

**Two Different Approaches Reducing Handoff
Latencies in Wireless Networks: Layer-2 Mobility
Management and Multiple Radios**

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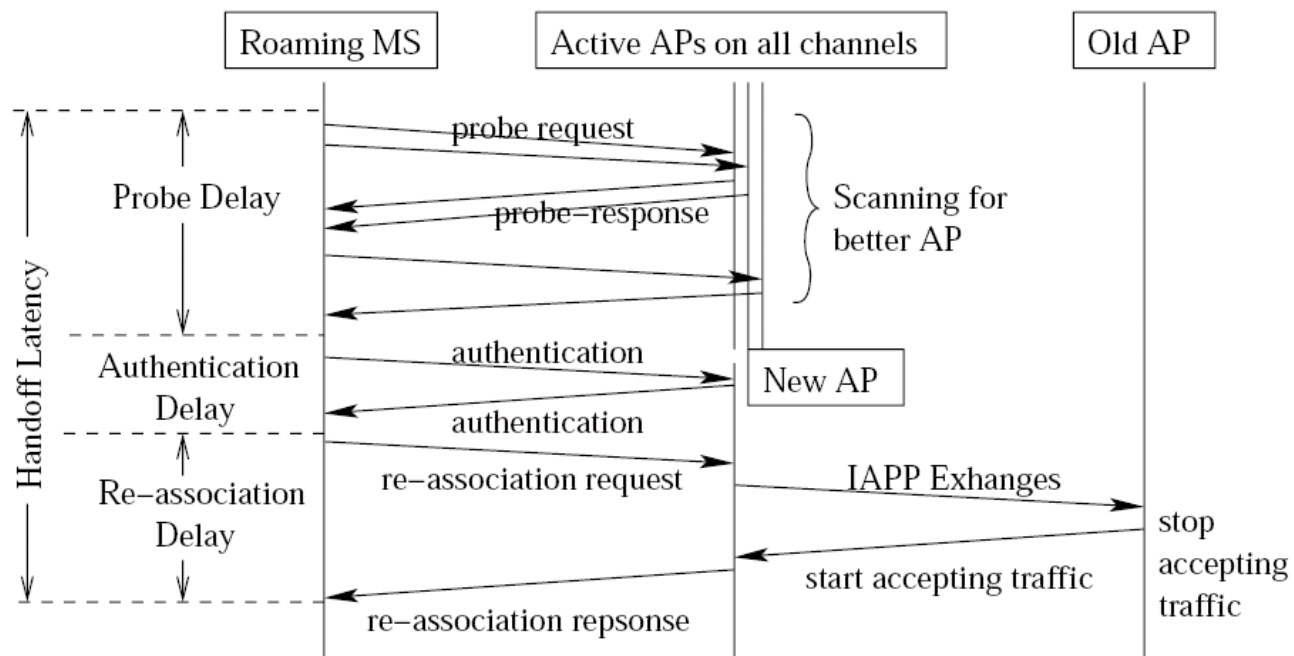


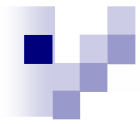
3 Steps in Handoff Procedures

- channel scanning -> probing delay
- authentication -> Authentication delay
- reassociation -> reassociation delay



