Section D. Leaflet

Title of the Experiment: Experiments for the validation of predictive wireless network management - ExpertNet

Name of the organisation: Incelligent

Logo of the organisation:

Goals of experiment:

- Increase the validity of the Incelligent proactive network management solutions through testing in a realistic environment.
- Prove the applicability and performance gains of the Incelligent products, thus contributing to the level of trust and intention of adoption by the Industry

Main challenges of Experiment:

The main challenges of ExpertNet were:

- to interface intelligent software stack with the UPIs of WiSHFUL on top of w-iLab.t testbed
- to develop and evaluate proactive, band and channel traffic steering mechanisms that work with minimum feature open source based 802.11 interface management stacks to improve the behaviour of access points and terminals in the underlying wireless environment.

Setup

ExpertNet used WiSHFUL UPIs along with Incelligent software to manage the wireless nodes with 802.11 interfaces. A UPI-based controller was installed on a node that acted as the experiment's controller and UPI-based agents on the rest of the experiment's nodes. The WiSHFUL framework was used through a python virtual environment.

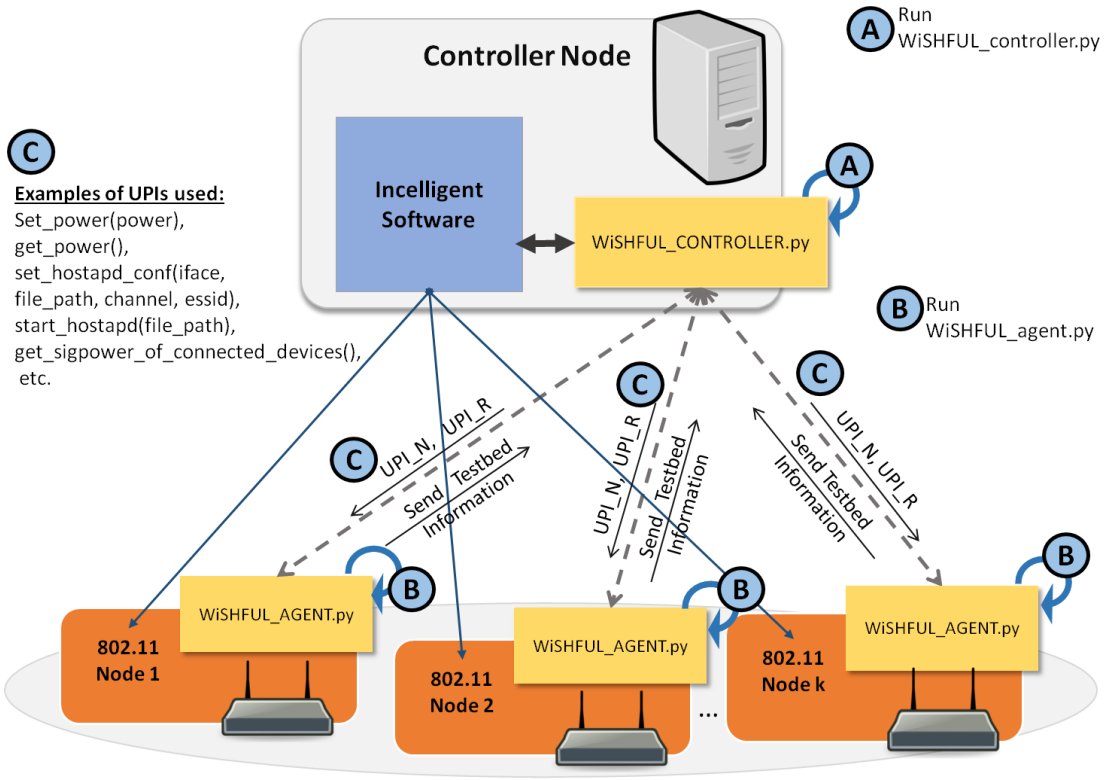

Figure 1: Software setup topology

Sets of experiments:

- *Steering Procedure Testing*: measurements were collected to evaluate the efficiency of the steering procedure and identify the best usage scenarios by Incelligent proactive management system.
- *Station Balancing*: Incelligent steering procedure and other techniques were combined so that the number of associated stations is balanced among distinct 802.11 Access Points set to the same SSID.
- *Spectral Resources Allocation*: Two classes of known stations, Gold and Silver, were associated with two different classes of 802.11 Access Points for the distribution of spectral resources.

