WiFi Mobility with MPTCP

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Context

- High AP density in urban areas
- Steady increase of WiFi-capable mobile devices
- WiFi is static by design
- Client is not taken care of when connectivity is lost

Current situation

- If the link fades, the client initiates a scan in order to find another AP
- Research: Speeding up the handover process
  - Does not solve the issue of losing TCP streams
  - Does not provide actual mobility

Our approach

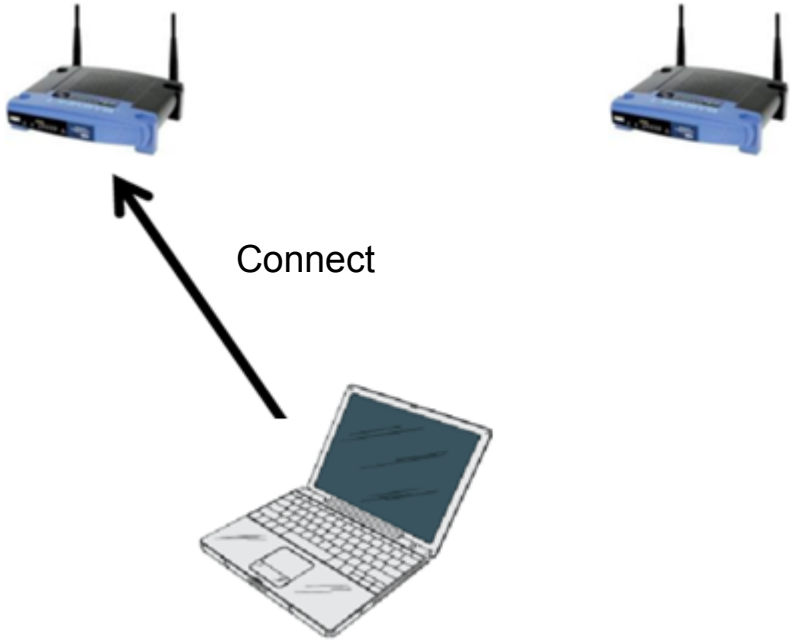
- Associate with multiple APs simultaneously
- Constantly switch between them (channels)
- Use virtual interfaces with different MAC addresses
- Use MPTCP over these, dynamically adding and removing streams