Illustration of Handoff Delay



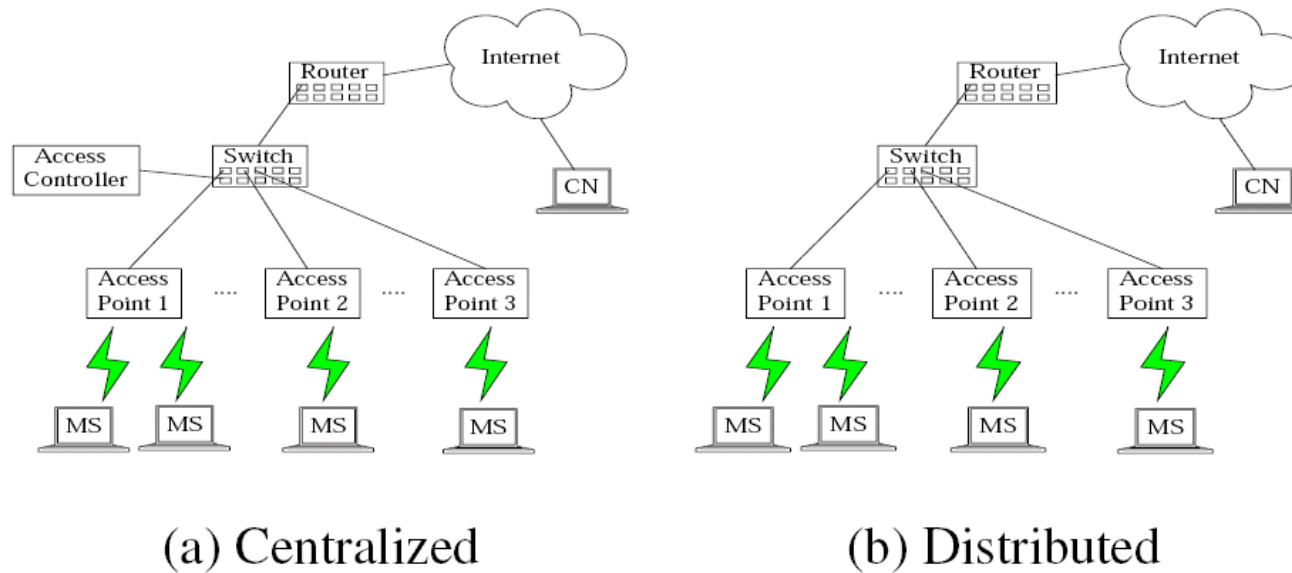


Context Information

- association state
- sequence number
- timestamp
- BSSID
- security information



Personal AP Architecture

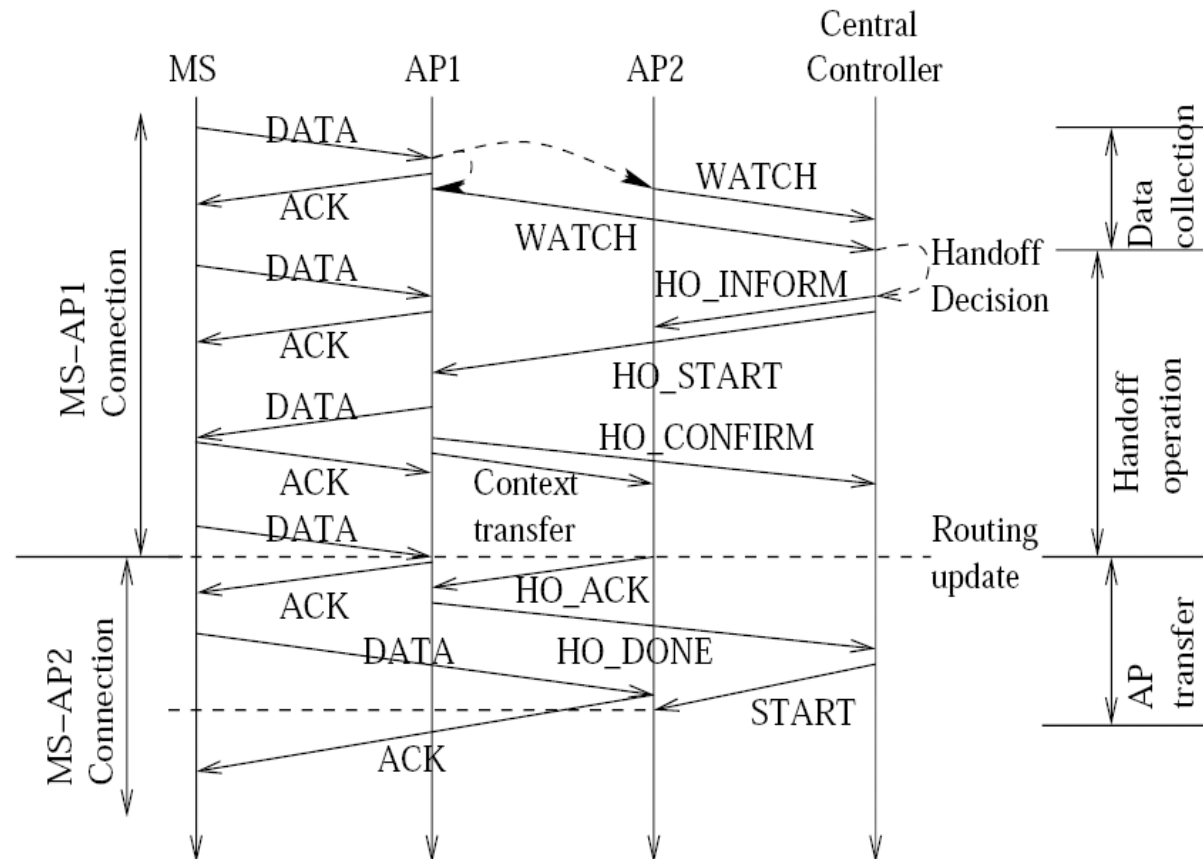




