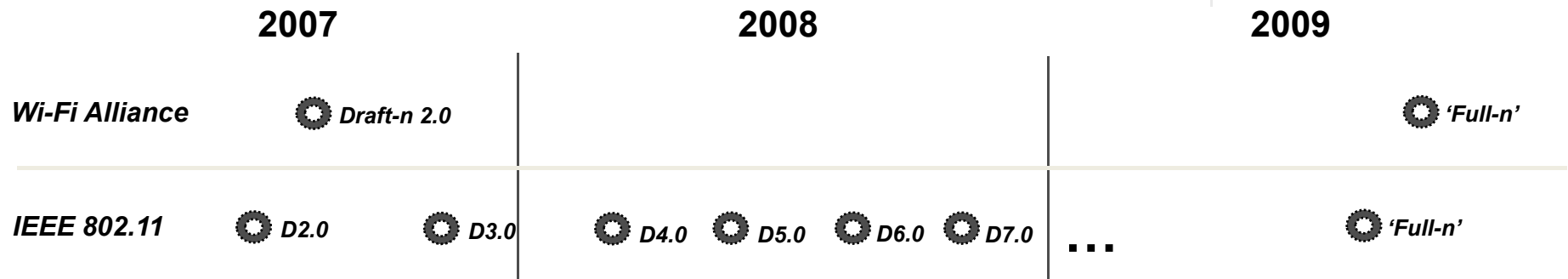


802.11n outlook

Peter Thornycroft
Aruba Networks
September 2008

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802.11n standards & certification timeline



Products already include:

40 MHz (@ 5 GHz)
 Short GI
 Simultaneous 2-band AP
 3x3, 2 SS
 A-MSDU, A-MPDU
 Mixed mode

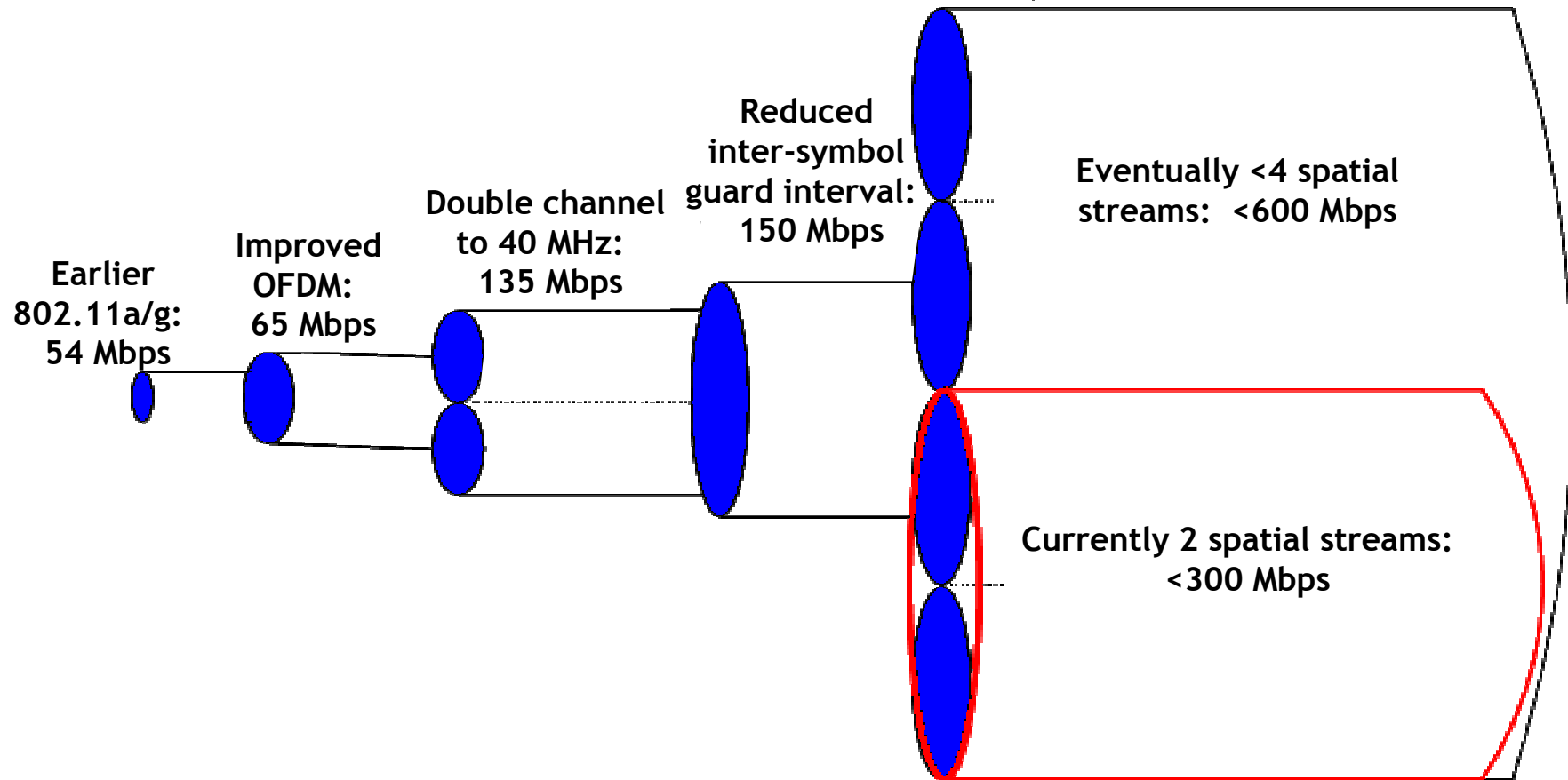
Forthcoming profiles:

