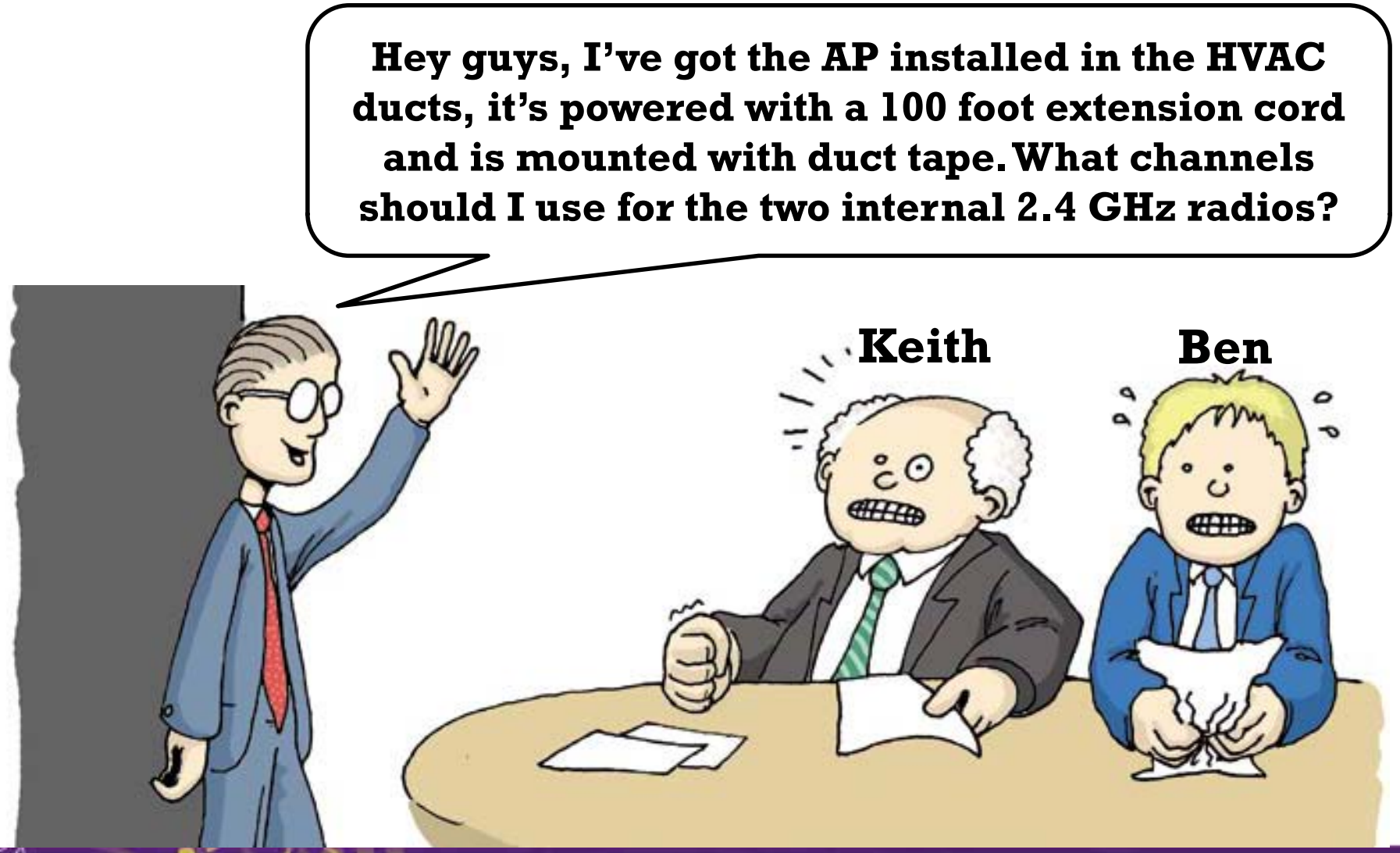
WLAN MythConceptions: The Real 802.11 Network

Tom Carpenter, CWNE, CTO – CWNP
@carpentertom

- Tom Carpenter
- @carpentertom
- tom@cwnp.com
- CWNE
- CTO – CWNP
- Author of eight books on WLANs
- Geek in love with Wi-Fi and Julie
- Lifelong learner who likes to start from the ground up and layer, layer, layer

Bad Questions



What is THE data rate in the link?

150 Mbps?

65 Mbps?

What is THE data rate in the link?

Management and Control Frames – Low Data Rate

Data Frames – SNR/Performance-Based Data Rate

Changes Over Time

Client – to – AP

AP – to – Client

Better question: What is the data rate of the frame?

What is the SNR in that building, space, location, etc.?

There is an answer to this question, it is:

um…

Better Question: What is the SNR right now at a specific location?

