



AIRHEADS

LAS VEGAS 2012

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Presented by Name
Aruba Networks
March 2012

ROCKIN' VOICE AND VIDEO OVER WIFI!



Agenda

Multimedia over WLAN Challenges

Generic Design Recommendations for Multimedia

Aruba Enablers for Voice

Aruba Enablers for Multicast Video

Enterprise Application – Collaboration & VDI

Understand Mobility Requirements

Mobile Devices



Multimedia



Collaboration



Virtual Desktops



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Multimedia over WLAN



Voice



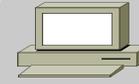
- RF challenges
- End-to-End QoS
- Battery life & Roaming
- Scaling Challenges
- Bandwidth management (CAC)
- Mobility and Roaming



Video



- RF Challenges
- End-to-End QoS
- Battery life & Roaming
- Scaling Challenges
- Unreliable protocol
- Low speed transmission



Data

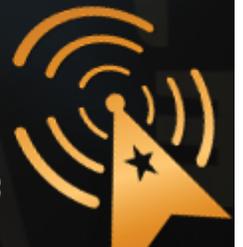


- RF Challenges
- Battery life & Roaming
- Scaling Challenges

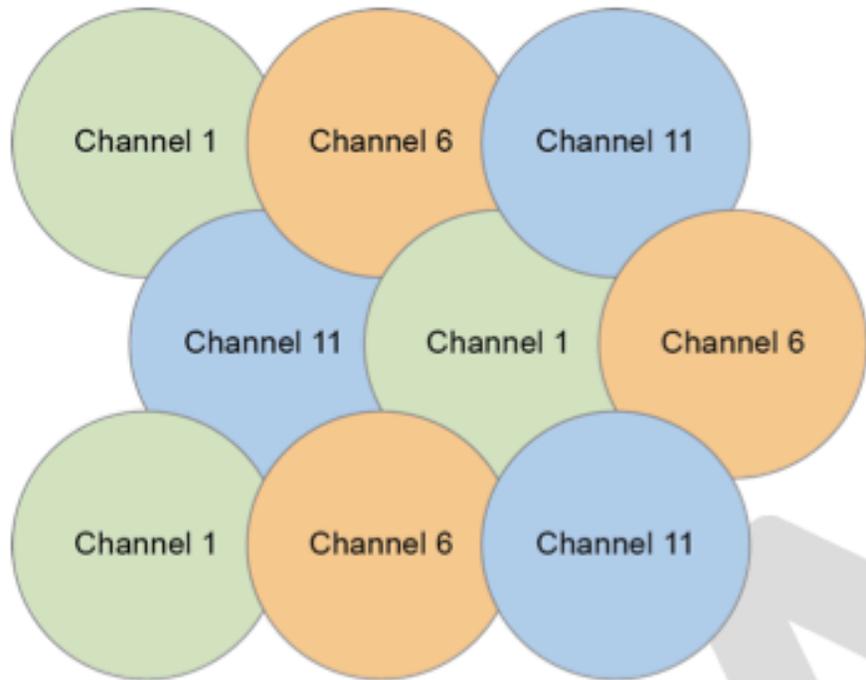
Voice + Video + Data???



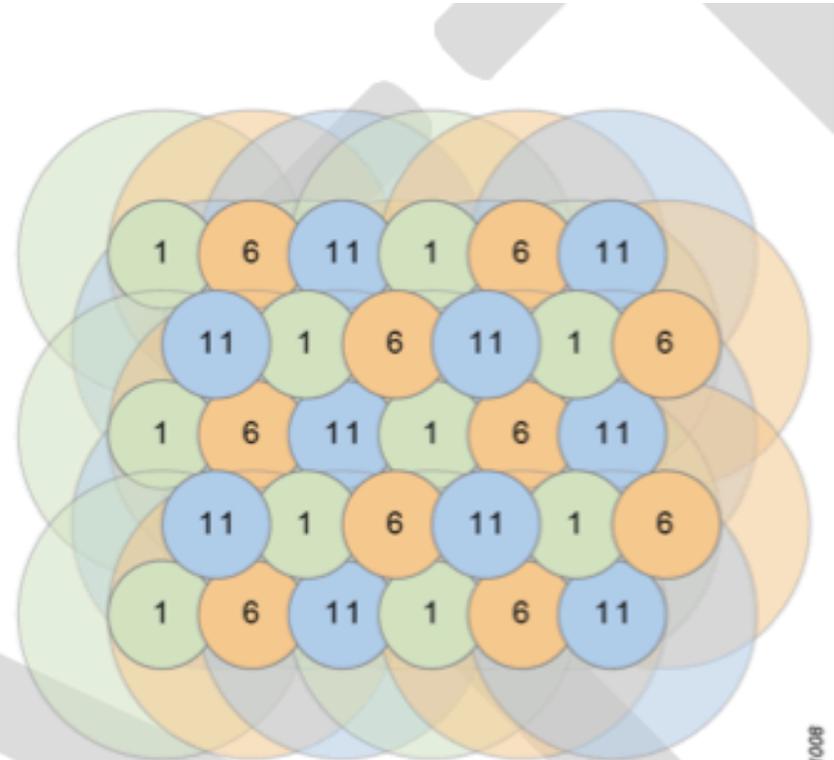
General Design Considerations for enabling Multimedia



