



High Performance Wireless Networks

HIGH DENSITY WIRELESS

DECEMBER 6, 2012



AGENDA

- **Wi-Fi Today**
- **Evolution of Wi-Fi**
- **Planning for Density and Performance**
- **Xirrus XR - First Modular Wireless Switch**

WIRELESS HAS REACHED CRITICAL MASS

- “ Without Proper Planning, Enterprises Deploying iPads Will Need 300% More Wi-Fi ”
- “ By 2015, 80% of newly installed wireless networks will be obsolete because of a lack of proper planning ”

Gartner[®]

EXPLOSIVE SET OF MARKET DRIVERS



Kindle Fire

Full Color 7" Multi-touch Display, Wi-Fi

\$199.00 Free Super Saver Shipping [Details](#)



Mobile data traffic 92%
CAGR, 2010 to 2015



500,000 "apps"



**Pricing
& Tariffs**



**Device
Counts**



**Content
Ecosystems**



**Mobile
Data**

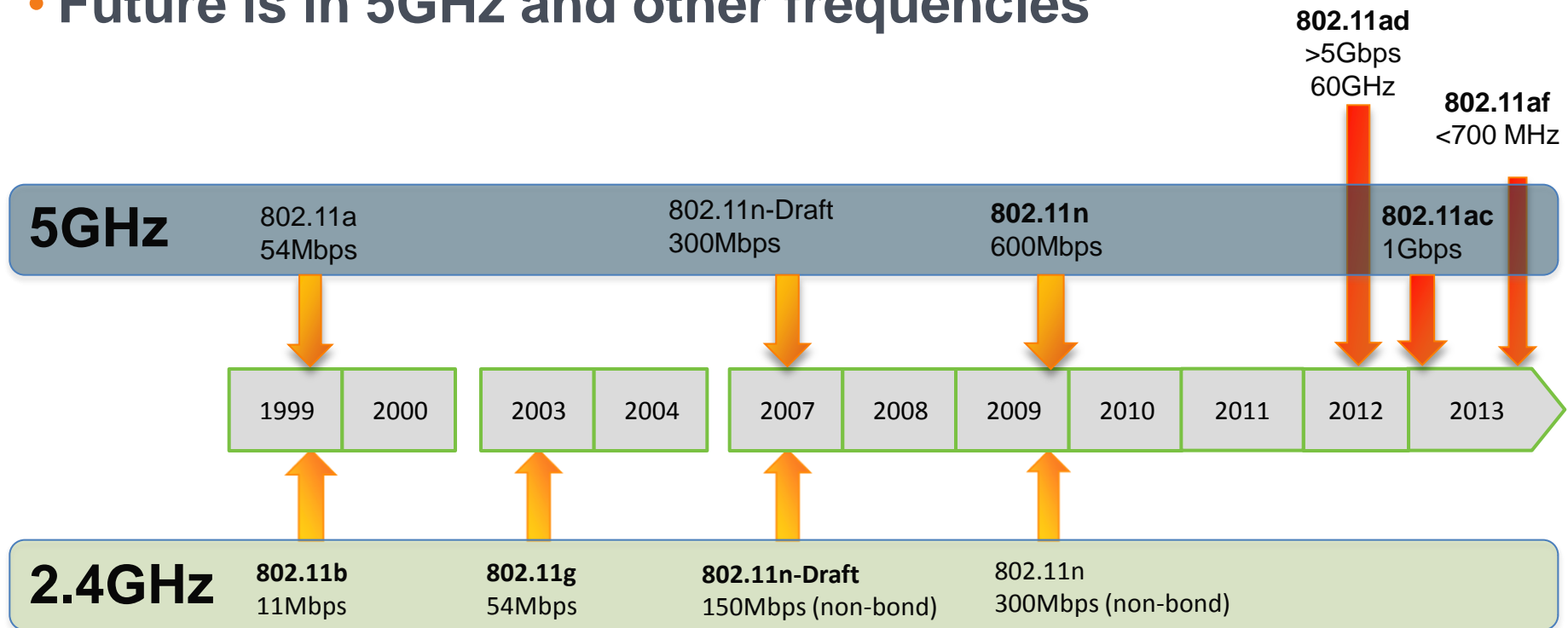
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802.11 (WI-FI) STANDARD EVOLUTION

- 2.4GHz is reaching end of the line for performance
- Future is in 5GHz and other frequencies