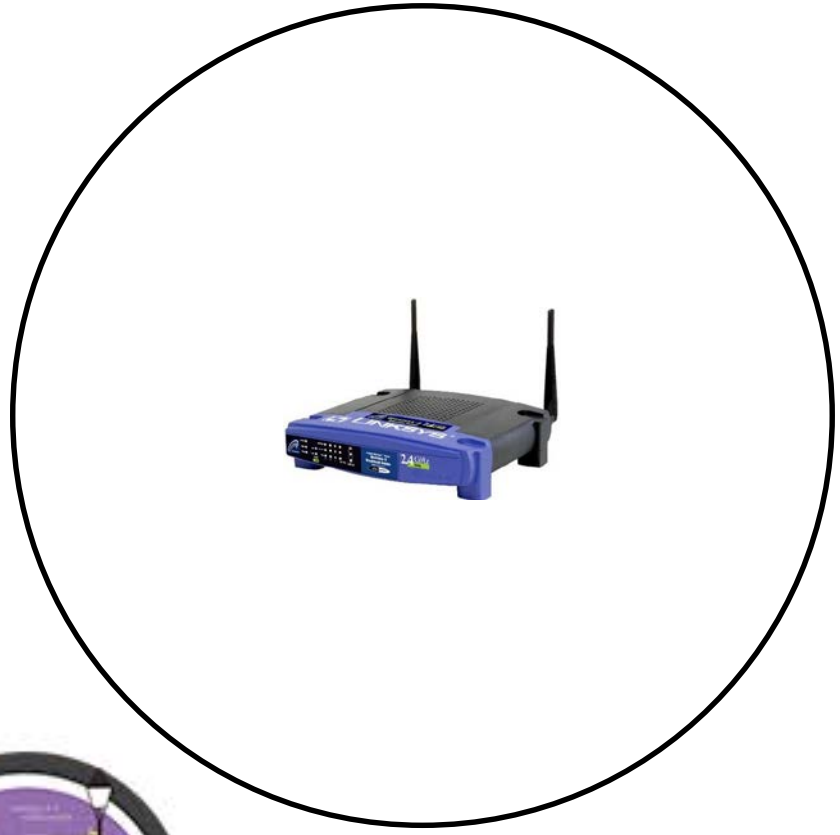
SNR impacted by:

- Changes in the environment
- Changes in the client positioning
- Intermittent interferers
- Noise from hardware

Myths

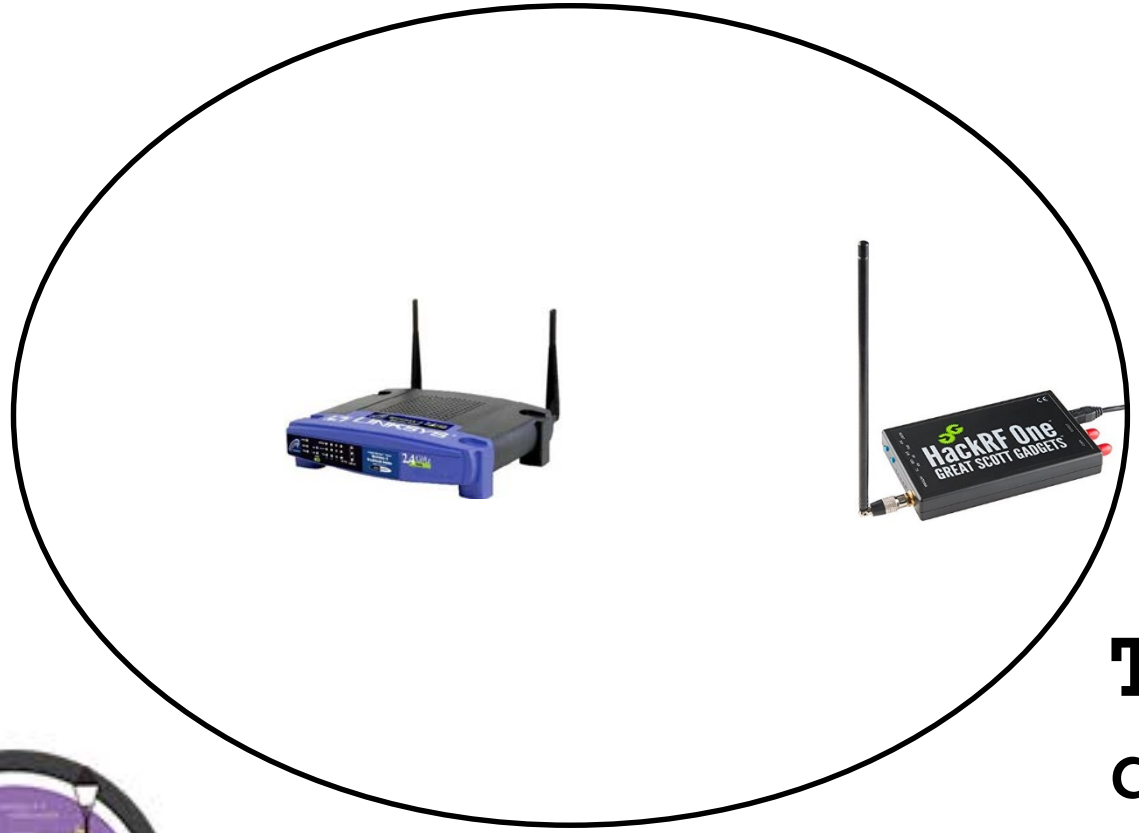
A widely held but false belief or idea.