RF Challenges: Plan for Capacity, not Coverage



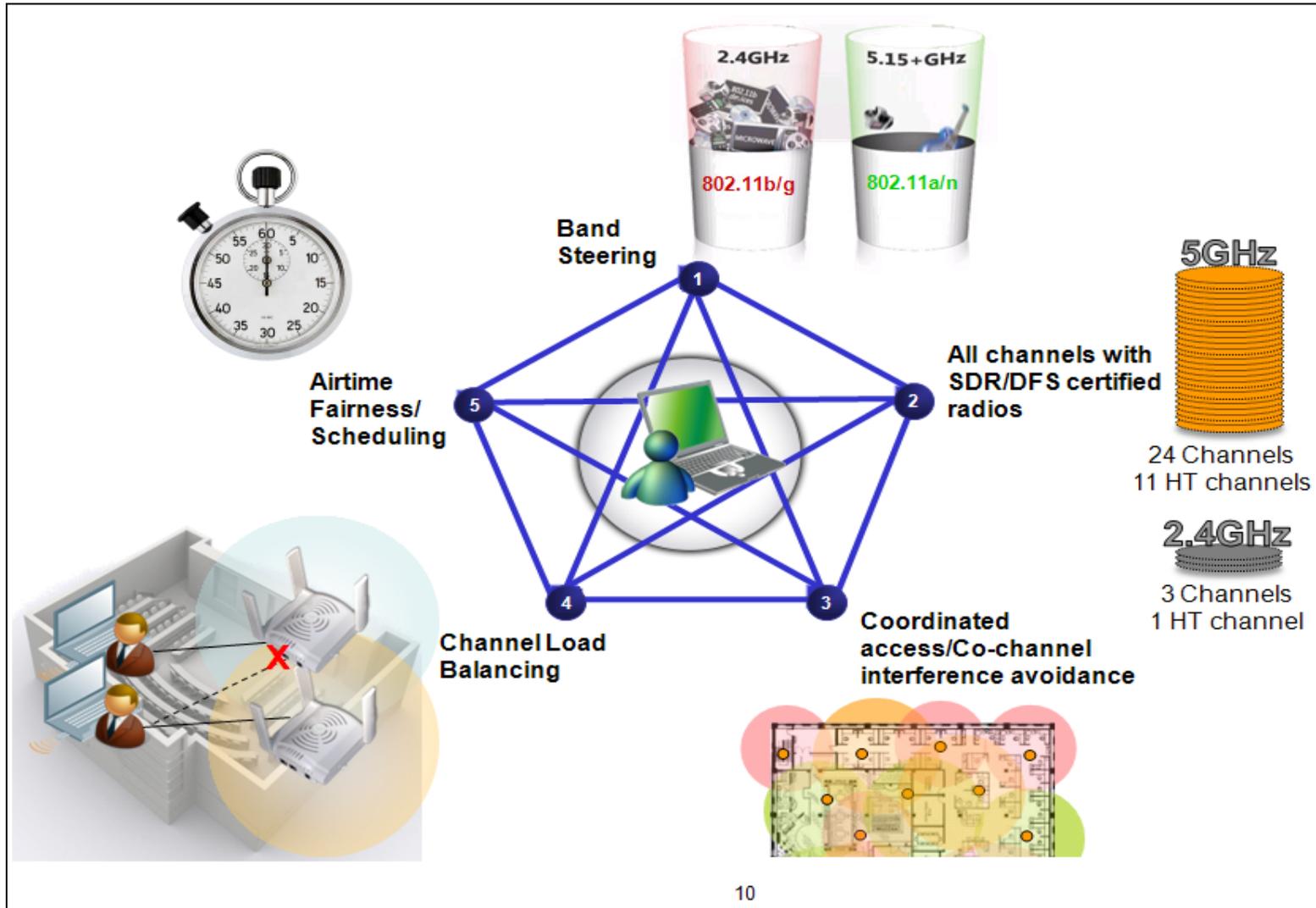
Coverage design with 7.2 Mb/s cell edge



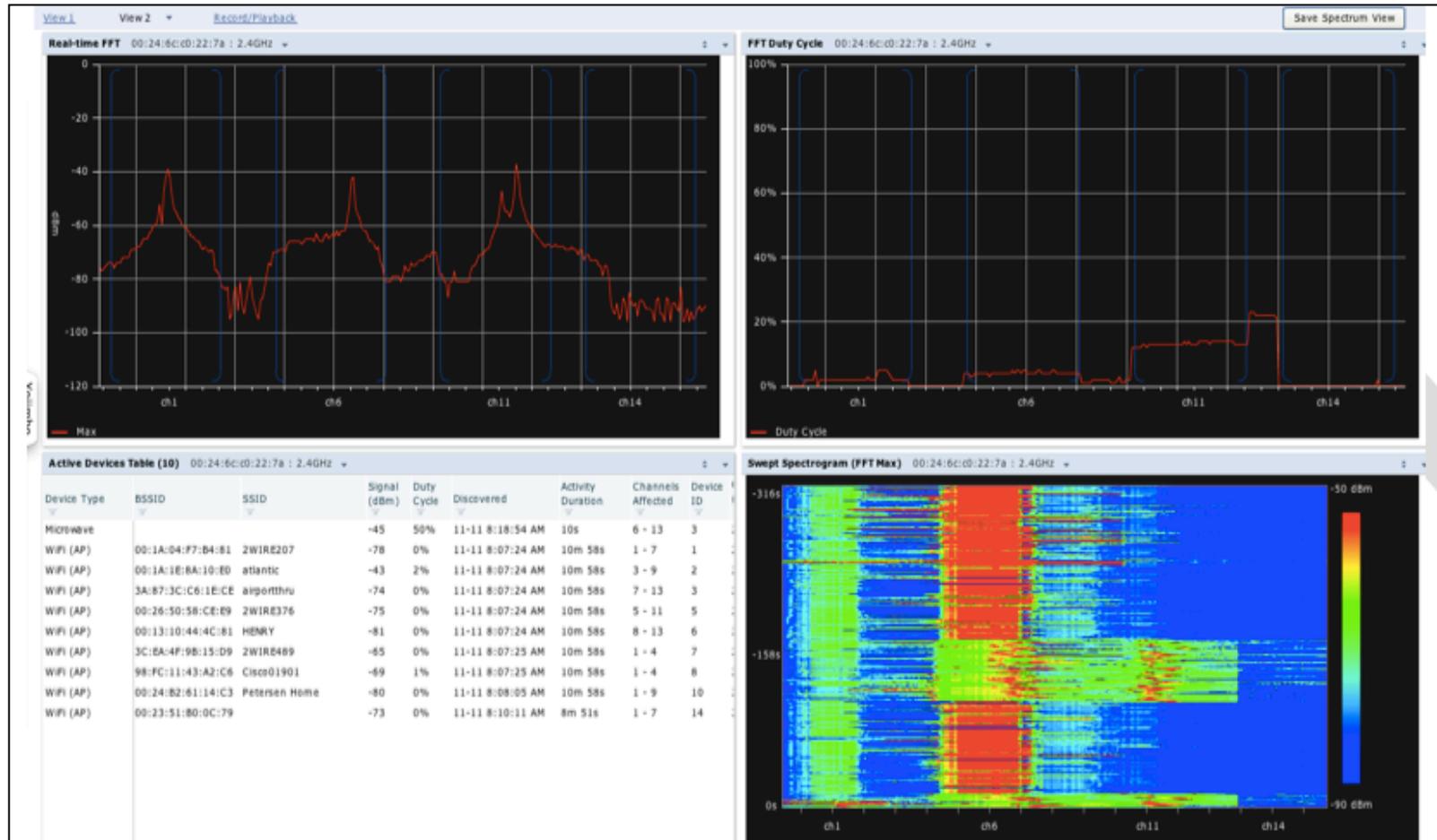
Capacity design with 216.7 Mb/s cell edge

arun_1008

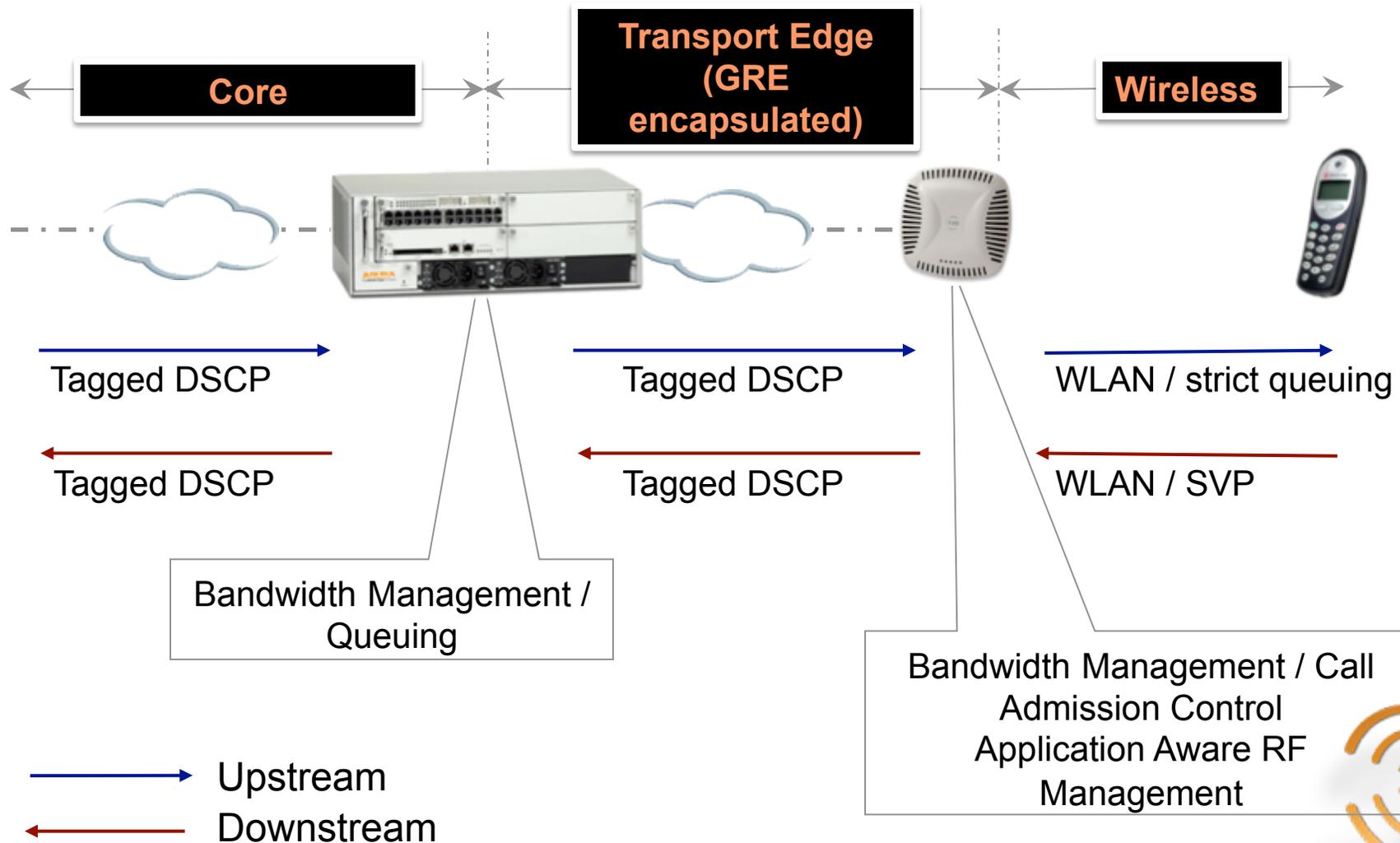
RF Challenges: 802.11n + ARM -> Assured Bandwidth