WI-FI CLIENT EVOLUTION

2.4Ghz Only



5Ghz Capable



Wireless Device Capability

Different devices operate distinct from each other on wireless

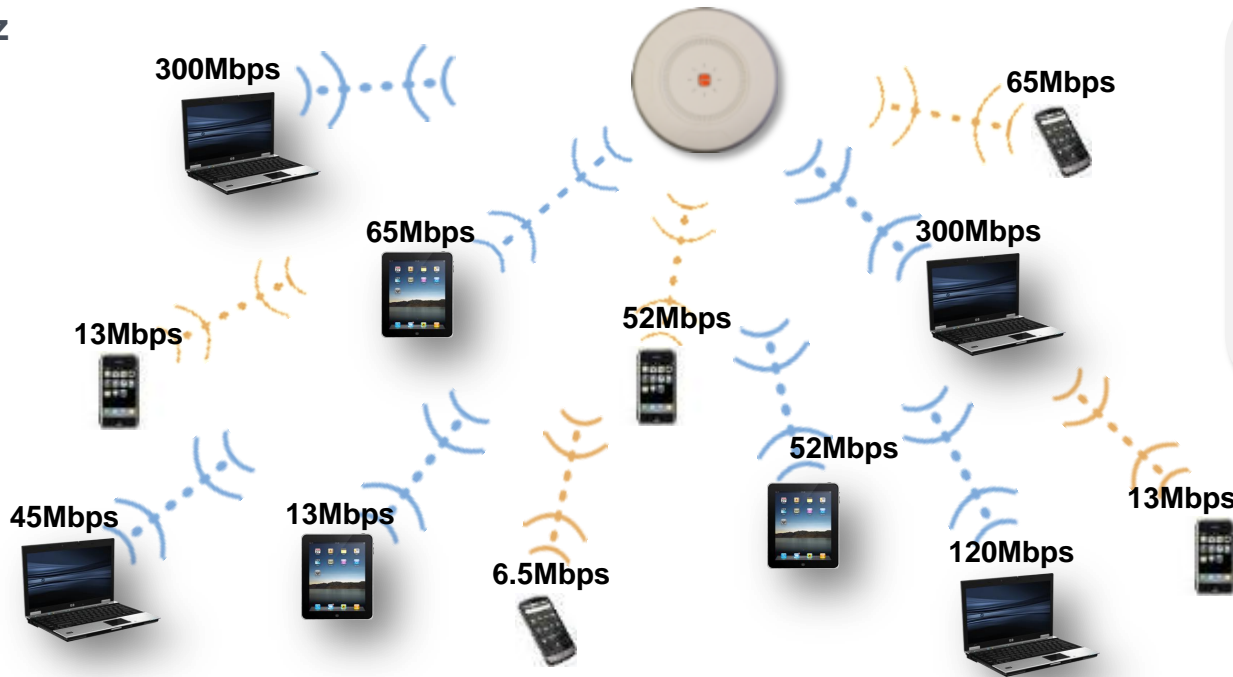
Device	2.4GHz	5GHz	Max Rate	Survey Criteria
POS scanner	X	X	54Mbps	Varies
Location tags	X		NA	> -60dBm
Media Players (iPod Touch)	X		65Mbps	> -65dBm
Smartphones (iPhone)	X	Few	65Mbps	> -65dBm
Tablets – low end (Kindle)	X		65Mbps	> -65dBm
Tablets – mid/high end (iPad)	X	X	65Mbps	> -65dBm
Netbooks	X	Some	300Mbps	> -70dBm
Laptops	X	X	300Mbps	> -70dBm



Wi-Fi Client Capacity- *Reality*

■ = 2.4GHz

■ = 5GHz



■ = 2.4G and 5G = 300Mbps Max

■ = 2.4G and 5G = 65Mbps Max

■ = 2.4G only = 65Mbps Max

In a Wi-Fi network, the user data rates varies with distance, device type, Wi-Fi band, and interference

AGENDA

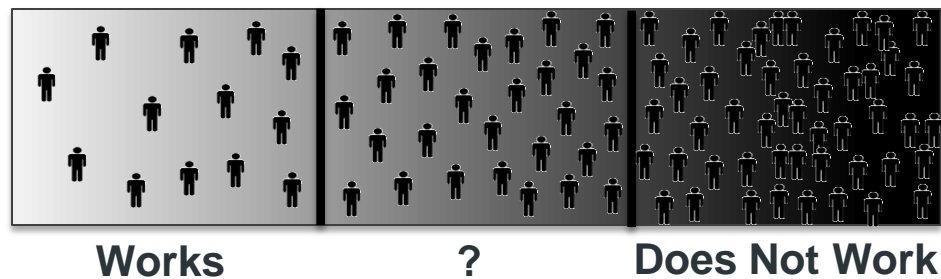
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DENSITY'S IMPACT ON PERFORMANCE

What happens if you do nothing?

