

# Let's Get Real About Wi-Fi Performance

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IT Professional Wi-Fi Trek 2016



# WHAT WE SEE



2016 • NEW ORLEANS

WIFI  
TREK

cwnp))  
Certitrek  
GROUP

# over 2 Gbps

To enable optimal user experience, the ZoneFlex R710 delivers up to 5dB of signal gain and aggregate data rates of over two gigabits per second (Gbps), 1,733 Mbps (@ 5 GHz) and 800 Mbps (@ 2.4 GHz).



aggregate peak data rate of  
**2.5 Gbps**

**aruba**<sup>®</sup>

NETWORKS  
an HP company

- Dual Radio 802.11ac access point with Multi-User MIMO
  - Supports up to 1,733 Mbps in the 5 GHz band (with 4SS/VHT80 or 2SS/VHT160 clients) and up to 800 Mbps in the 2.4 GHz band (with 4SS/VHT40 clients)



# 5.2 Gbps!



**Dual 5-GHz  
radio  
support**

Enables both radios to operate in 5-GHz client serving mode, allowing an industry-leading 5.2 Gbps (2 x 2.6 Gbps) over-the-air speed while increasing client capacity.



**CISCO**™



# 2.6 Gbps

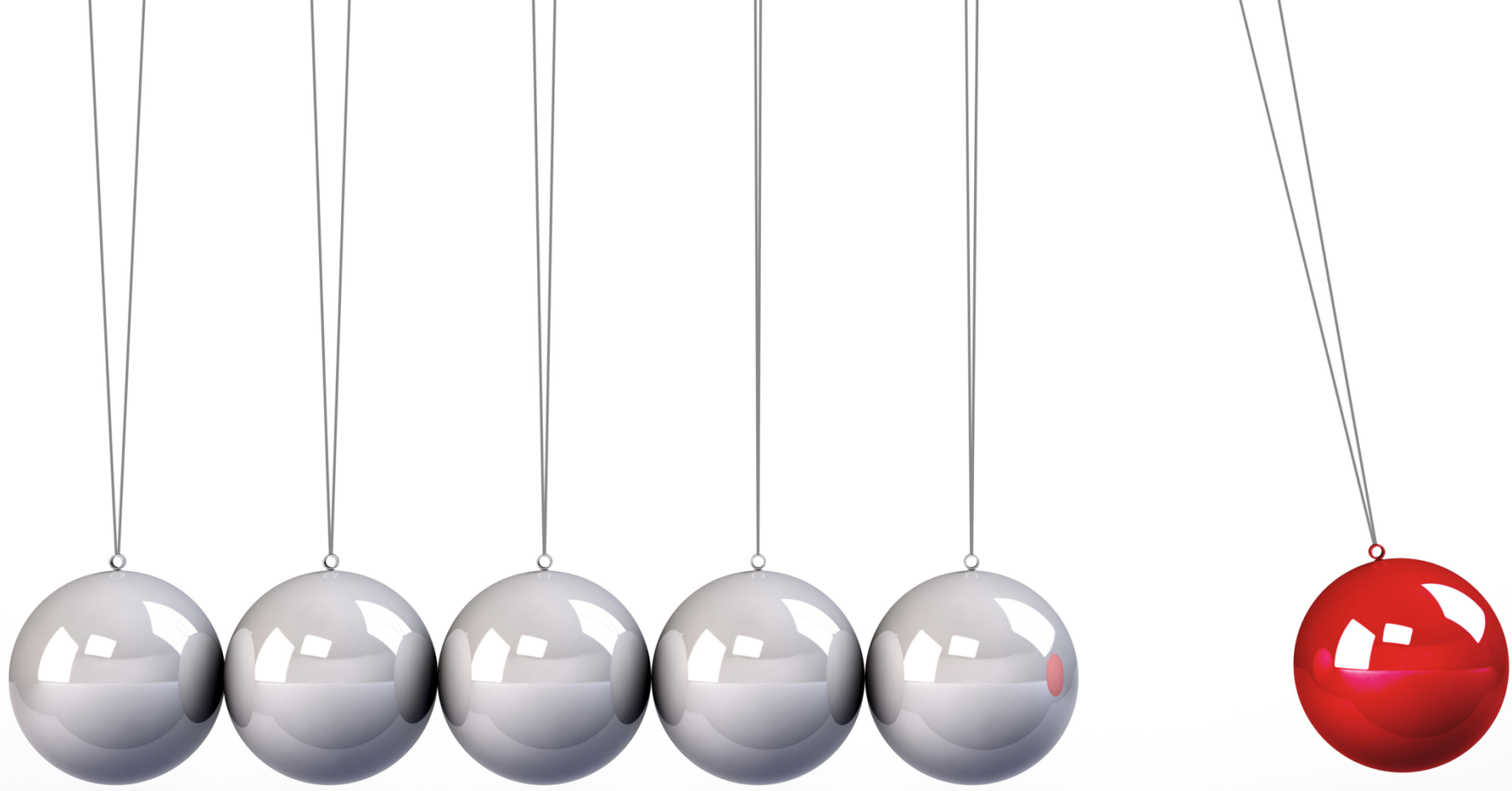
data rates



Two 3x3:3 radios; software selectable  
2.4 GHz/5 GHz and 5 GHz for 2.6 Gbps  
data rates







# The Physics of 802.11



WHAT

makes .ac go faster?