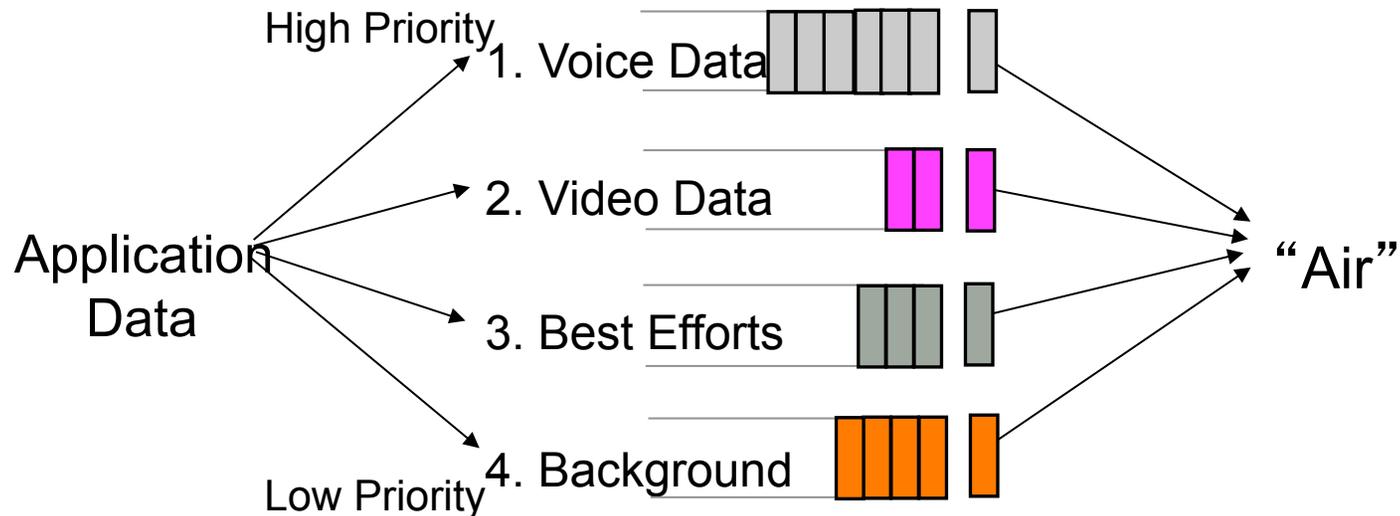
RF Challenges: Interference Avoidance with Spectrum Analysis



End-to-End QoS: Introduction

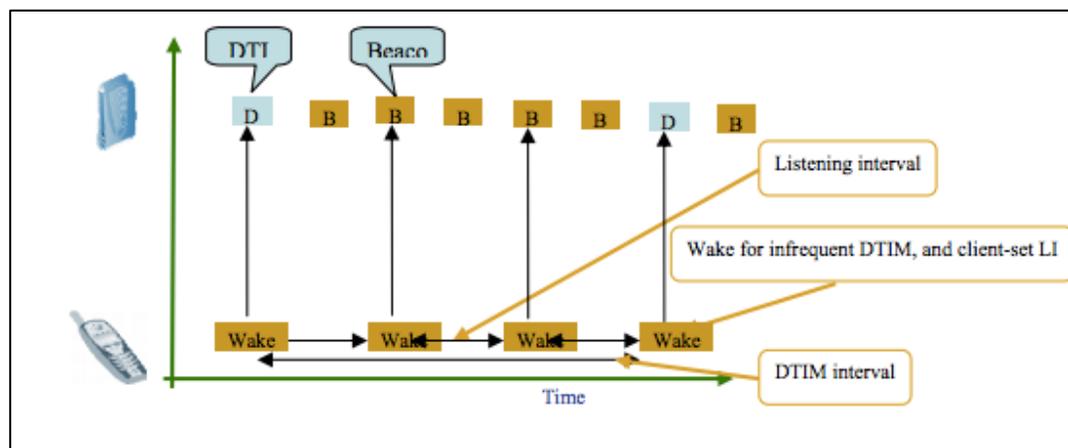
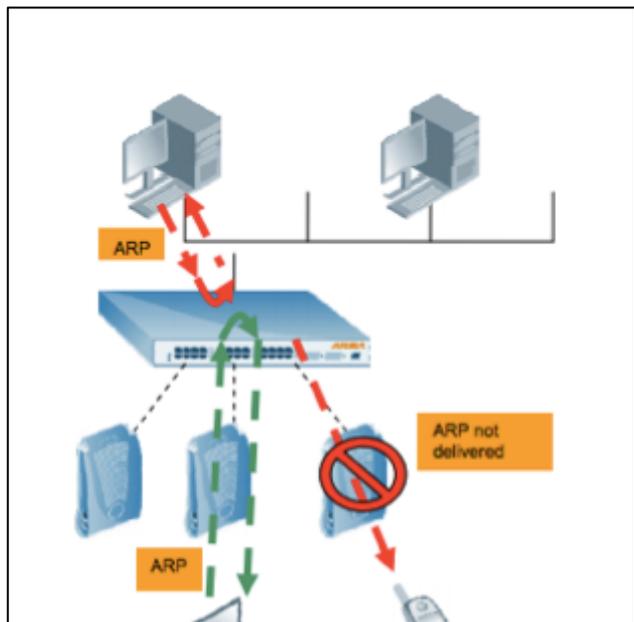


End-to-End QoS: WMM Support



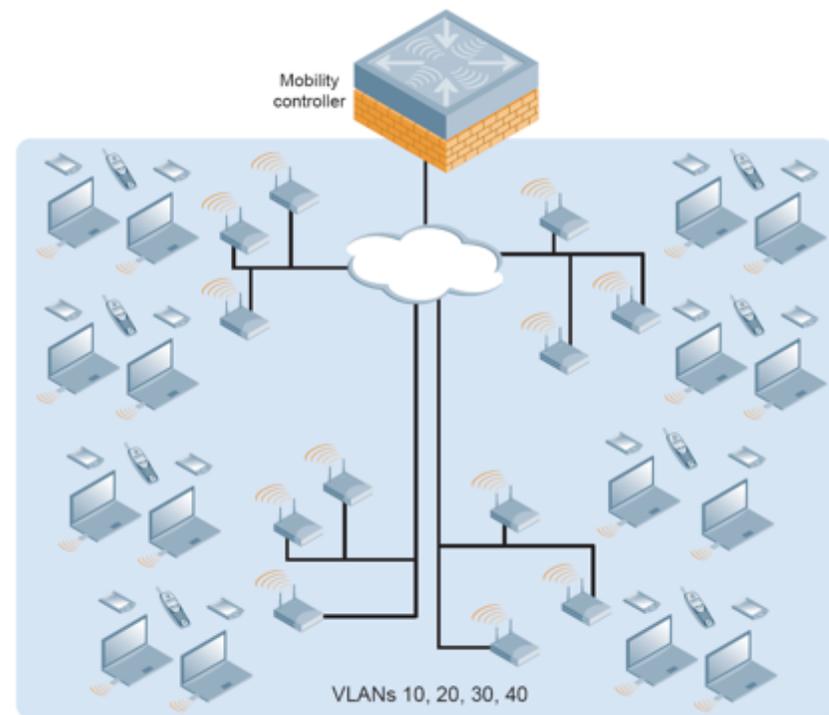
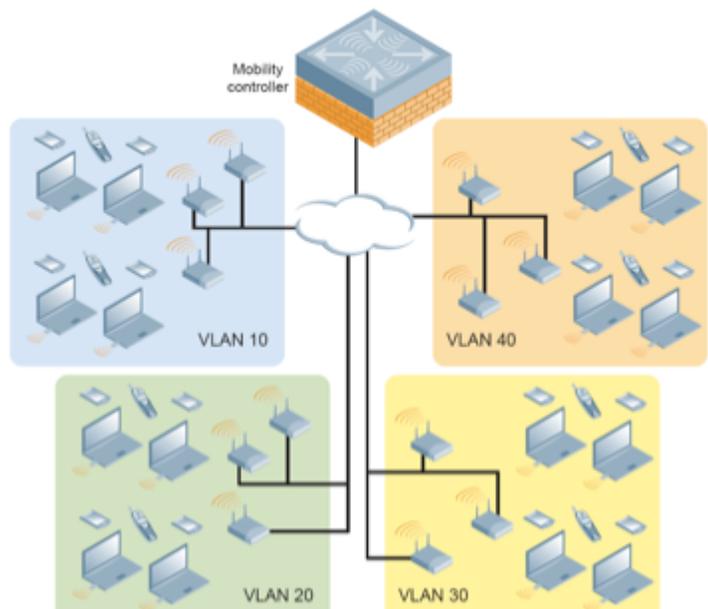
1. WMM Specifies how priority queues map to DSCP and dot1P tags
2. Different access categories, different contention parameters
3. 4 queues per radio; 8 queues total; supported on all APs
4. Voice and video gets priority over data

Client Battery Life Challenges



1. WMM UAPSD support – increased power saving, increased cell capacity
2. Distribute TIM so that clients need not receive every beacon frame (~100 ms)
3. With Proxy ARP controller responds to ARP requests enabling clients to sleep longer
4. Traffic filtering at the AP to avoid extraneous multicast/broadcast frames

Scaling Challenges: VLAN Pooling



1. Aruba VLAN Pooling allows a set of VLANs to be assigned to a designated group of users
2. Can use VLANs that already exist in the enterprise
3. Enables IP address and session persistence