- As device density and traffic goes up, so will complaints
- Wireless networks that ran fine all of a sudden do not work

As Density/Usage Increases...



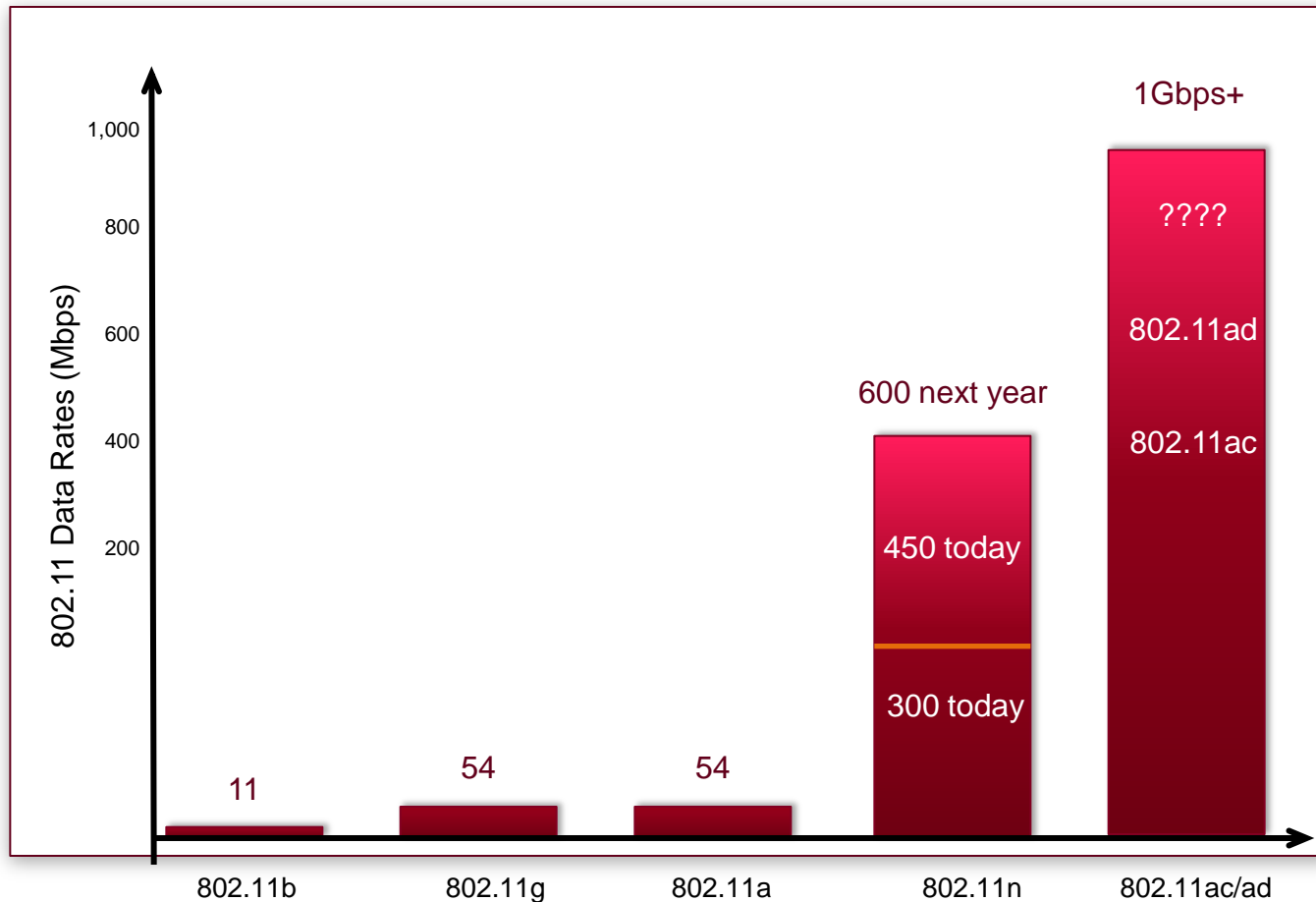
The Network Deteriorates

SOLUTION: DESIGN FOR GROWTH

- Networks must provide **Ubiquitous coverage**
 - Spotty/hot spot coverage insufficient
- **Signal strength (RSSI) must be designed for tablets and smartphones**
 - -67dBm minimum
- **Full coverage for both Wi-Fi bands**
 - 2.4GHz as LCD
 - 5GHz for most tablets & BEST performance