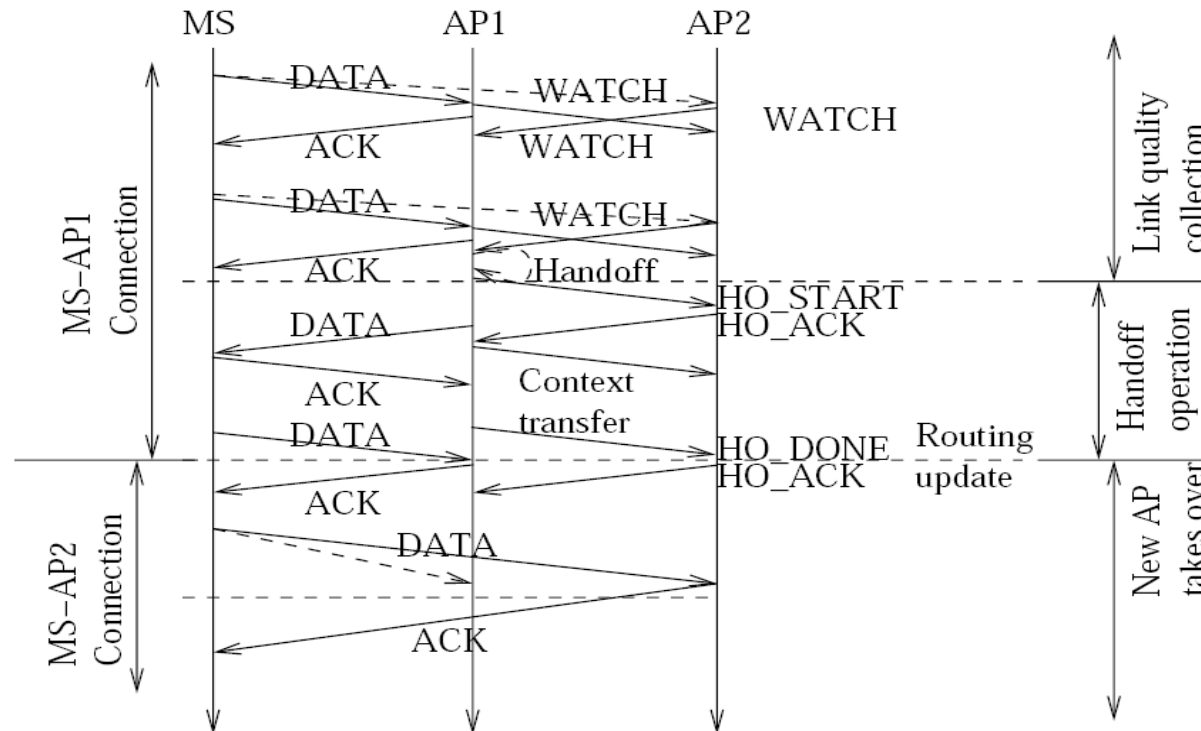
Handoff Decision

- Access Controller (AC) monitors Mobile Station (MS)
- Criteria: Received Signal Strength (RSSI)
- MS connects to new AP
- Personal AP Protocol transfers context to new AP