Channel switching

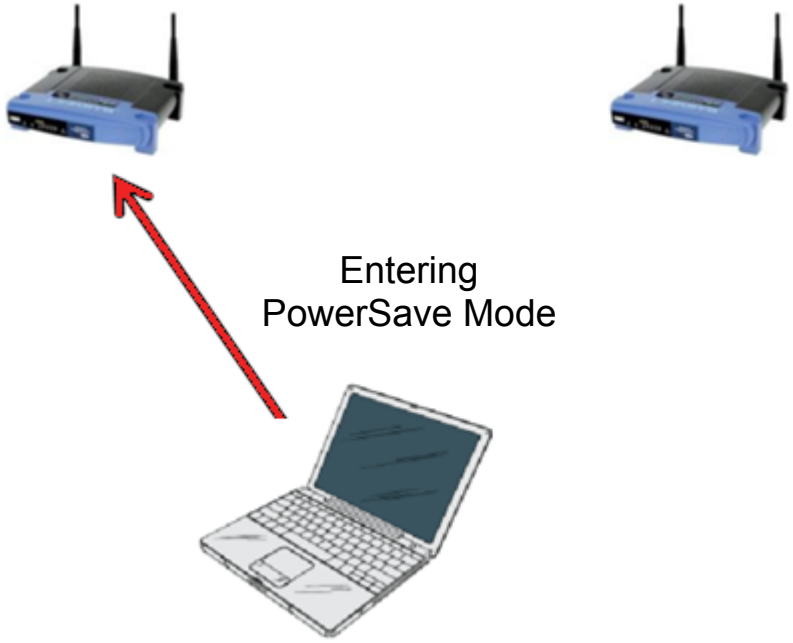
AP1

AP2

Channel switching



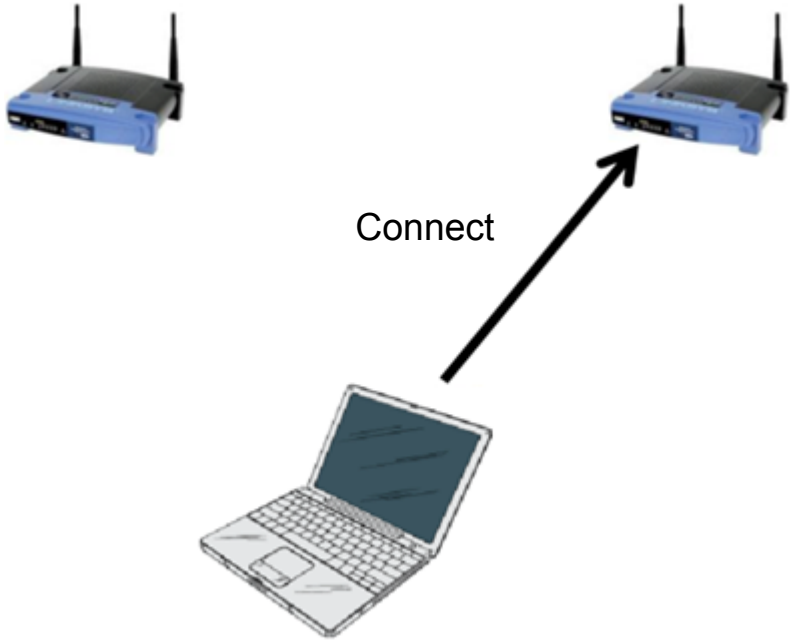
Channel switching



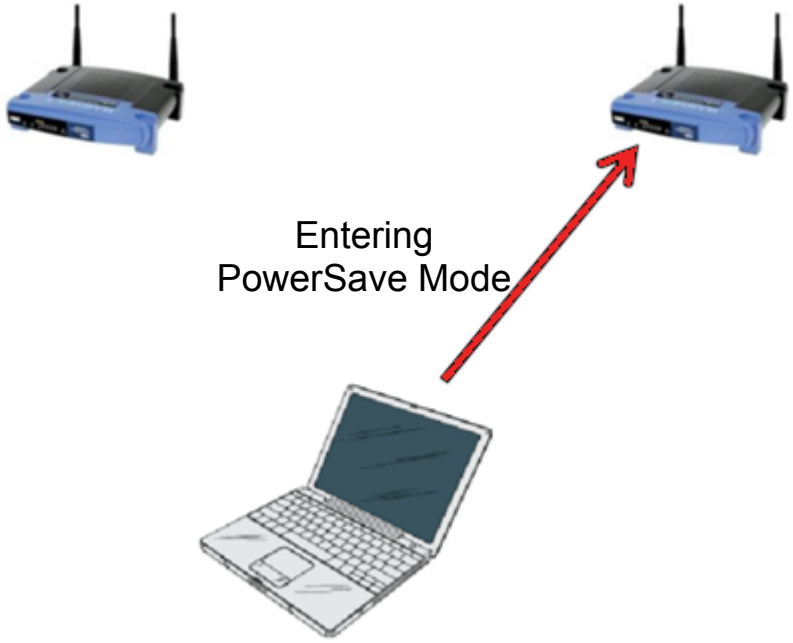
Channel switching

Reconfigure channel

Channel switching



Channel switching



Channel switching

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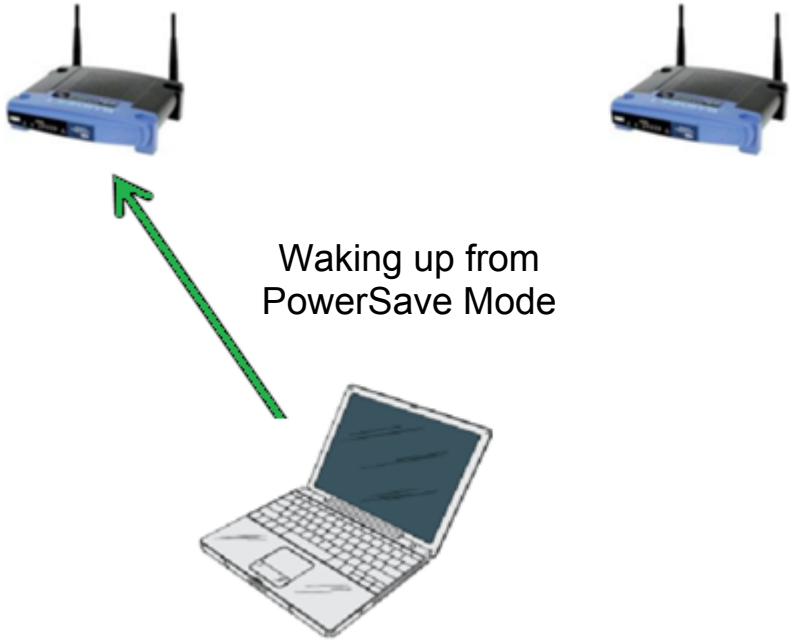

Implementation

- Modified mac80211 kernel module
- Does not depend on the underlying driver or vendor
- Channel switching is triggered dynamically

Setting up

- MPTCP-0.89 (kernel 3.14)
- Compile modified mac80211
- Unload vendor-specific wireless driver(s)
- Unload mac80211
- Load custom mac80211
- Reload wireless driver(s)
- Configure routing

Things to hack on

Run mobility experiments for the whole week!

- Mapping the IETF access points- location, SSID, channel.
- Scripts to measure performance
- Kernel hacking to fix various issues

Questions