SOLUTION: PLAN FOR PERFORMANCE

Wireless Performance is on par with wired



SOLUTION: SMART USE OF BANDS & CHANNELS

Two frequency bands used in Wi-Fi (**22 channels**)

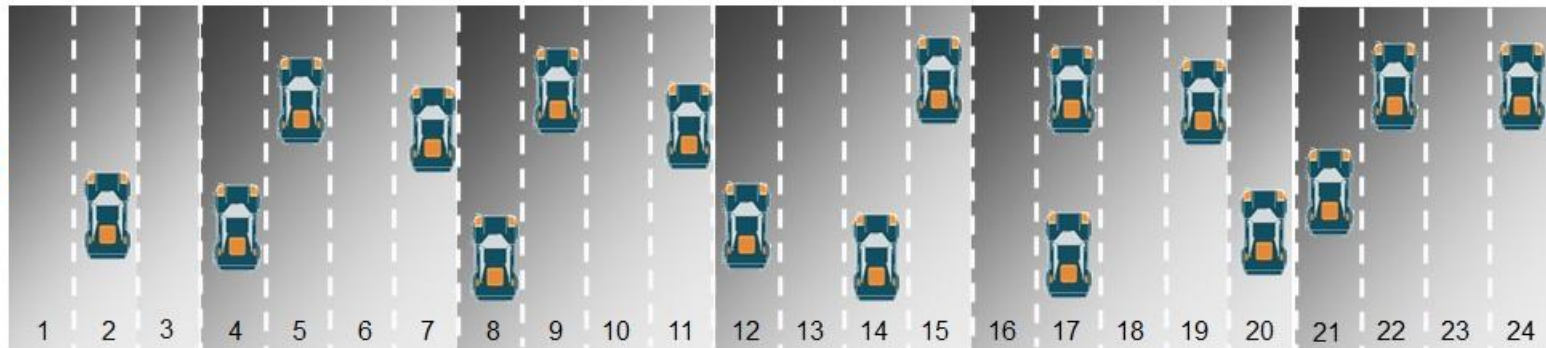
- **2.4GHz** – used by 802.11b/g/n clients
 - **3** non-overlapping channels
 - Limited bandwidth, prone to interference
- **5GHz** – used by 802.11a/n clients
 - **19** non-overlapping channels (differs by geo region)
 - 6X the bandwidth, Less potential for interference