Basic (current, for PCs)
 Handheld
 (mostly power-saving)
 Consumer Electronics
 (mostly streaming video)

'Final' 802.11n will add:

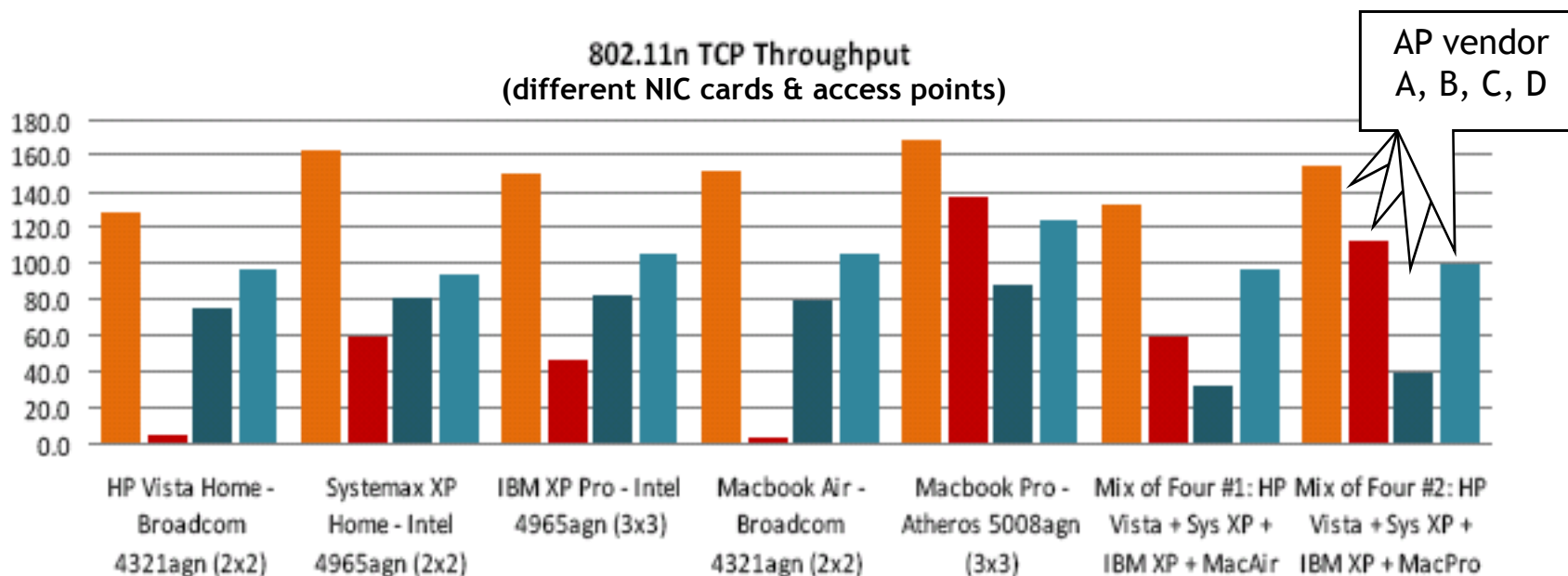
3x3, 4x4 <4 SS
 Beamforming
 STBC
 More Coexistence
 MRC
 Lower-power
 Better Rx sensitivity