Main results:

- Required time to steer a station to another BSSID in seconds and its implications to layer-3 latency.

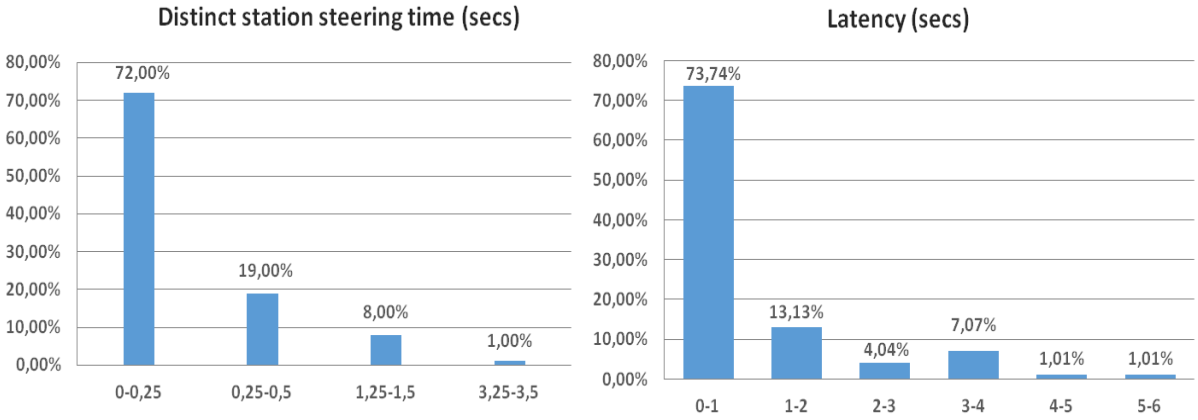

Figure 2: Left: 802.11 steering in seconds, Right: Added latency in seconds due to steering

- Spectral and 802.11 AP resource balance impact on throughput

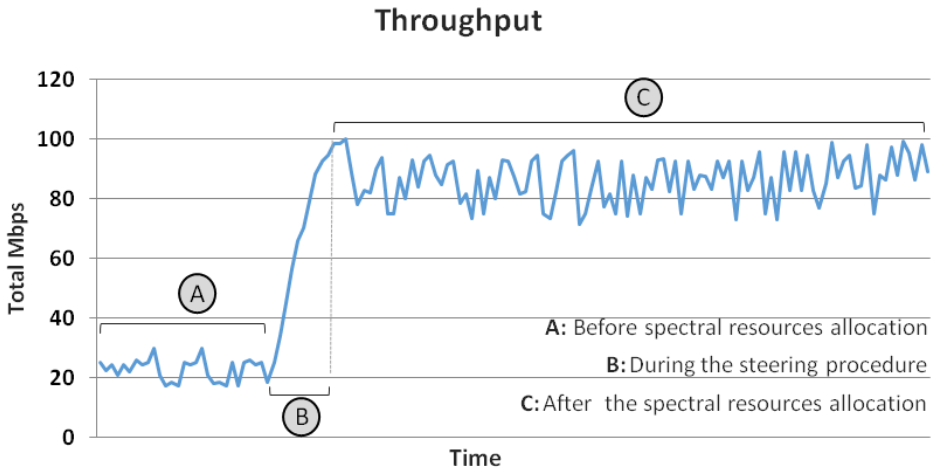

Figure 3: Throughput increase upon spectral and 802.11 AP resource balance

Conclusions:

- identification of the limitations and the best usage scenarios of the implemented steering mechanisms by Incelligent proactive management system and network state prediction algorithms.
- evaluation of integration strategies for Incelligent proactive management system with open source software based 802.11 APs
- positive overall valuation of ExpertNet's results:
  - significant increase of throughput after the spectral resources allocation
  - very good steering time and added latency

Feedback:

The WiSHFUL framework was relatively easy to use and to extend and the WiSHFUL consortium was extremely helpful. WiSHFUL is going to have a great impact on the experimentation driven research in wireless communications technologies. Thanks to the software and hardware tools provided by WiSHFUL, Incelligent was able to enhance its product offerings and position itself better in the market.