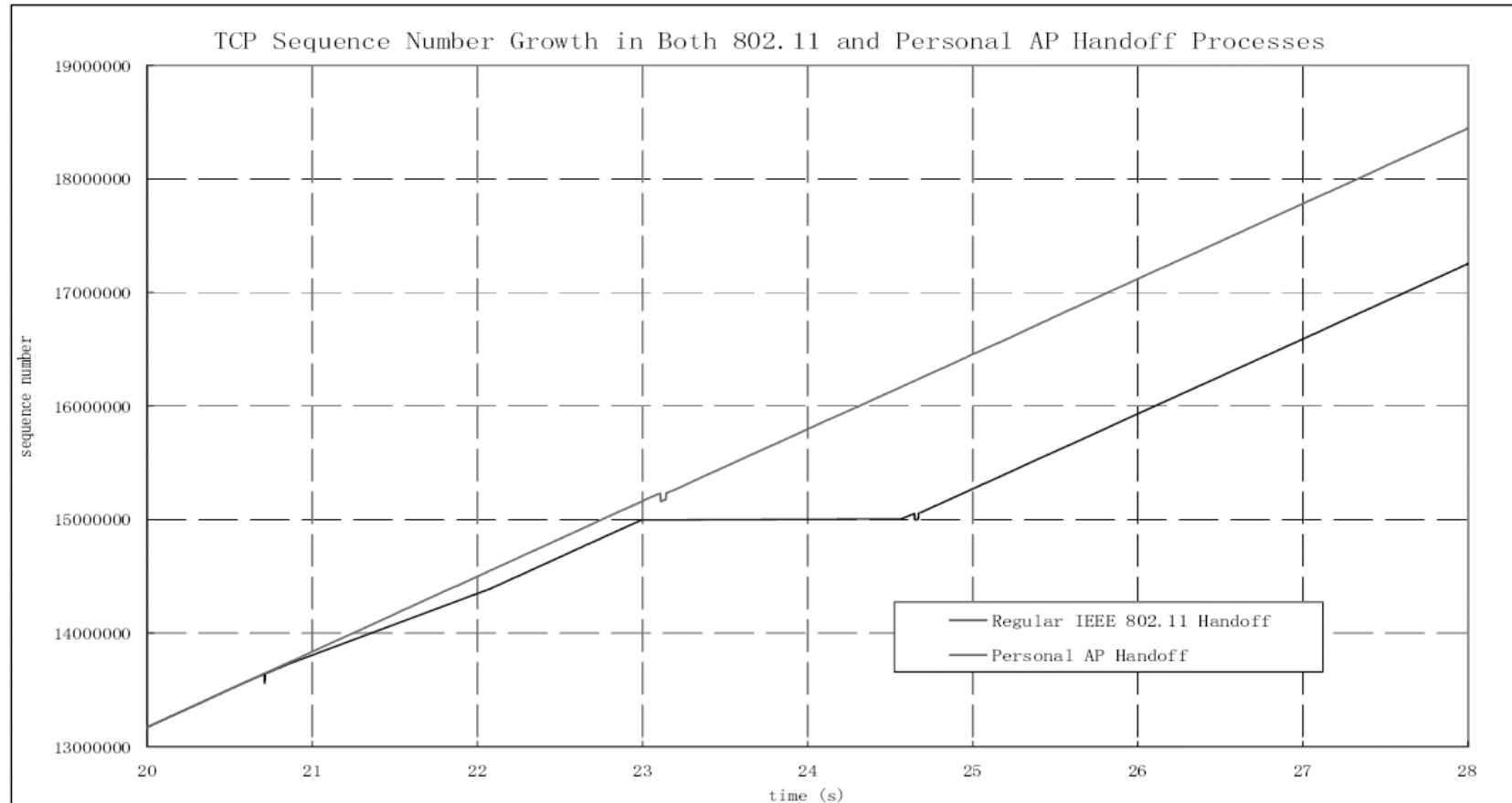
Handoff in Centralized Personal AP System