Draft-n 2.0 performance: technology



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Draft-n 2.0 performance: test results



Key factors for performance:

- RF Channel width
 - # Spatial streams
 - MAC aggregation
 - Extra antennas
- (e.g 2x3, 3x2, 3x3 for 2SS)

802.11n D2.0 APs with earlier clients:

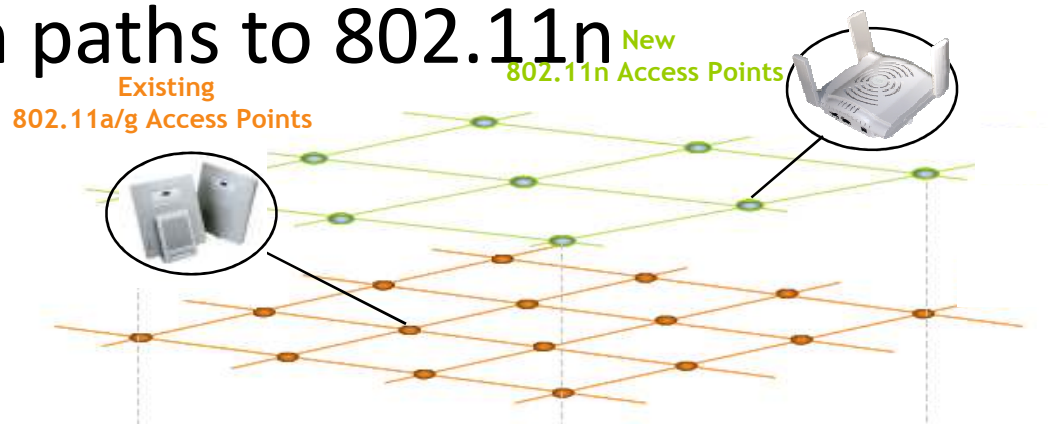
- Downlink - Better Tx diversity
- Uplink - Better Rx sensitivity
- Better Rx diversity

Migration paths to 802.11n

802.11n Overlay: additional APs

5 GHz operation makes it easy to co-exist with legacy WLAN

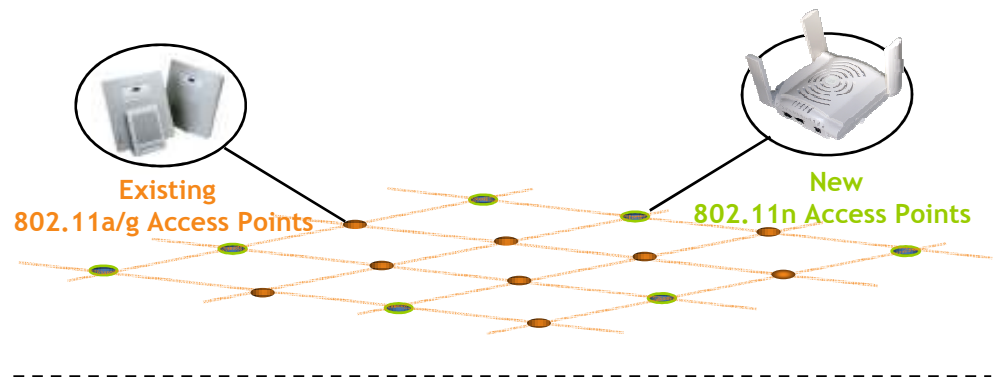
Requires seamless integration into the RF domain



Replace 802.11a/b/g AP with 802.11n

Reuse existing cabling and PoE infrastructure if possible

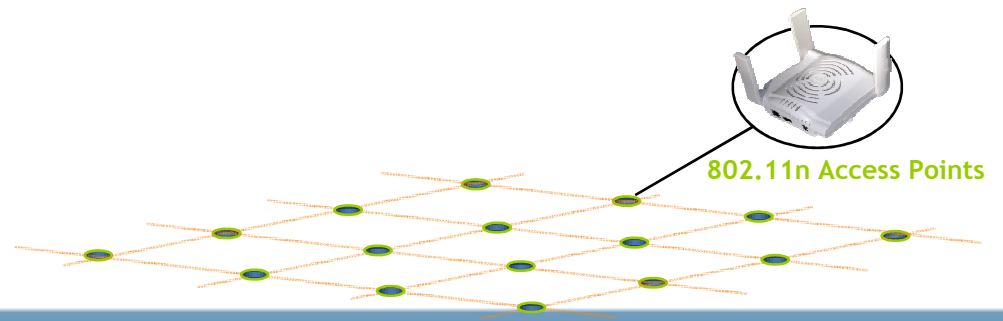
Point substitution for speed-spots or network-wide substitution