Wider Channels

More Spatial Streams

256 QAM

MU-MIMO

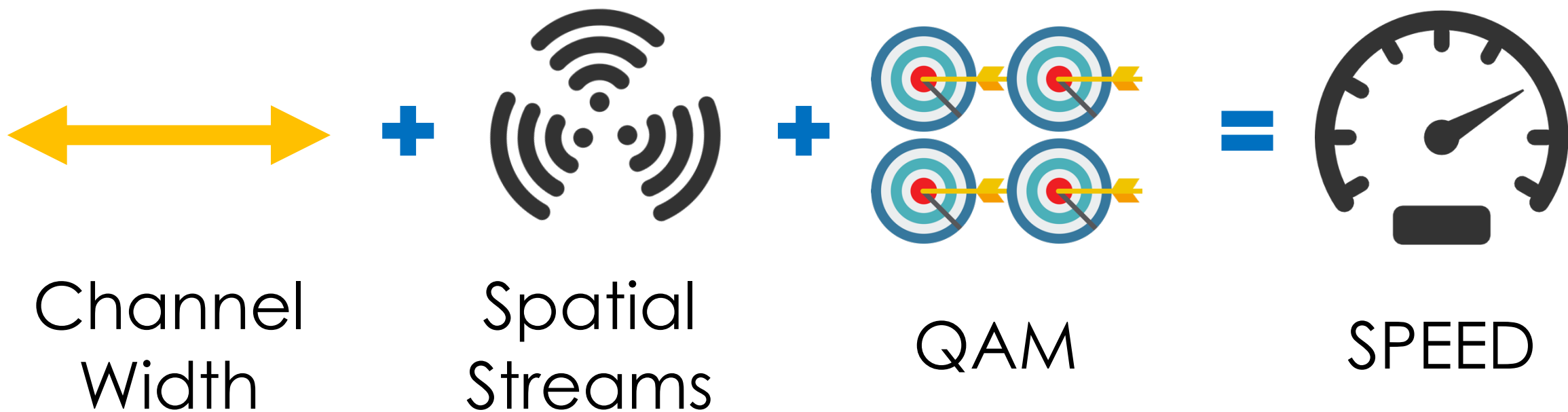
The Fantastic

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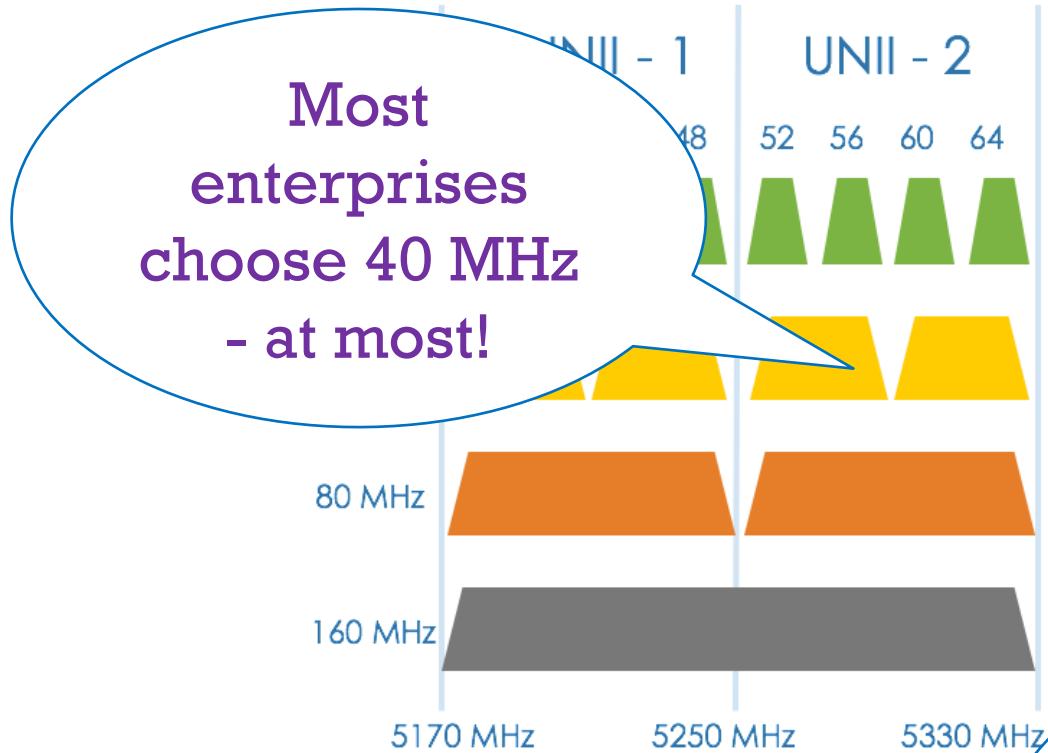
WIFI  
TREK

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# So What Throughput Can I Get?



# Available Spectrum



# Clients

clients.mikealbano.com

THE LIST HOW TO CONTRIBUTE RANDOMIZER

Click a device to download

Device/Chipset

There are fewer than a dozen MU-MIMO capable clients

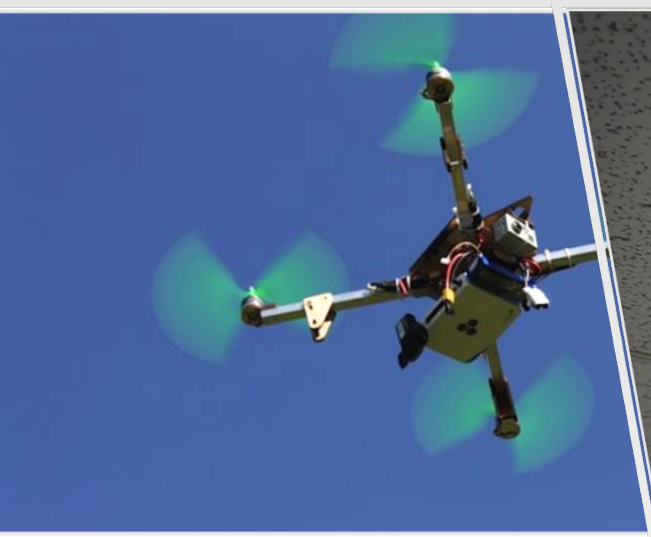
MU-MIMO

1 - 92 /

Device	100	104	108	112	116	120	124	128	132	136	140	144	149	153	157	161	165	SS	.11	MU	Max Tx	.11w
Amazon Echo	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	2	n		11	N
Amazon Fire Phone	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y			Y	1	ac		30	N
Amazon Fire TV	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				Y	Y	2	ac		7	N
Amazon Kindle Fire HD	Gen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1	n		13	N
Apple TV 3rd Gen	US	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y					
Centrino7260AC	EU	Windows	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	2	ac		15	N
Chromebook - Acer C7	US	C710-2847	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	2	n		20	N
Chromebook - Lenovo 11e	US		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	2	ac		22	N
Chromecast 2	US		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	1	ac		20	N