Bandwidth Management

Implementation Rules

- Per role-based bandwidth contract
- Per user-based bandwidth contract

Bandwidth Contract	
Upstream: Not Enforced	<input type="text"/> <input type="button" value="Change"/> <input type="text" value="Per Role"/>
Downstream: Not Enforced	<input type="text"/> <input type="button" value="Change"/> <ul style="list-style-type: none">✓ Per RolePer UserPer AP Group

- Per SSID-based bandwidth contract

Enable Shaping Policy	<input type="checkbox"/>	Voice Share	<input type="text" value="25"/> %
Video Share	<input type="text" value="25"/> %	Best-effort Share	<input type="text" value="25"/> %
Background Share	<input type="text" value="25"/> %		



Aruba Voice Enablers

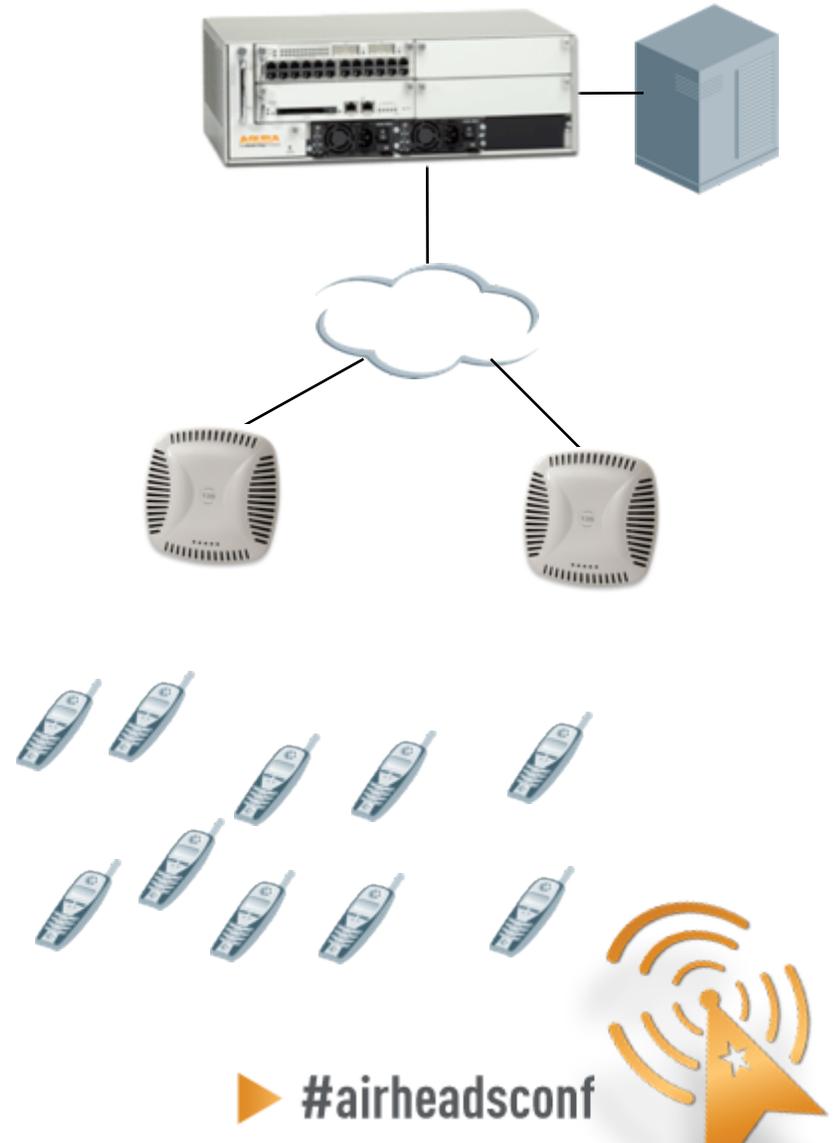
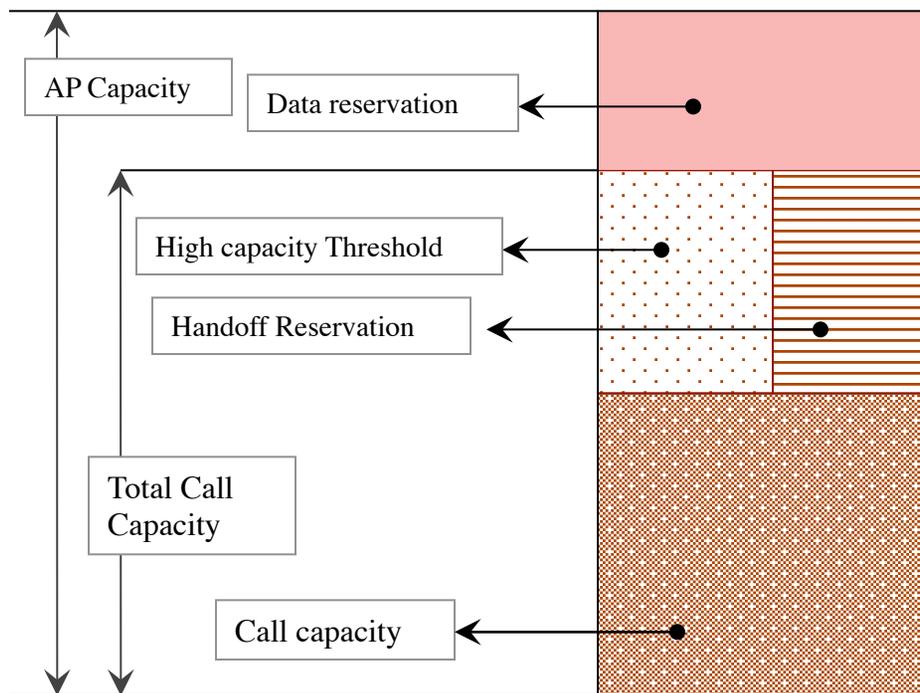


Bandwidth Management: Call Admission Control

Example : Call Capacity = 6

High capacity threshold = 2

Handoff threshold = 2

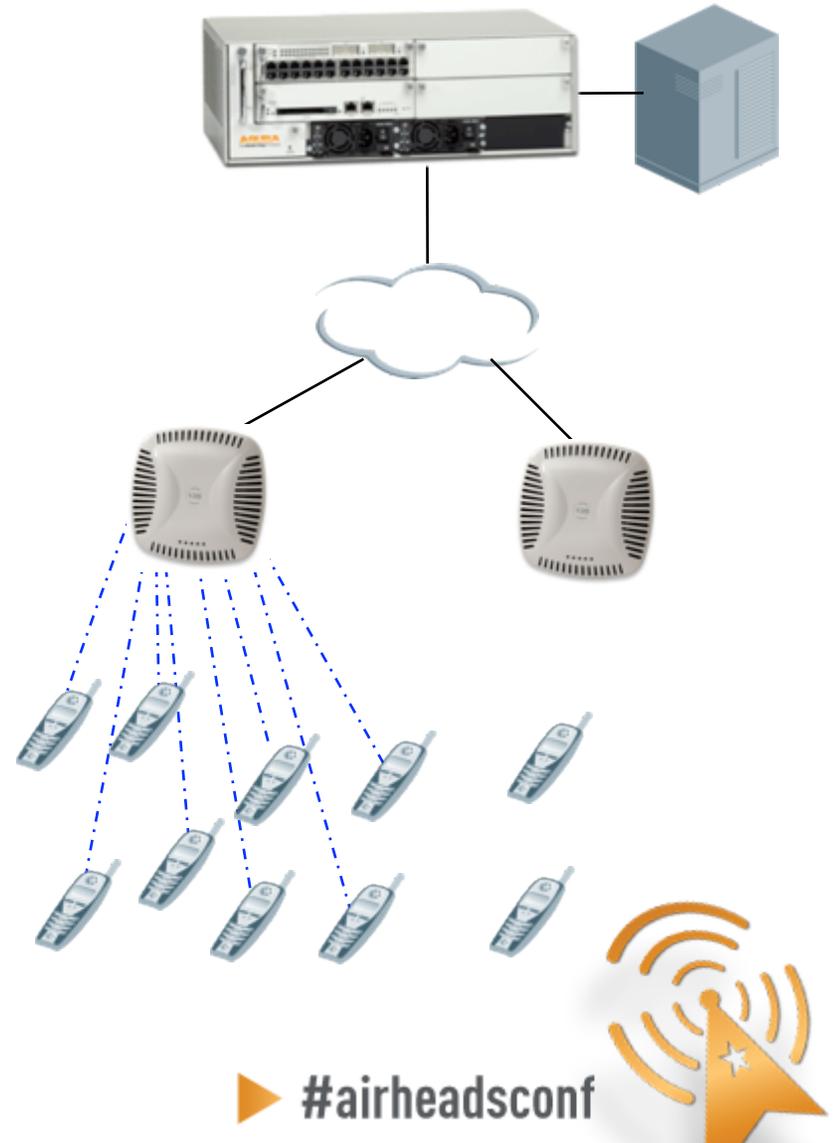
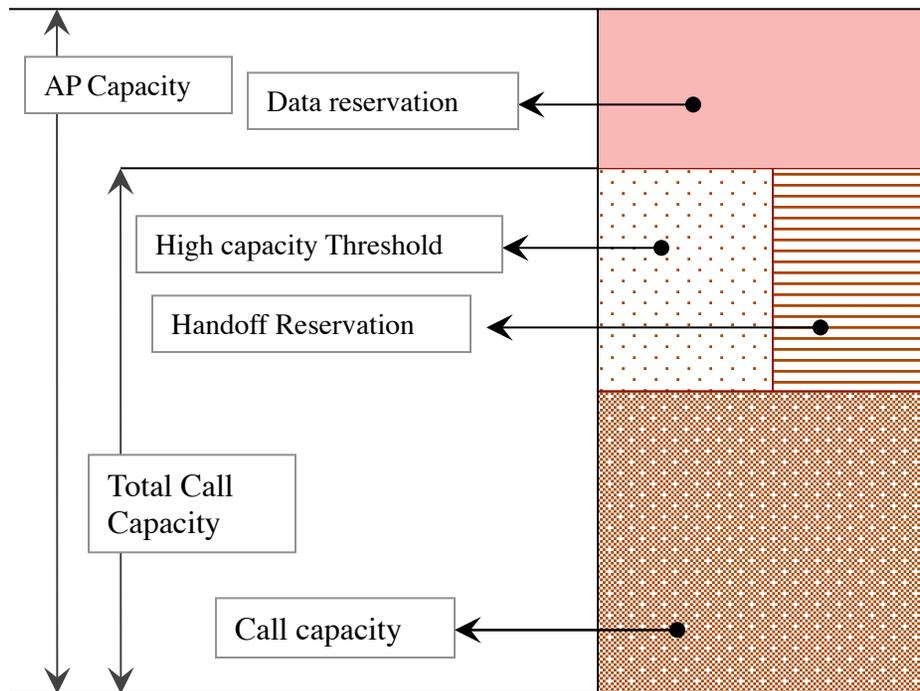


