

SENSEFUL

SDN driven Joint Access and Backhaul coordination for dense Wi-Fi Small Cell networks



I2CAT Foundation

Goals

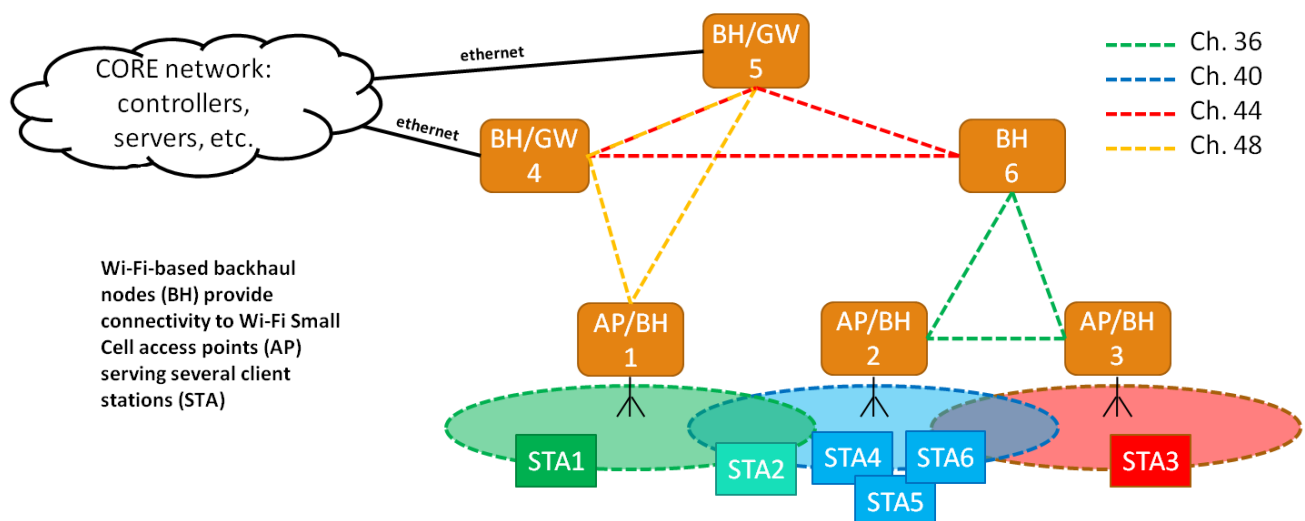
- Evaluate a novel architecture addressing the two problems of dense small cell deployments:
 - Adaptability to a varying environment and efficient mobility solutions in the dense access layer → SDN as the key enabling technology.
 - Traditional wired connectivity of access points does not meet cost/efficiency restrictions → apply novel wireless backhauling technologies.

Challenges

- **Backhaul-aware access:** the status of the wireless backhaul can determine the quality of service offered to the clients served through the access network, but this coordination requires fast and efficient communication of the two worlds.
- **Radio resource management:** the scarce radio resources available in the unlicensed bands used by Wi-Fi access and backhaul require an intelligent management.

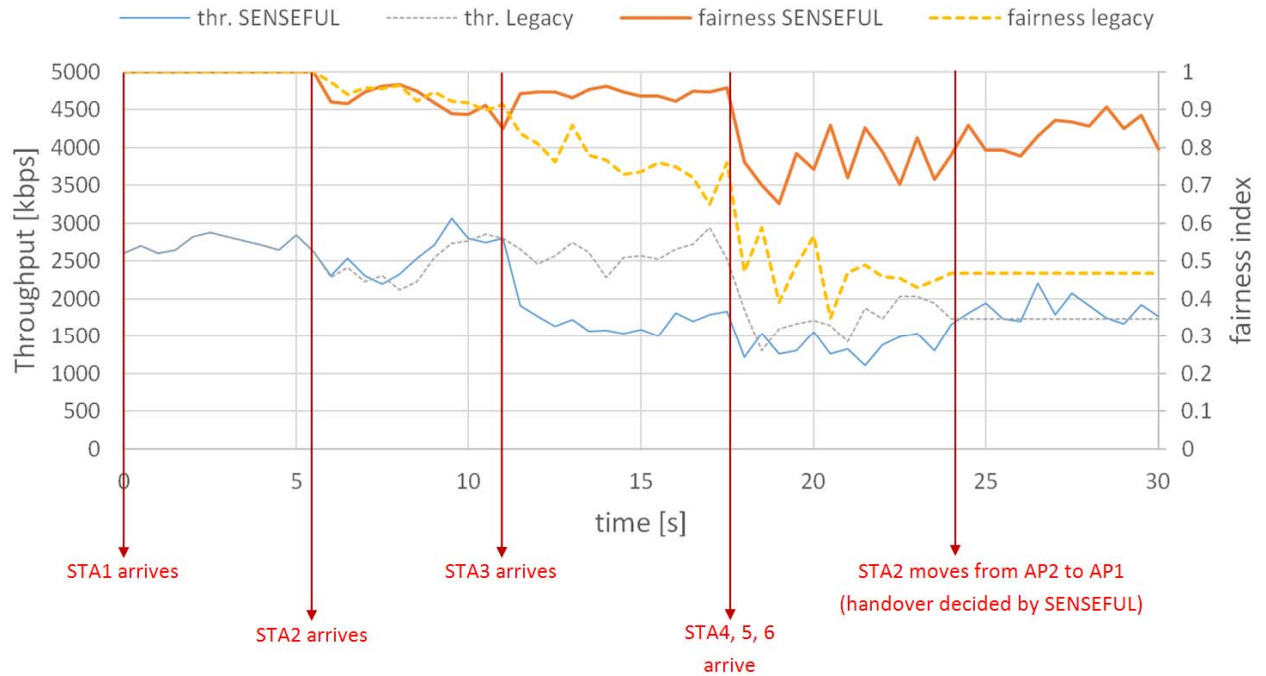
Experiment

- Joint management of access and wireless backhaul is evaluated in the topology shown below, where access points and backhaul switches compete for the same radio resources.



Results

- The experiments can be explained following a particular sequence of events that show the benefits of the proposed scheme in terms of throughput and fairness.



Conclusions

- In dense scenarios, joint control of access and backhaul allows the implementation of new strategies (e.g. backhaul-aware handovers or centralized TDMA scheduling) with evident benefits over a legacy network, where access and backhaul operate independently. Benefits are not only measured with conventional KPIs (fairness, throughput) but also in intangible terms such as flexibility.

Feedback

- WiSHFUL allowed us to put to the test our vision of future ultra-dense small cell deployments. This vision includes wireless multi-hop backhaul operating in coordination with the access network. The WiSHFUL platform was both the canvas and the brush we used to make that vision tangible, measurable and arguable.