2.4GH



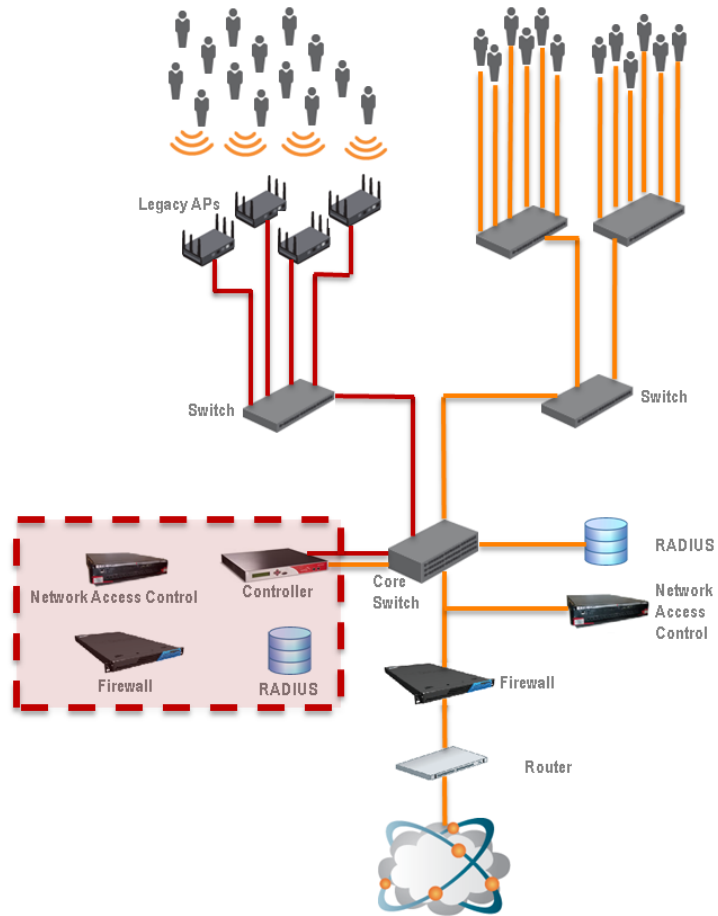
vs

5GHz

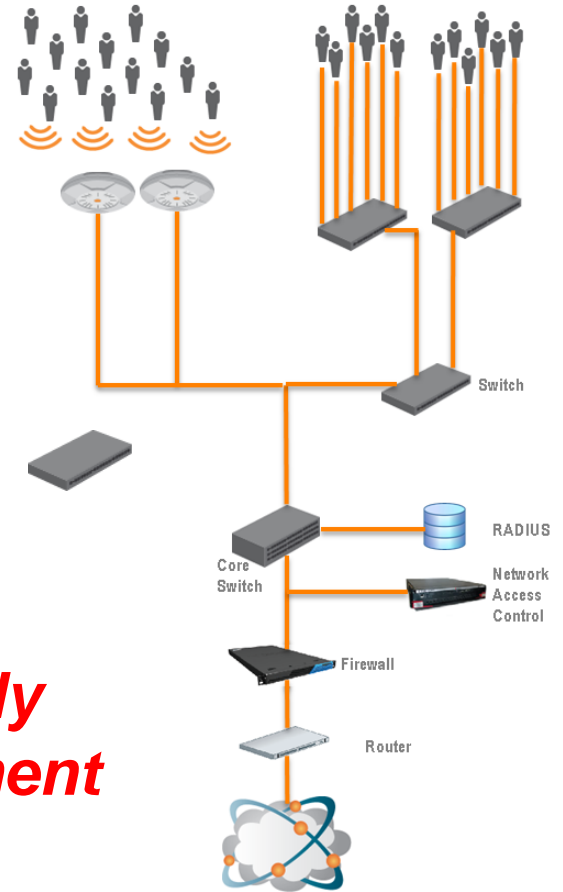


SOLUTION: ARCHITECT FOR PERFORMANCE

Legacy Wireless Network



Modern Wireless Network



**Both
Centrally
Management**

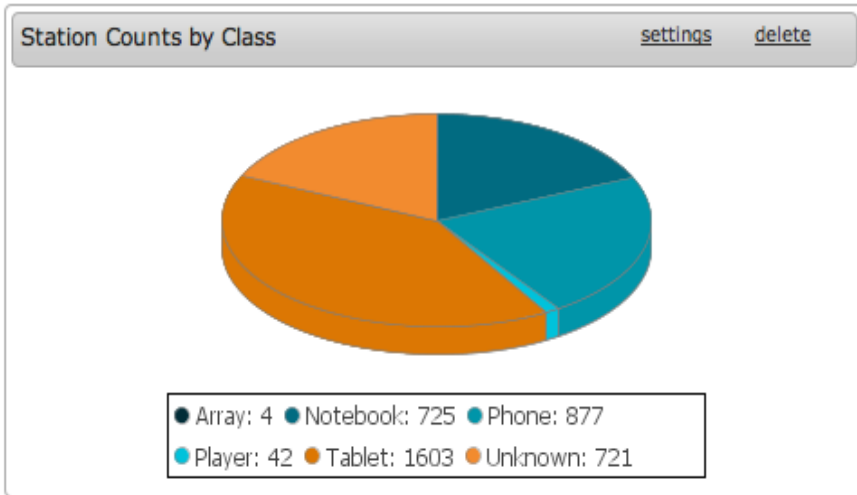
SOLUTION: SELECT CLIENTS FOR PERFORMANCE

- Clients - The Weakest Link
 - **Client types bring even best network to it's knees**
 - *11n alone does not = high performance*
 - *5Ghz more important than 11n*
 - **Product Capabilities are the key**
 - *Understand 2.4Ghz vs. 5Ghz*
 - *Will always be a mix of clients*
 - *Separate high and low speed clients*
 - *Move all dual band clients to 5Ghz*
 - *Higher performance for 5GHz clients*
 - *Higher Performance for 2.4Ghz clients*



SOLUTION: DEVICE CLASSIFICATION

- Identify station type and class, e.g. tablet, phone, Blackberry, iPad, etc.



