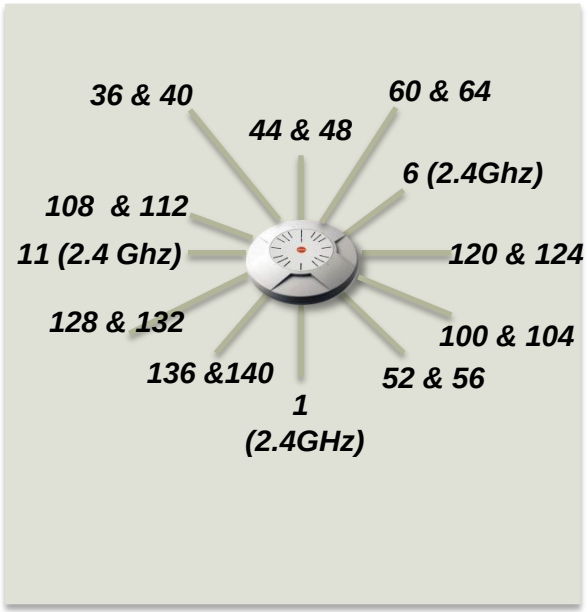
Traditional Wi-Fi Design

Usable Bandwidth = 300Mb (60Mb + 240Mb)
9 Radios used (3 Unused)
17 Devices Per Radio
2 Mb Per Device

Wi-Fi Capacity Planning with Xirrus

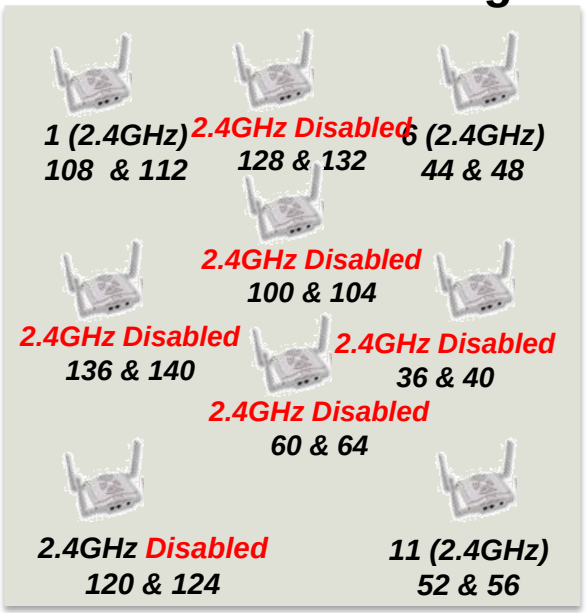
Project Specifications: 150 devices, 20% growth

Xirrus XN12



Usable Bandwidth = 1080Mb (180Mb + 900Mb)
12 Radios, all used
13 Devices Per Radio
7.2 Mb Per Device

Traditional Wi-Fi Design



Usable Bandwidth = 420Mb (60Mb + 360Mb)
12 Radios used (6 Unused)
13 Devices Per Radio
2.8 Mb Per Device

Things to Consider

- With proper planning you can dramatically lower your network spend while enabling a wired like experience for the device explosion
- It used to be “switch where you can, route where you must”
- Xirrus says “Wi-Fi where you can, wire only where you must”

Q&A

IT Roadmap CONFERENCE & EXPO
An IDG Enterprise Event

Thank you!

Paul Kersse

Area Vice President

Xirrus, Inc.

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