Handoff in Distributed Personal AP System

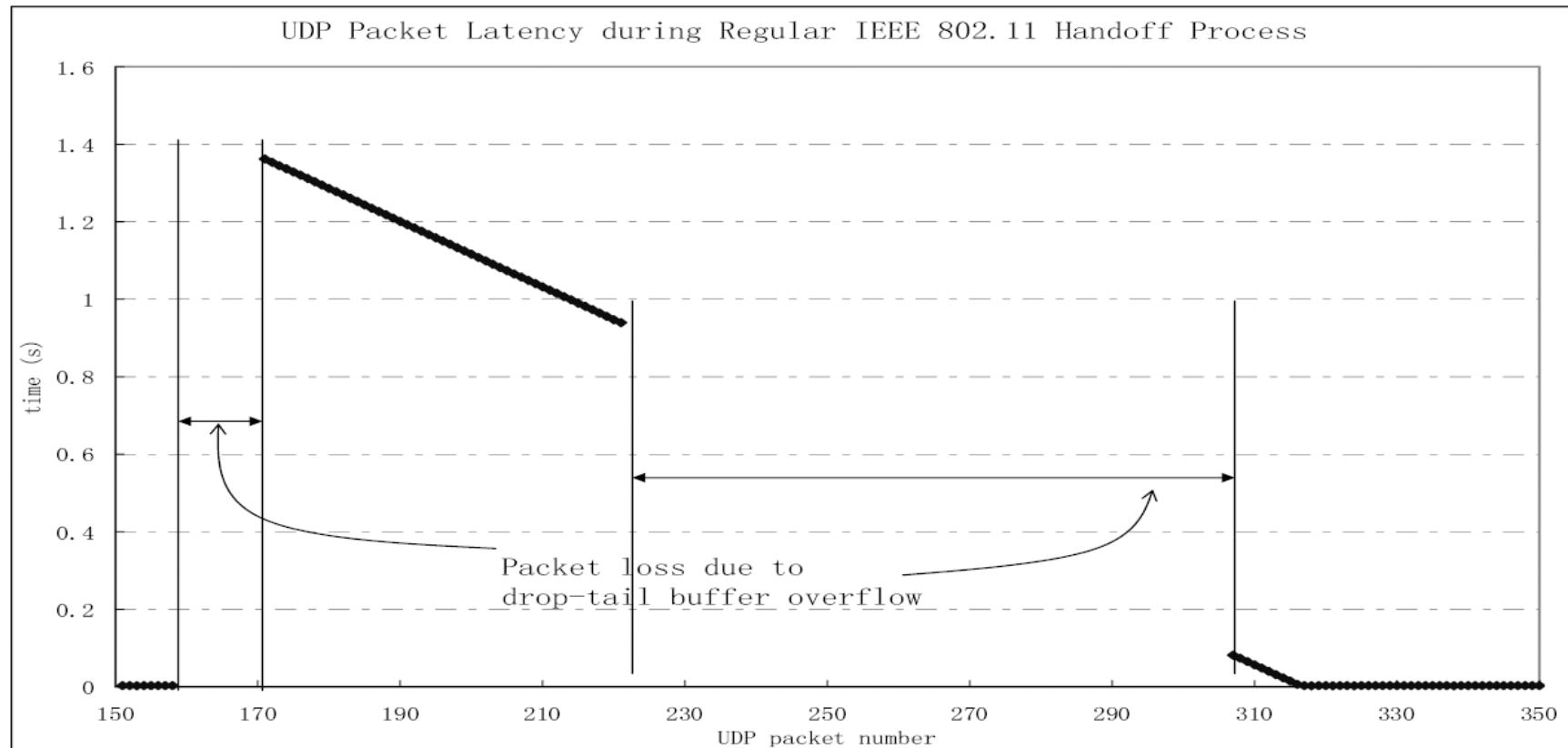


TCP Delays in 802.11 and Personal AP Systems

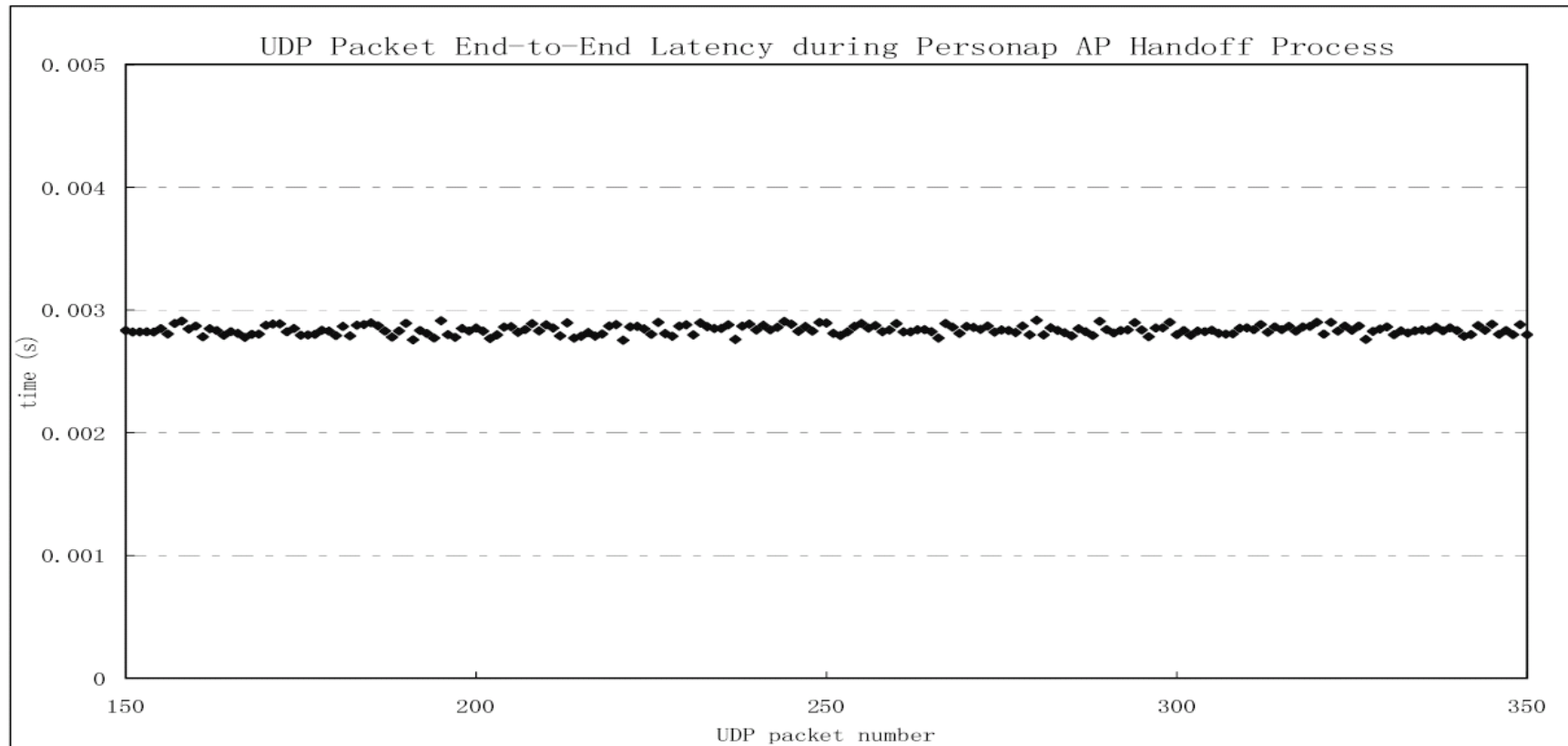




UDP Delay in 802.11 System



UDP Delay in Personal AP System