The size of the BSA is determined by AP transmit power



The area containing the members of a basic service set (BSS). It might contain members of other BSSs.

~~The size of the BSA is determined by AP transmit power~~



The area containing the members of a basic service set (BSS). It might contain members of other BSSs.

TRUTH: The size of the BSA is determined by the clients.

This client resulted in a very small BSA

802.11ac APs require more than 1 Gbps Ethernet connections

802.11ac 3x3:3 max data rate with 80 MHz channel = 1300 Mbps
802.11ac 4x4:4 max data rate with 160 MHz channel = 3466.7 Mbps
802.11n 3x3:3 max data rate with 40 MHz channel = 450 Mbps

=

3916.7 Mbps Potential

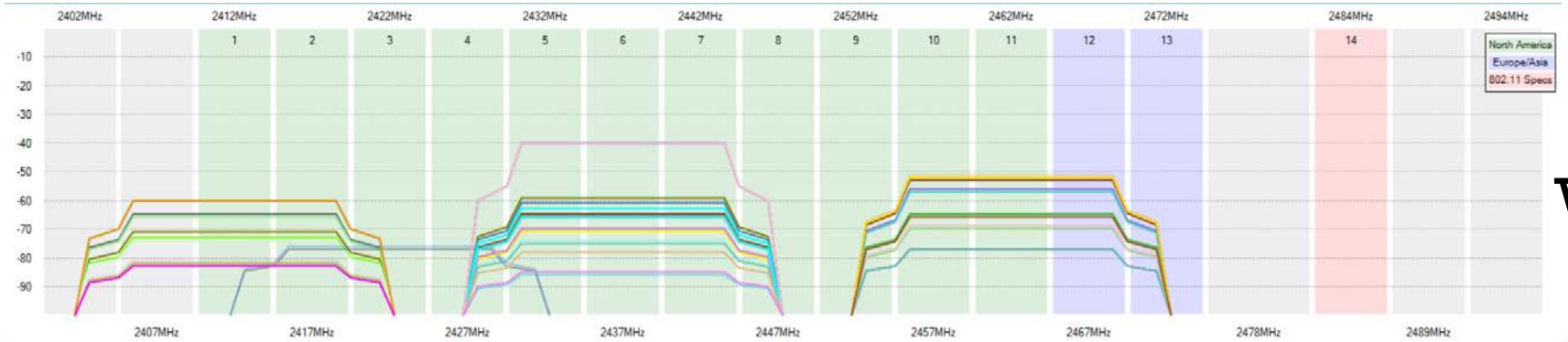
2.4 GHz is dead, dying or going away soon

Ch...	Current	Avg	Max	Duty Cycle
Band: 5 GHz Lower				
36	-110	-104	-77	1.22%
40	-109	-106	-96	0.00%
44	-109	-106	-87	1.16%
48	-110	-107	-97	0.00%
52	-110	-105	-84	7.43%
56	-110	-105	-84	6.35%
60	-111	-107	-97	0.00%
64	-109	-106	-97	0.00%

Ch...	Curr...	Avg	Max	Duty Cycle
Band: 2.4 GHz				
1	-100	-92	-69	99.74%
2	-97	-92	-69	79.80%
3	-95	-89	-69	99.52%
4	-93	-89	-70	99.54%
5	-93	-86	-70	97.63%
6	-92	-86	-64	99.39%
7	-94	-86	-64	82.86%
8	-95	-86	-64	95.89%
9	-96	-88	-64	95.01%
10	-94	-89	-65	62.99%
11	-92	-89	-65	47.94%

Channel	AP	Station	Phone
36	4	0	0
44	3	0	0
52	5	0	0

Channel	AP	Station	Phone
1	14	0	0
6	7	0	0
11	21	0	0



Well, this is unpleasant…

~~2.4 GHz is going away~~

TRUTH: 2.4 GHz is the new IPv4!

- RFC 2460 – 1998
- 1999-2000 trainers and vendors talking about it replacing IPv4 within 5-10 years
- 2014 – 99% of traffic still carried by IPv4
- 2016 – a vendor at a networking conference, "we don't support IPv6 yet"
- 2016 – 13% of traffic reaching Google was IPv6
- Hence 2.4 GHz is the new IPv4 – so be real and deal with it

Acquiring the CWNE certification is hard

It is not!

Thank you!