Call Admission Control - Example

Example : Call Capacity = 6

High capacity threshold = 2

Handoff threshold = 2

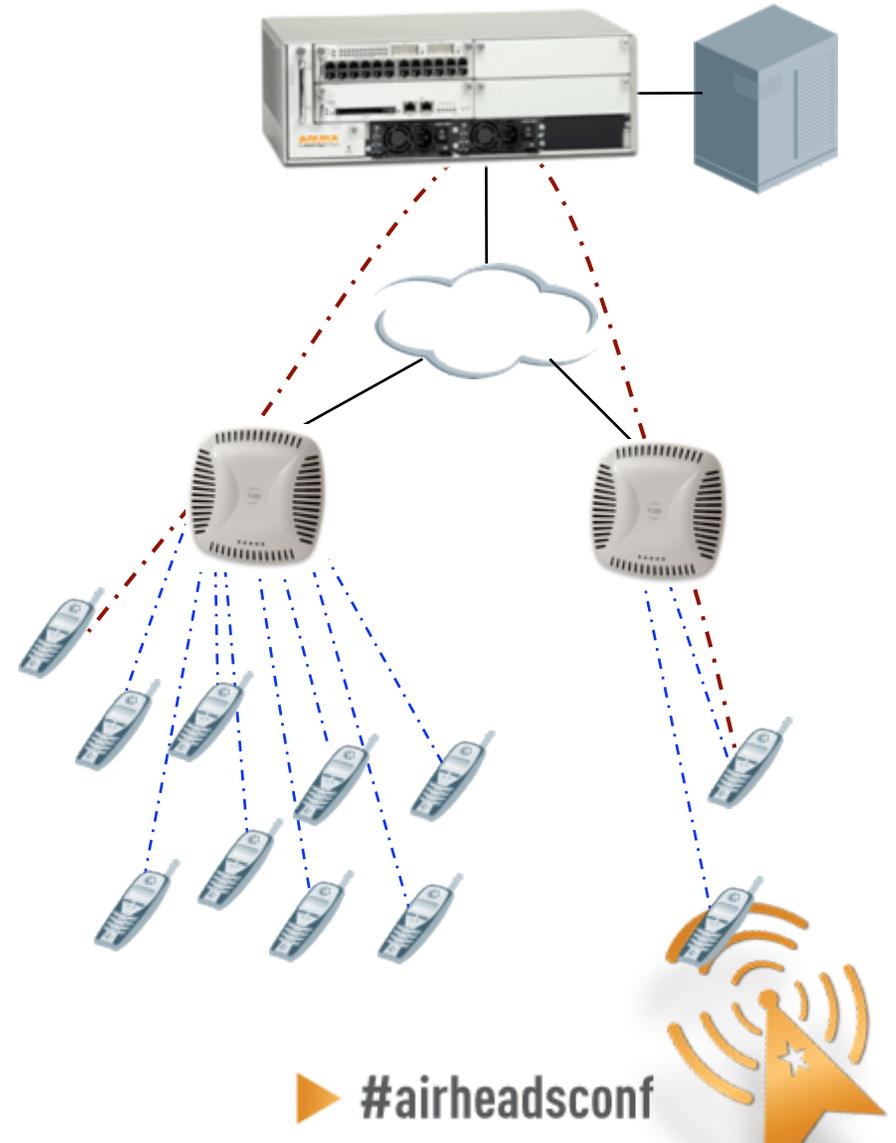
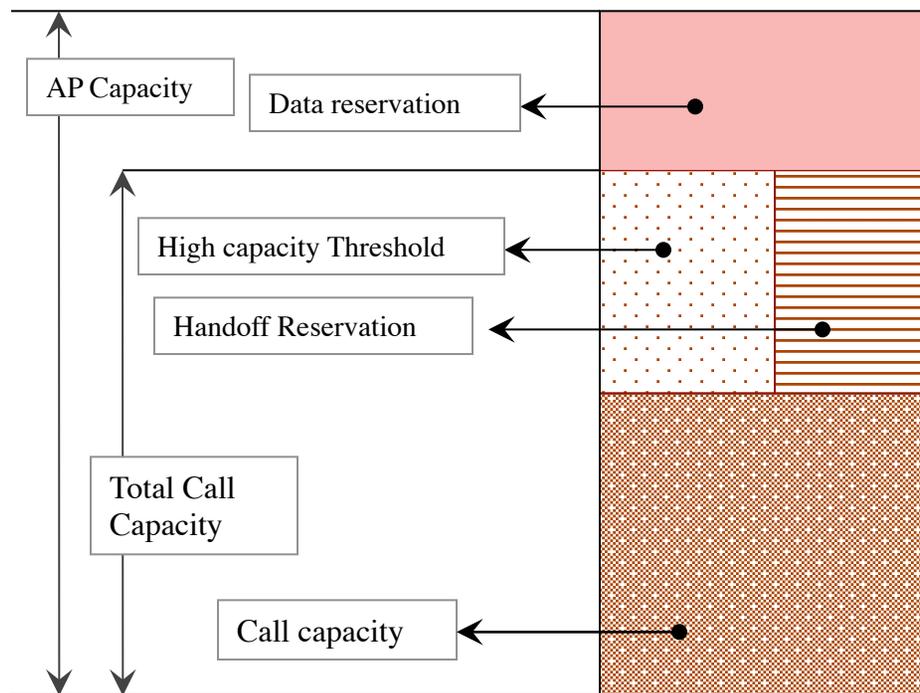


Call Admission Control - Example

Example : Call Capacity = 6

High capacity threshold = 2

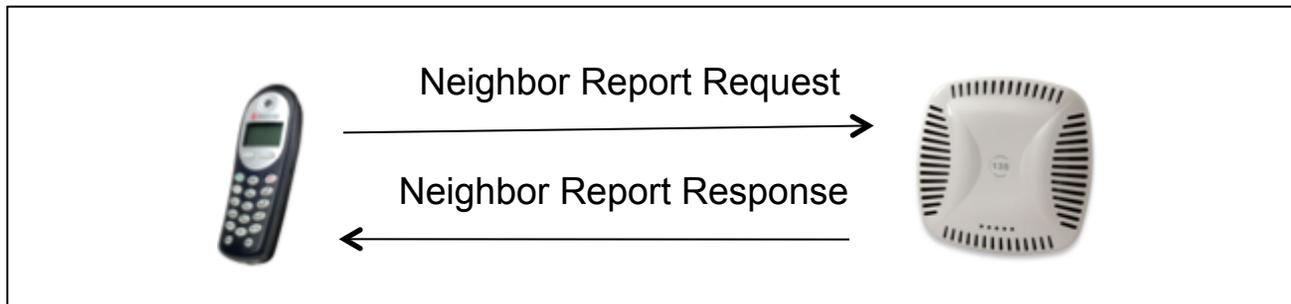
Handoff threshold = 2



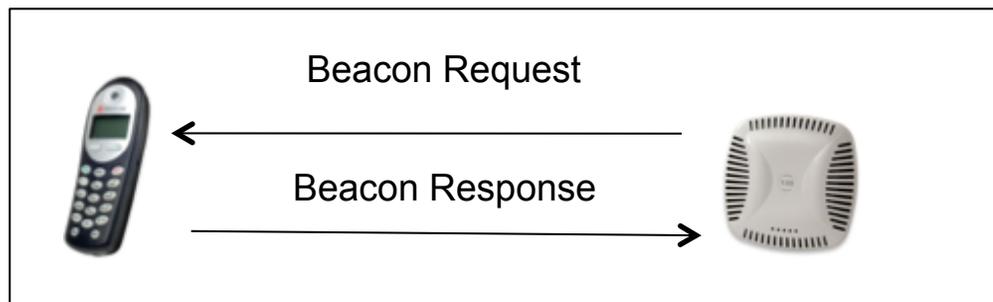
Mobility & Roaming: Enterprise Voice Certification (Co-operative Client Control)