Multi Scan

- Two Interfaces
- No Changes to Access Points

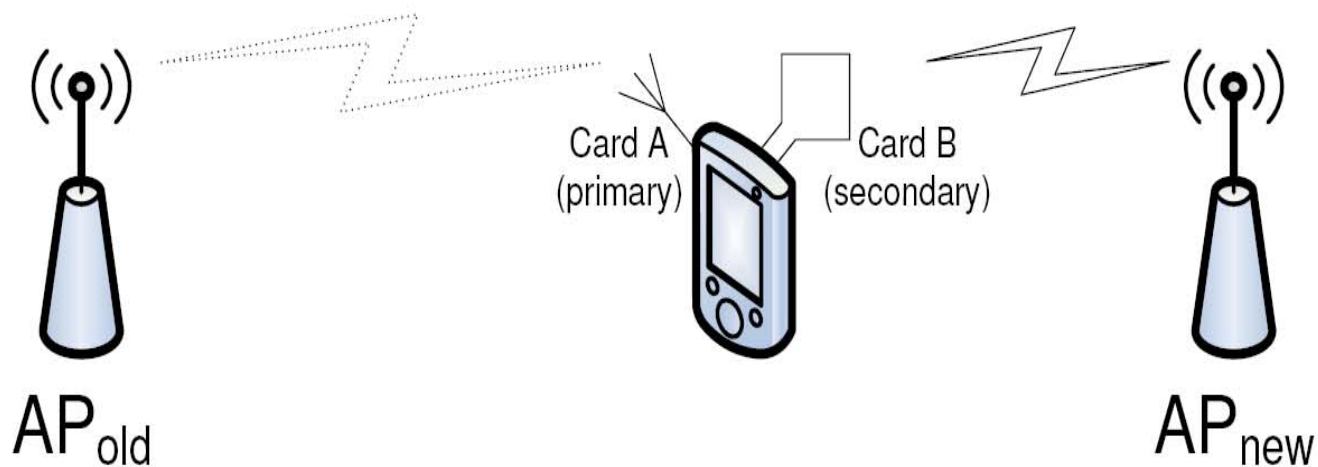


Handoff in Multiscan

- Normal Operation Interface 1
- Reassociation Interface 2
- Interface Switch
- Completion