There are ZERO 4 spatial stream clients

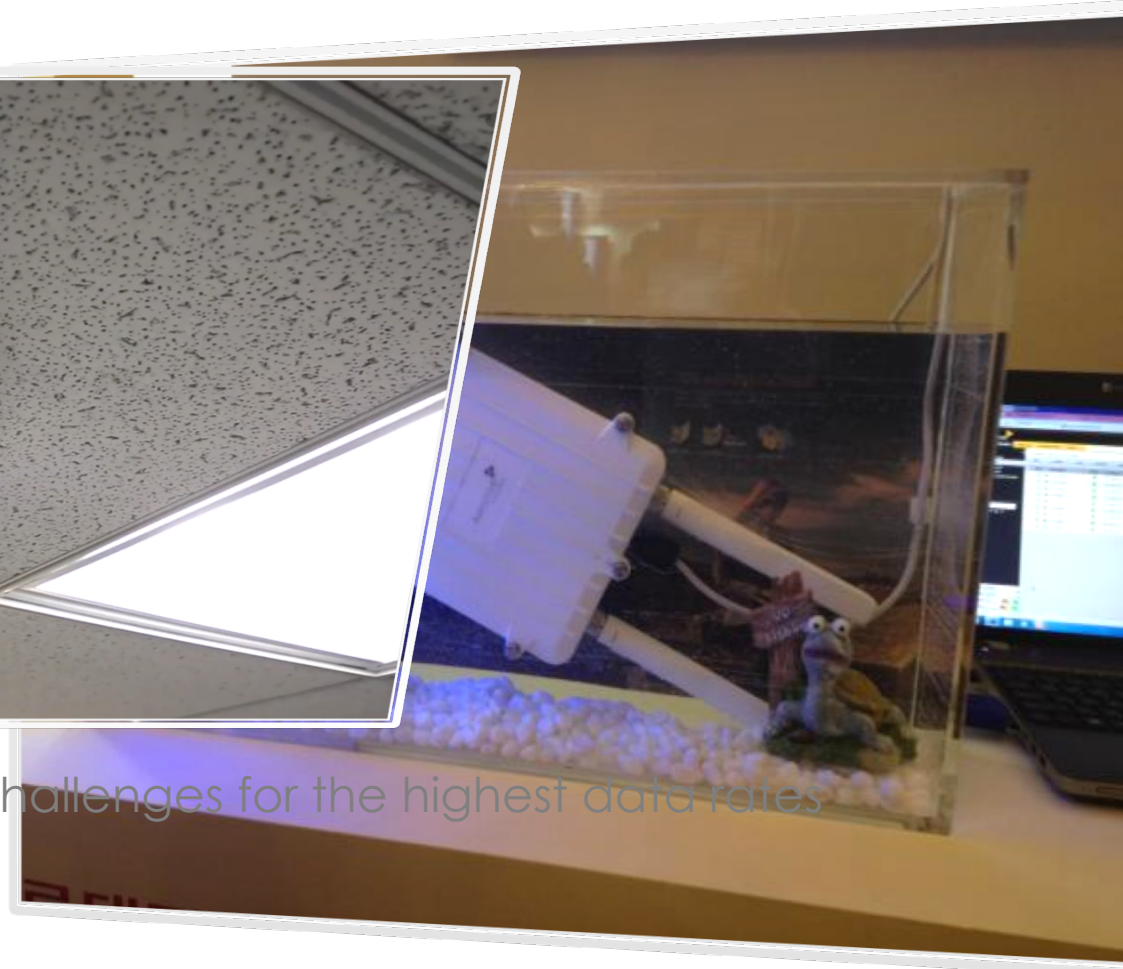
# Where is the AP Deployed?



In the Air?



Even a standard ceiling deployment can present challenges for the highest data rates



Walls?  
Antenna Type?  
Number of Users?

Underwater?!?



