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# Wi–Not: Exploiting Radio Diversity in Software–Defined 802.11–based WLANs

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## Motivations

- Exponential increase in the mobile data traffic demand.
- Mashrooming of uplink-centric applications: Machine Type Communication, Internet of Things, and Vehicle-to-everything communication.

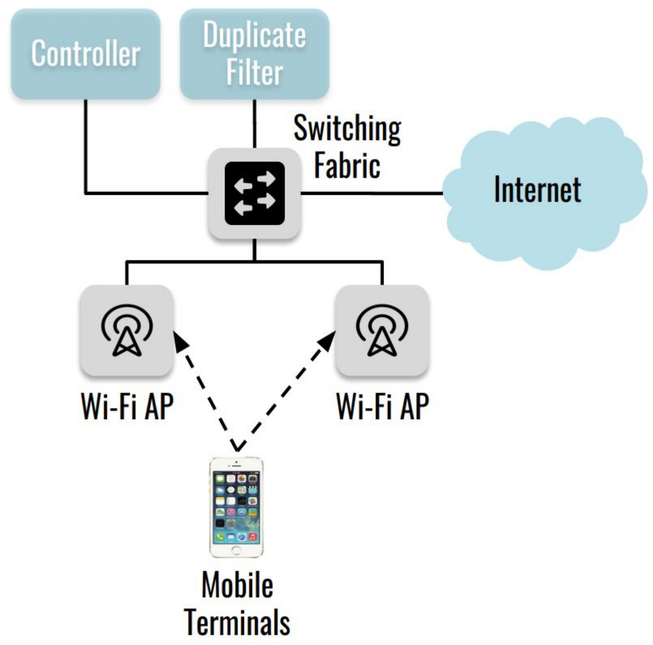
## Problems

- Currently, mobile terminals can select only a single point of attachment (i.e., an AP) and use only that in both uplink and downlink.
- Moreover, mobile terminals cannot exploit the radio diversity of WiFi networks by, for example, relying on multiple attachment points in the uplink direction.

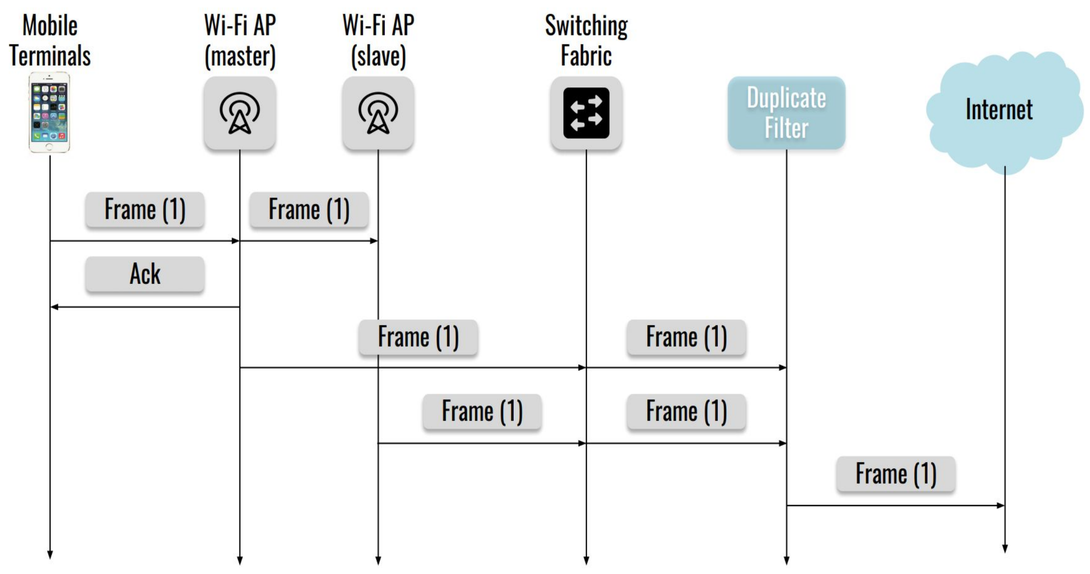
## Contributions

- An SDN–based solution is introduced capable of exploiting radio diversity in 802.11–based networks .
- An algorithm is proposed for dynamically selecting the AP that should generate the L2 ACKs.