Real time data collection with 802.11k

- Neighbor Report (What is the AP seeing over the air)

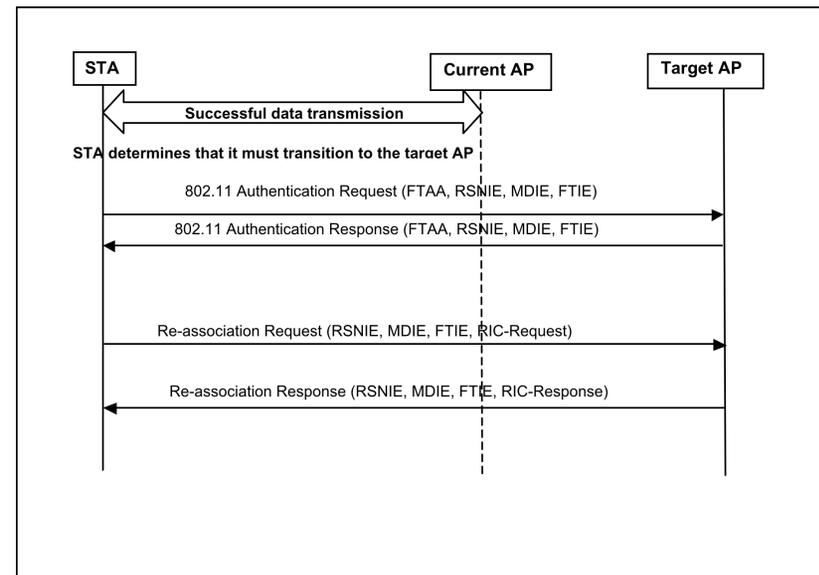
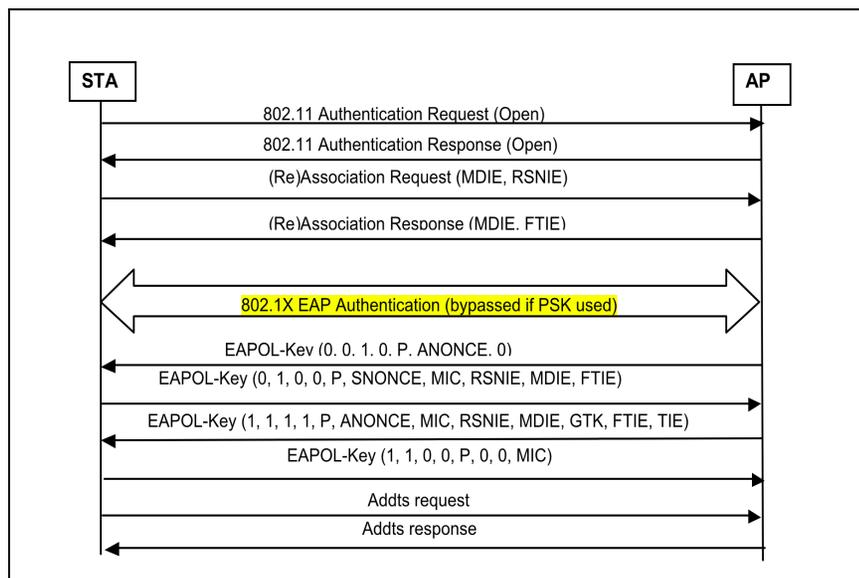


- Beacon Report (What is client seeing over the air)



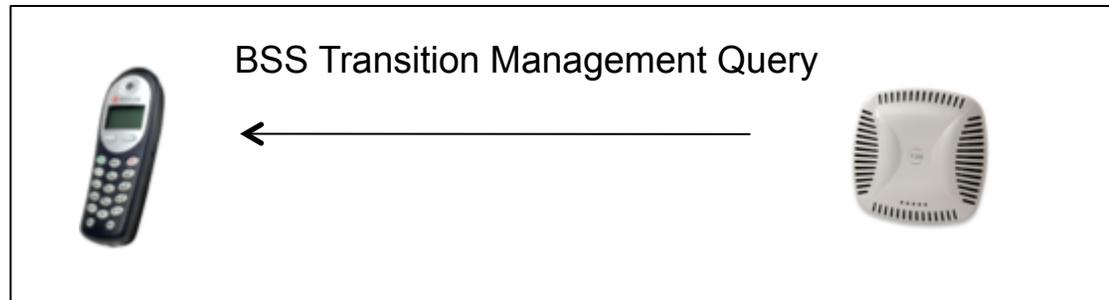
Mobility & Roaming: Enterprise Voice Certification

The handover delay from one AP to the other is reduced significantly; security and QoS states synchronized before roam



1. Minimize delay in a clients transition from one BSS to another
2. Establishment of Security and QoS states at the target AP prior to/during association
3. Reduces handover delays to up to 50 ms, enhances voice performance
4. Requires support on the WLAN and the client side

Mobility & Roaming: Enterprise Voice Certification



With 802.11v, AP encourages clients to roam to the best AP utilizing information from 11k, 11r

- Encouraging the AP to to a BSS transition
- Uses the system level view obtained by the beacon and neighbor reports from 11k
- Helps in admission control
- Requires WLAN and client support

Mobility & Roaming: Fast Roaming Enablers

	PMK Cached				No PMK Cached		
	Intra-Controller Intra-VLAN	Intra-Controller Inter-VLAN	Inter-Controller Intra-VLAN	Inter-Controller Inter-VLAN	Intra-Controller Intra-VLAN	Intra-Controller Inter-VLAN	Inter-Controller Intra-VLAN
Min.	56 ms	62 ms	63 ms	56 ms	219 ms	223 ms	225 ms
Max.	86 ms	67 ms	70 ms	62 ms	257 ms	240 ms	240 ms
Avg.	68 ms	64 ms	66 ms	59 ms	231 ms	230 ms	233 ms

1. Security determines handover performance

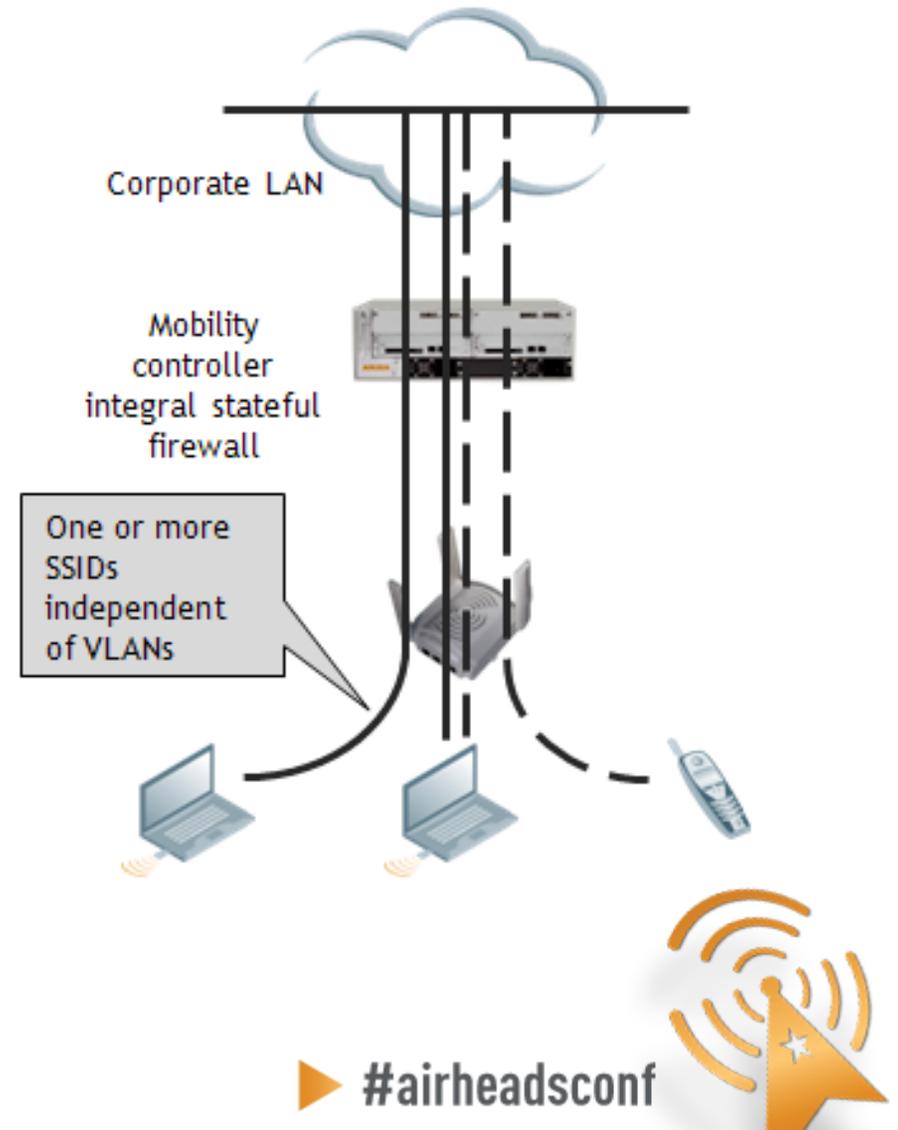
1. Need 802.1X security with PSK speed
2. Use WPA2 with 802.1X and opportunistic key caching (OKC) in centralized-controller WLAN; 11k/11r (future)