**REALITY**

<http://bit.ly/WiFiTrek-MU-MIMO>

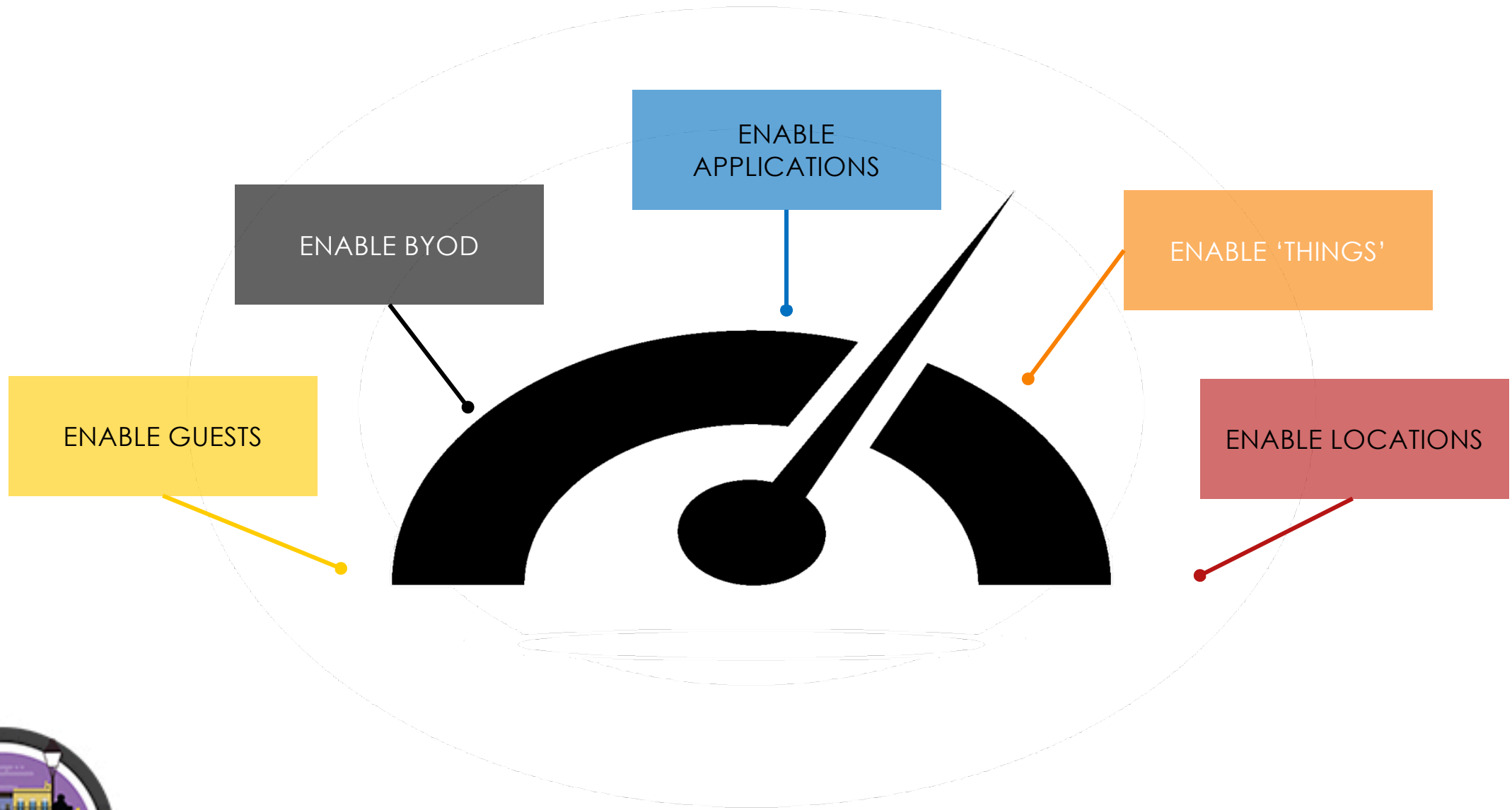
“  
*Independent*  
Speed Tests”



A close-up photograph of the front of a red sports car. The image shows the headlights on either side, the top of the front grille with its vertical slats, and the top of the front bumper with its horizontal slats. The car's paint is a vibrant red. A dark purple horizontal band is overlaid across the center of the image, containing the text.

Performance:  
More than a Number





# What comes next?

- 802.11ax: Standard being developed for high density deployments (both AP & client)
- Goal: increase throughput by 4x
  - Efficiency gains, not speed gains
  - Target is average per-station throughput, not total network throughput
- Overlay on older 2.4 GHz and 5 GHz PHYs (802.11a/b/g/n/ac) – compatible with older technology
  - Experimental results: 5-10x gain
- Timeline: Estimate Draft 2.0 in 2017?...



# The Cold Hard Truth



# Thank you



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