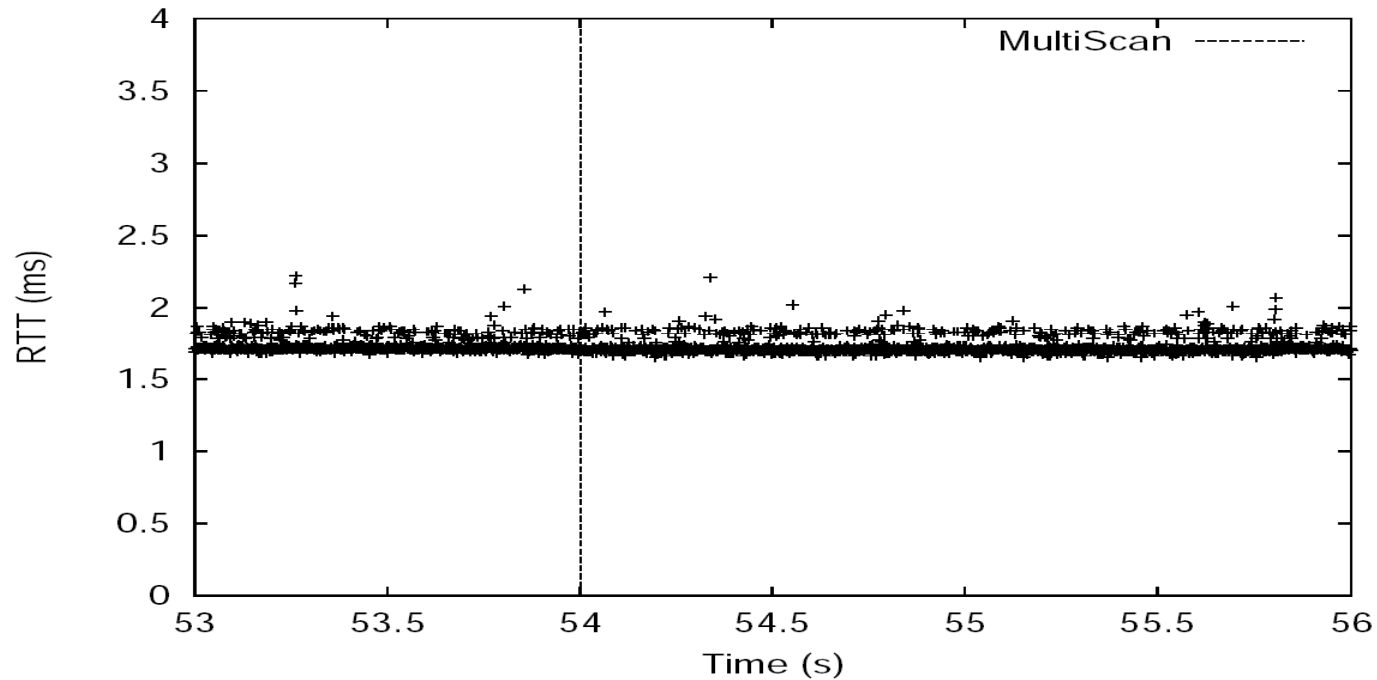


Multi Radio Handoff Scenario



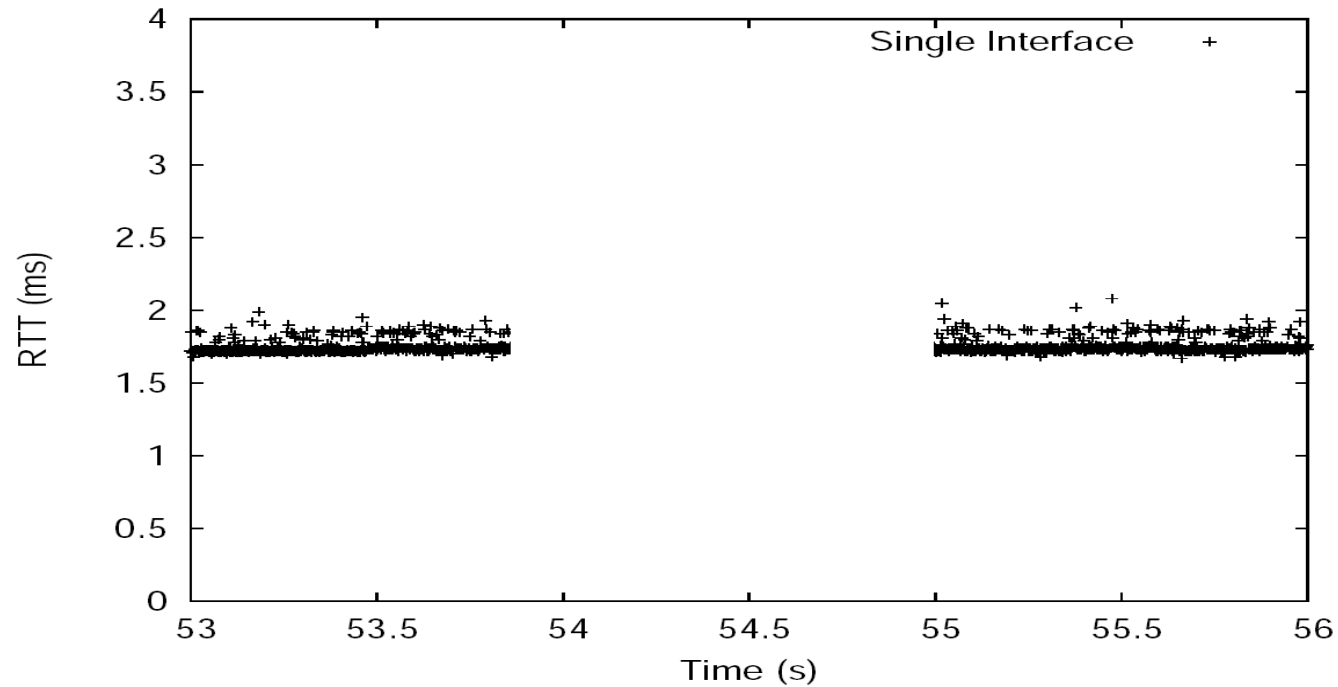


Handoff Two Interfaces





Handoff One Interface





References

- J. Wang and L. Bao, "Layer-2 Mobility Management in Hybrid Wired/Wireless Systems", The Second International Conference on Quality of Service in Heterogeneous Wired/Wireless Networks (QSHINE), Orlando, FL, August 22 - 24, 2005.
<http://www.ics.uci.edu/~lbao/publications/WangQSHINE2005.pdf>
- Vladimir Brik, Arunesh Mishra, Suman Banerjee, "Eliminating handoff latencies in 802.11 WLANs using multiple radios: Applications, experience, and evaluation", Internet Measurement Conference, Berkeley, CA, October 2005.
<http://www.cs.wisc.edu/~suman/pubs/multiscan.pdf>