2. Session awareness for L3 roaming, voice aware dot1x rekeying

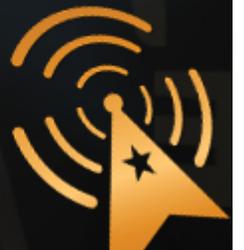


ALGs: Voice Separation by Firewall

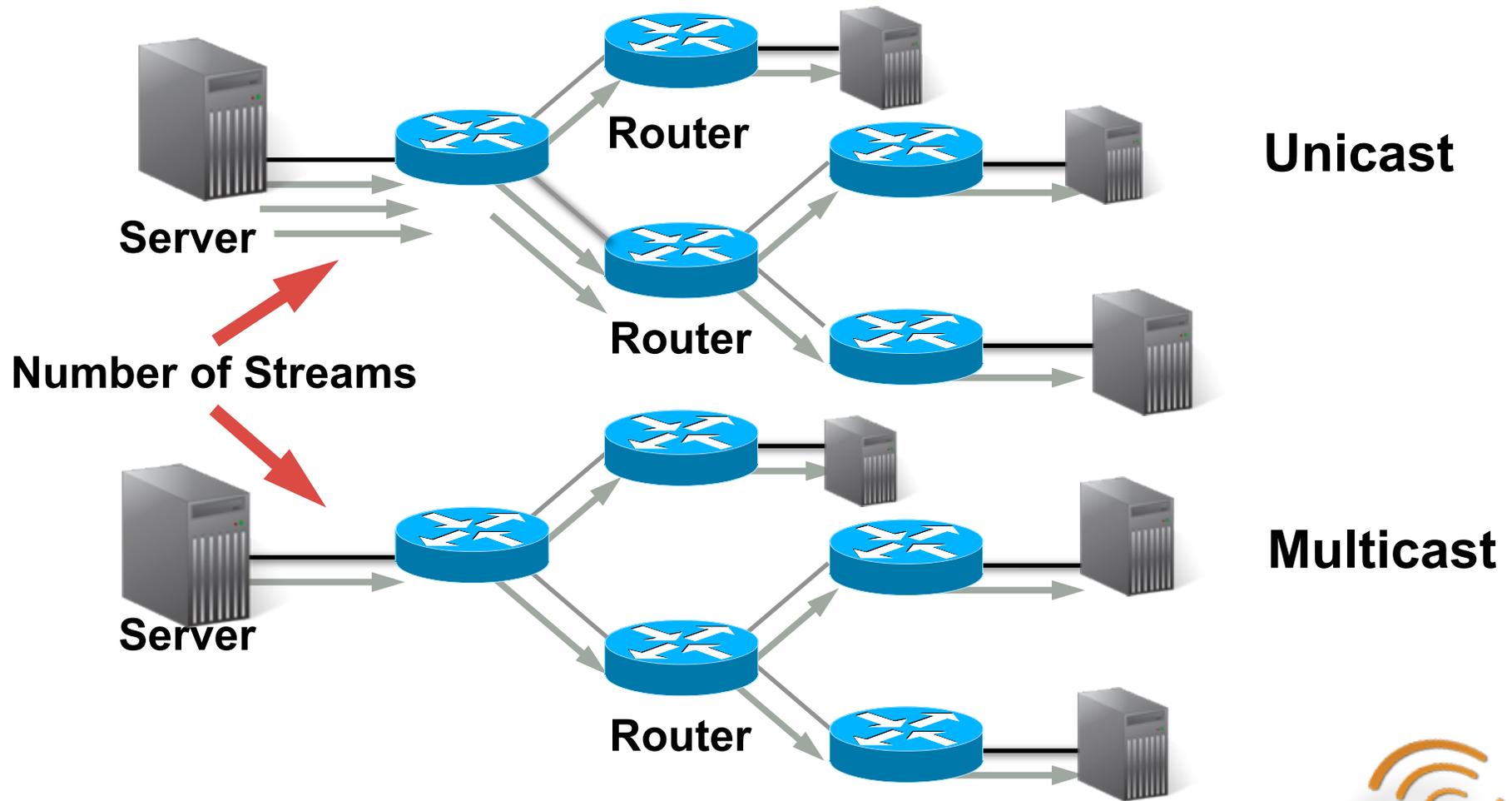
1. ALG support for most common voice protocols
2. ALGs include - SIP, SCCP, H323, NOE, Vocera etc.
3. Constantly adding newer ALGs



Aruba Video Enablers



Introduction: Multicast vs. Unicast



Multicast – Why and Why not?

Benifits



- Efficiency – reduced network traffic, reduced server and CPU load
- Performance – eliminates traffic redundancy
- Application – enabled distributed applications for different verticals

Challenges



- Best effort Delivery, no QoS guarantees – poor quality, drops are to be expected
- No error correction – fire and forget
- Sent out at low control rates; 1 MB for b/g, 6 Mb for a

Impact

- Does not utilize 802.11 N High Throughput data rates***
- Heavy utilization of channel due to high rate of very slow packets***
- Video delivery is not reliable causing poor Quality of Experience***