Station Counts by Manufacturer [settings](#) [delete](#)

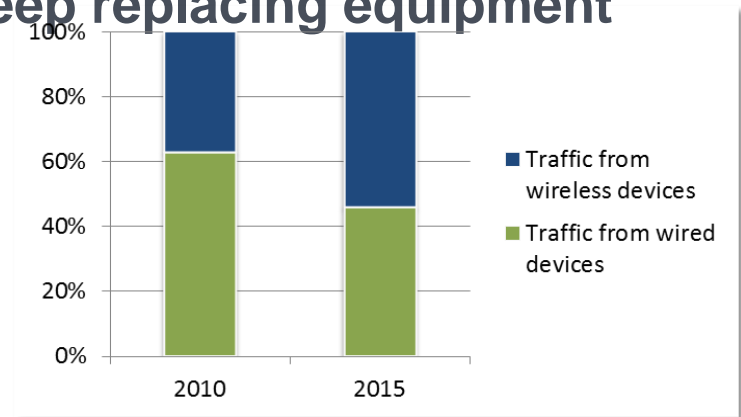
Apple	2963
Intel	297
Unknown	174
RIM	147
HTC	93
Samsung	88
Hon Hai	75
Motorola Mobility	38
Liteon	24
In Motion	18

																				Total Stations: 101	
Select	MAC Address	IP Address	User Name	Hostname	Manufacturer	Device Type	Device Class	SSID	Group	VLAN	QOS	IAP	Band	Ch	TX Rate	RX Rate	RSSI	SNR	Silence	Last Alarm	Time D:H:M
<input type="checkbox"/>	00:24:d7:77:0d:74	10.100.23.135		BCyr-test1	Intel	Windows	Notebook	xirus-xr3x3			2	iap4	5GHz	44+48	135.0Mbps	405.0Mbps	-40	51	-91		0:07:10
<input type="checkbox"/>	e8:3e:b6:f6:a9:8f	10.100.23.76			RIM	BlackBerry		xirus-xr3x3			2	iap2	5GHz	36+40	65.0Mbps	65.0Mbps	-38	54	-92		1:14:10

SOLUTION: UPGRADABILITY

- **Wireless traffic will continue to explode, need a solution that is not fixed and prone to obsolesce.**
- **In that time, the next Wi-Fi standards will emerge**
 - 802.11ac 5GHz
 - 802.11ad 60GHz
 - 802.11af 700MHz (white spaces)
- **A flexible solution is essential to not keep replacing equipment**
- **Keys to support future growth**
 - 5+ years operation
 - Modular, upgradeable hardware
 - Software upgradeable functionality

← No 2.4GHz!



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- **Xirrus XR - First Modular Wireless Switch**

XIRRUS = PERFORMANCE WIRELESS



Traditional wireless network **deployments are failing** in the face of an onslaught of devices and application usage



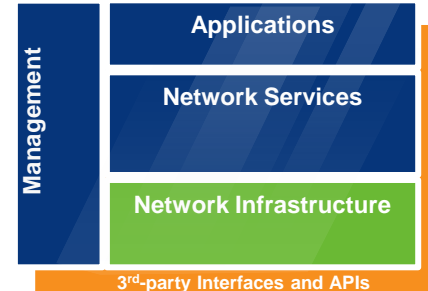
Xirrus has a **unique** platform and architectural advantage



The XR Wireless Array is an **industry first**: a truly modular wireless switch

THE XR WIRELESS ARRAY

Industry's Only Modular Wireless Switch



1. Multiple radios (2 to 16 per Array) →
2. Directional Antennas →
3. Integrated Controller →
4. Modular Chassis-based Design →



75% Less Equipment
Cable pulls
Switch ports

XR KEY DIFFERENTIATORS



**Fully
Upgradable**

Modular AP upgradeable

Multi-state APs (2.4G/5G)

Common components

802.11ac/11ad ready



**Highest
Performance**

Greatest Device **Density**

- 500+ devices per Array

Highest **Capacity**

- Multi-gigabit capacity

Broadest **Coverage**

- 4X coverage



**Lowest
TCO**

Less **equipment**

Fewer **cables/switches**

No **controller**

Lower **maintenance**

Complete line of products from 2 to 16 modular APs

XIRRUS : THE DIFFERENCE

Traditional

2 Radio APs

Fixed Radios

Short Product lifespan

Centralized Controllers

Fixed performance



NEW

Modular wireless chassis

**Multi-state Radios
(2.4G/5G)**

**Upgradable and
expandable**

Distributed Intelligence

Cognitive load handling



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- **QA**
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Thank You

*Hans Van Damme
Xirrus, PreSales Manager Benelux
Hans.vandamme@Xirrus.Com*