## Wi-Not system architecture




## Frame exchange among the Wi-Not components in the uplink direction




- Master AP, which is selected based on the RSSI, is the AP providing uplink and downlink connectivity to the mobile terminal and is in charge of generating ACKs.
- Slave AP is the AP providing only uplink connectivity to the mobile terminal.
- The uplink traffic received from both APs is dispatched to the duplicate filter via the switching fabric, which is pre-configured by the SDN controller
- Duplicate filter is in charge of eliminating the redundant frames and sending a unique frame to its destination.

## Results

The experimental evaluation carried over a real-world testbed shows that the proposed approach can deliver an improvement of up to 80% in terms of UDP goodput and up to 60% of TCP throughput

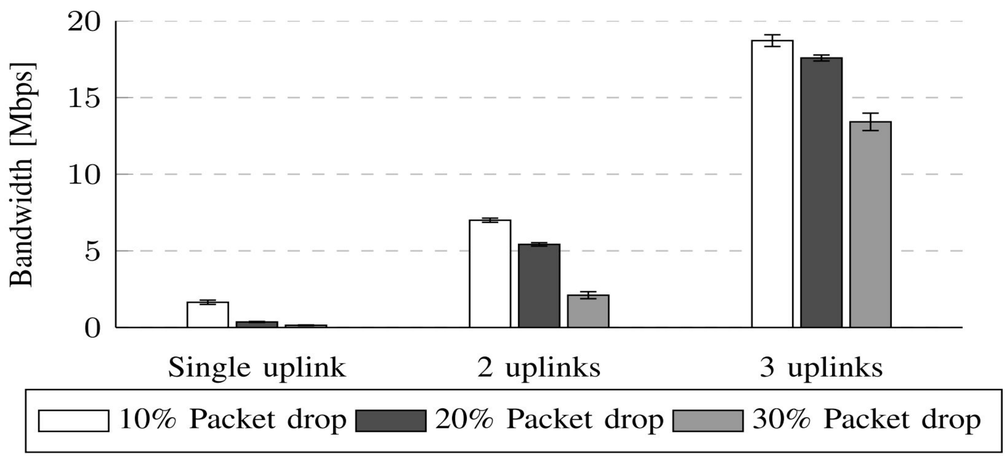



**Figure 1.** Maximum bandwidth for TCP traffic and different packet loss ratios: single vs multiple uplinks.

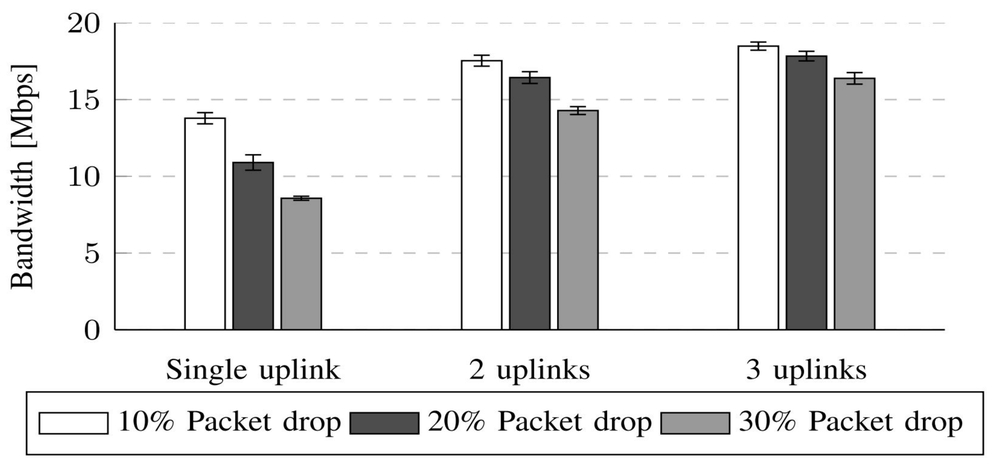



**Figure 2.** Maximum bandwidth for UDP traffic and different packet loss ratios: single vs multiple uplinks.

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