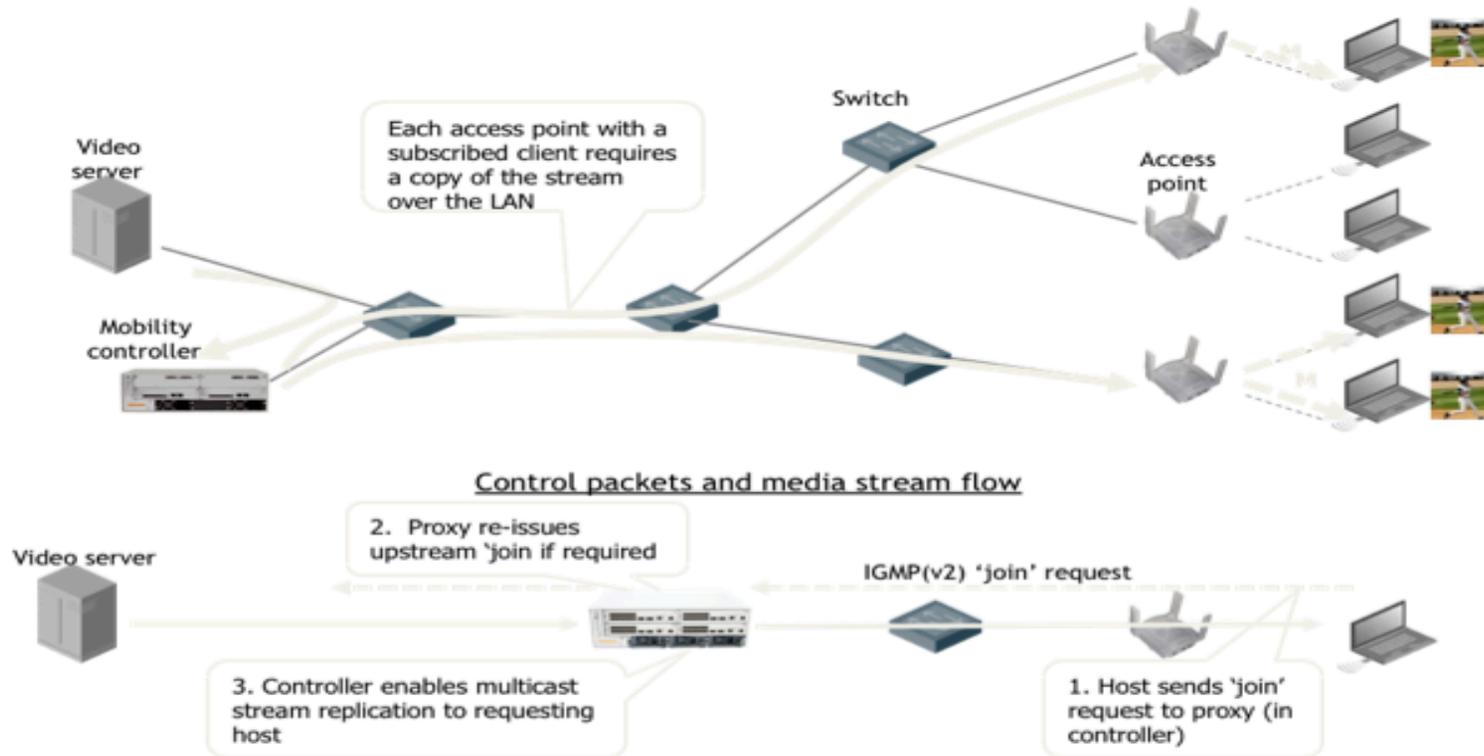
Cure to Video over WLAN Challenges

1. Wired Optimization
2. Wireless Optimization
3. Video Detection & Traffic Prioritization
4. Video Transport Optimization
5. Active Network and RF Client Control

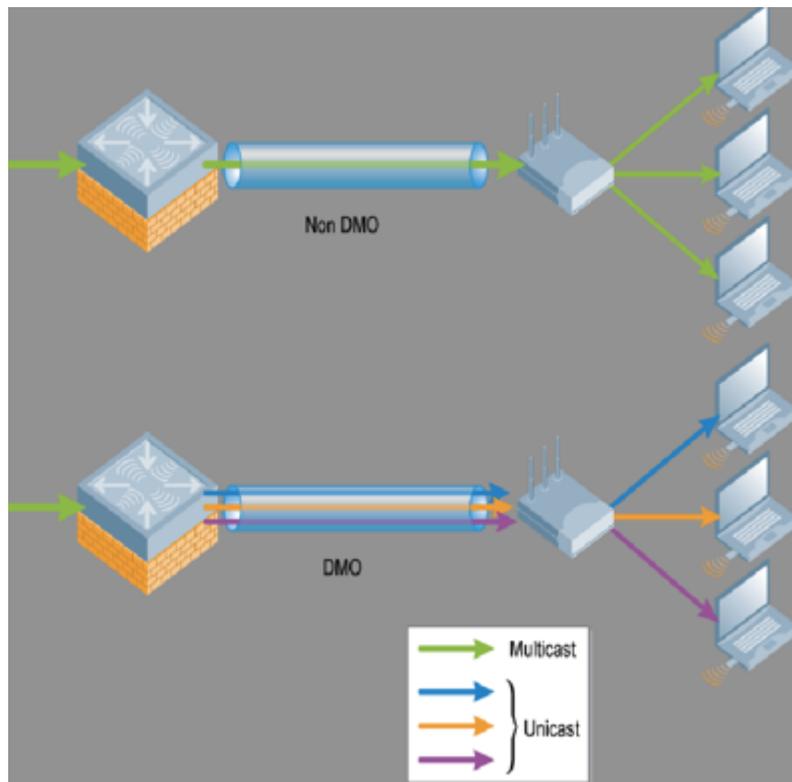


Wired Optimization with IGMP Proxy

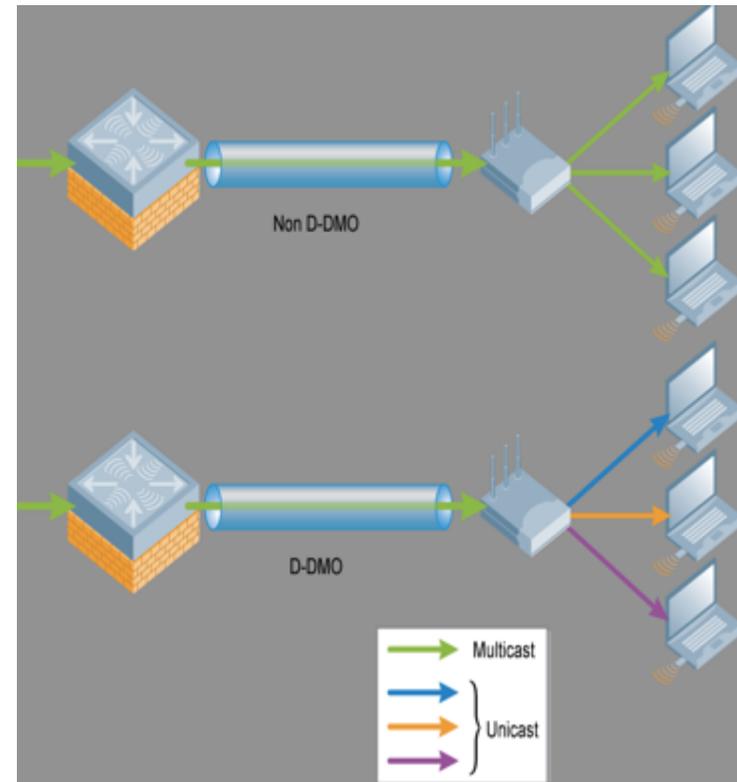
IGMP Proxy and Multicast Streams in a Centralized-Traffic WLAN



Aruba Video Optimization – Multicast to Unicast Conversion

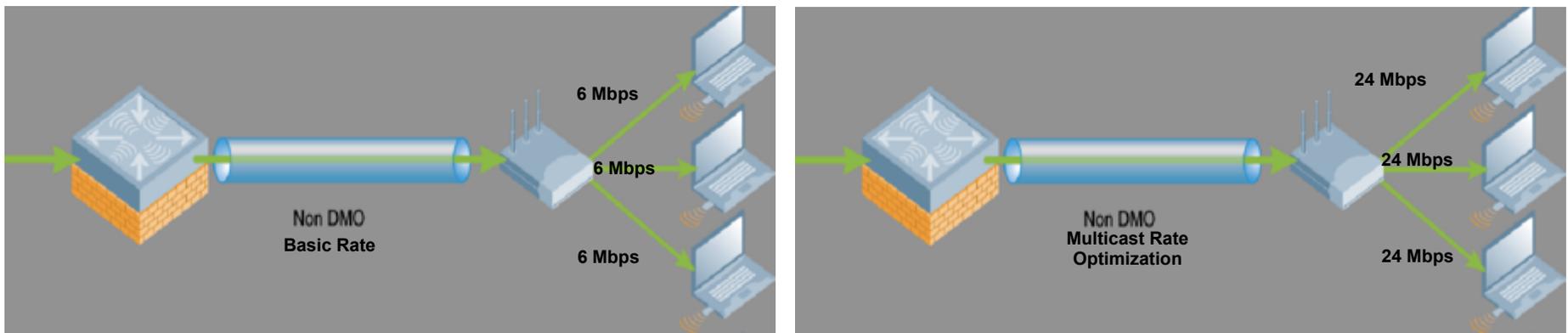


**Dynamic Multicast Optimization
(Conversion at the WLAN Controller)**



**Distributed Dynamic Multicast Optimization
(Conversion at the AP)**

Aruba Video Optimization – Multicast Rate Optimization



Without any special tuning, multicast packet will be sent at either ‘basic rate’ or ‘support rate’ whichever is lower. For example, if I have the following:

802.11a Basic Rates	18	24						
802.11a Transmit Rates	6	9	12	18	24	36	48	54

Multicast/Broadcast packet will be sent at 6 Mbps since it’s the lowest of all rates. This applies to ‘N’ as well.

Enterprise Apps: Collaboration and VDI



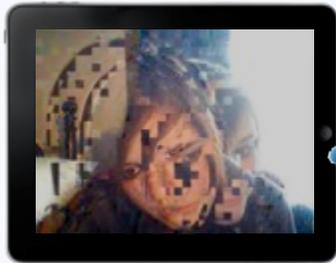
Media Classification



- To detect a Media flow type where the Signaling is encrypted
- Methods developed for identifying voice and video for
Microsoft OCS
Apple FaceTime
- After classification apply appropriate service to flow
- When identified tag the frame for transport
- Media Classification assumes data immediately follows signaling

Business Critical Apps: Citrix

Before: All traffic receives Static QoS



App: Unknown??
QoS: Static



- Enforce QoS
- ICA Visibility

After: QoS based on traffic type



- App: EMR
QoS: Highest (VI)
- App: Video
QoS: High (VO)
- App: File Sharing
QoS: Low (BE)



- Classify ICA
- Tag QoS



Aruba
Access
Network

WAN

DATACENTER

NetScaler



XenDesktop
XenApp
Farm





**Coming Up:
Tech Playground 12pm – 1:30pm**

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