

Evaluation Test Cases for Interactive Real-Time Media over Wi-Fi Networks

draft-fu-rmcat-wifi-test-case-01

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Outline

- Motivation
- **Proposed Test Scenarios**
- Additional Considerations

Motivation for Wi-Fi Test Cases

- Wi-Fi as a dominant mode of Internet connection for laptops, tablets, and smart phones
- Behavior of a RMCAT candidate solution may be impacted by the wireless transmission medium and MAC-layer behavior:
 - Time-varying, error-prone
 - Half-duplex: uplink competes with downlink
 - Over-the-air packet contentions
 - Losses and delay due to persistent retransmissions

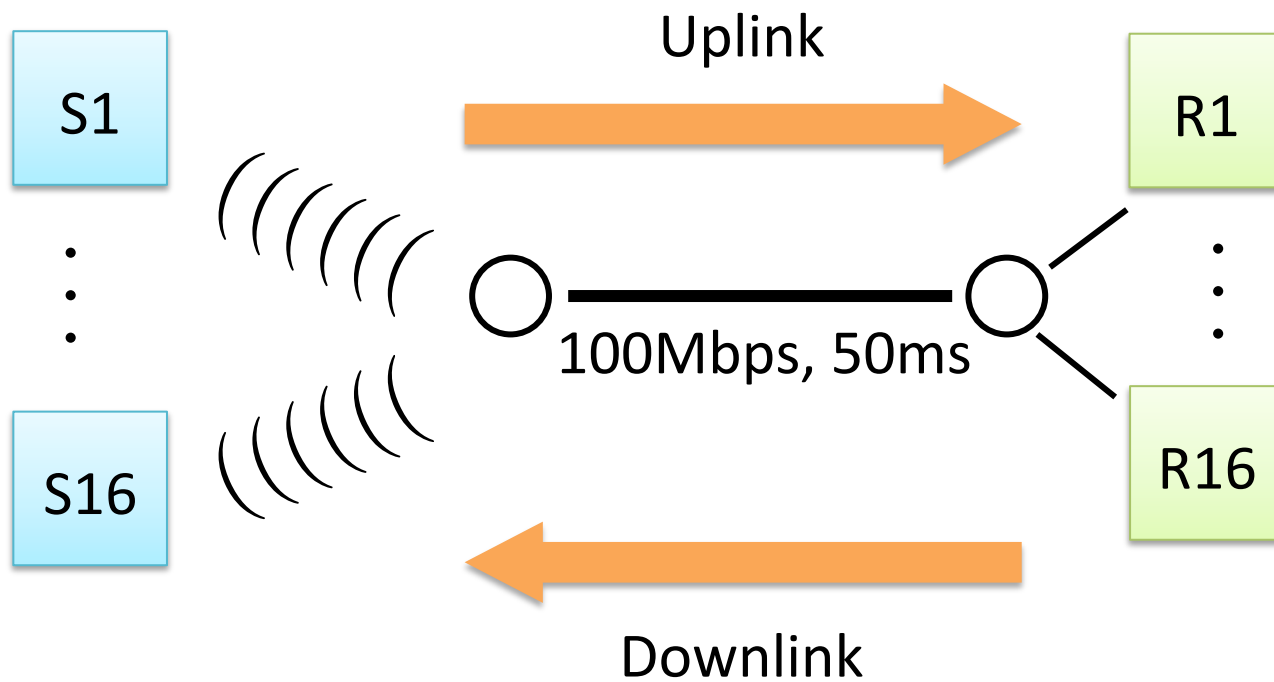
Proposed Tests: Wired Bottleneck

- Simulates home-based Wi-Fi connections
- Tests robustness of RMCAT solution in the presence of a non-congested wireless hop
- Behavior expected to be similar to that from wired network test cases
- Test Scenarios:
 - Single uplink flow
 - One pair of bidirectional flows
 - Single uplink flow vs. long TCP flow

Proposed Tests: Wireless Bottleneck

- Mimics crowded multi-user Wi-Fi networks such as coffee house or enterprise offices
- Focuses on how RMCAT solution reacts to congestion due to over-the-air packet contention
- Uplink/downlink flows may exhibit different behavior
- Test Scenarios:
 - Single uplink flow reacting to PHY rate adaptation
 - Multiple uplink/downlink/bidirectional flows
 - Multiple flows vs. long TCP

Example Topology



Which 802.11 Specification to Follow?

- Adoption in practice:
 - Currently widely deployed: 802.11g and 802.11n
 - Upcoming standards: 802.11ac, 802.11ad
 - Legacy standard: 802.11b
- Availability in simulation platforms:
 - Both ns-2 and ns-3 has Wi-Fi modules based on 802.11b/g
 - Modu802.11n is work in progress for ns-3
- Current draft is based on 802.11g specifications

Additional Testing Scenarios

- Tests with time-varying traffic load
- Tests with multiple interfering APs
- Other considerations:
 - Wi-Fi roaming between access points (APs)
 - Wi-Fi/Cellular interface switching
 - Use of EDCA/WMM in 802.11e
 - Legacy effects of 802.11b

Comments? Questions?