802.11n Greenfield

No site surveys needed if designed for capacity

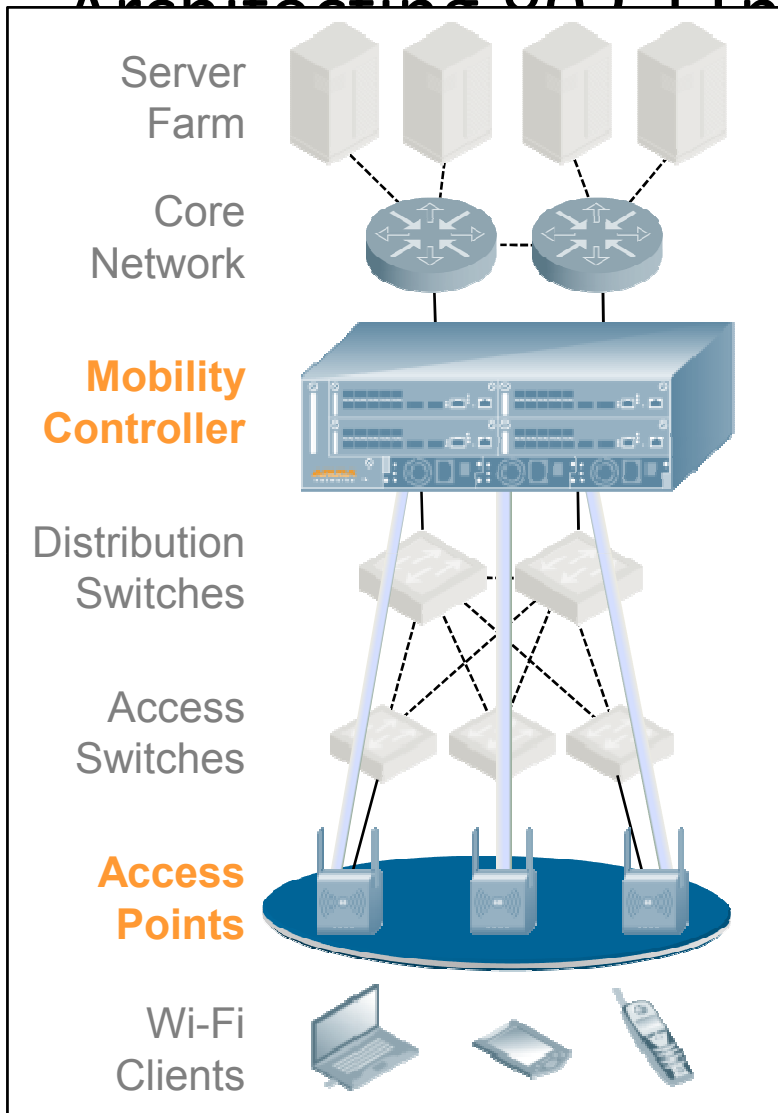
RF planning tools provide estimates of AP placement



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Architecting 802.11n

for wireless and mobility



1. **RF dimension**
 - Capacity management
 - Ease of deployment
2. **Networking dimension**
 - VLAN architecture
 - Forwarding models
3. **Security dimension**
 - User/device security
 - RF security
4. **Applications dimension**
 - Application performance/QoS
 - Seamless Roaming
5. **Scalability dimension**
 - Controller scalability

11n products to expect in 2009/10

- **Chip-level integration**
 - Smaller die area, fewer chips per module, lower power consumption
- **Power requirements**
 - Can we beat the 802.3af hurdle, or do we need to upgrade edge switches for new PoE standards?
- **New features**
 - Beamforming, STBC, coexistence, MRC...
- **Applications**
 - More capable video, high speed mesh networks, ...
- **Adoption & cost**
 - Expect 802.11n to be the default for notebook PCs in 2009, APs in 2010 and for other clients (phones, scanners, ...) in 2011-12

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802.11n outlook

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