Wi–Balance: SDN–based load–balancing in Enterprise WLANs

Estefanía Coronado, José Villalón, Antonio Garrido

High-Performance Networks and Architectures (RAAP). Albacete Research Institute of Informatics (I3A). University of Castilla-La Mancha, Albacete, SPAIN

Abstract

The high demand for wireless connectivity and the increase in the applications bitrate have lead to deploy denser and heterogeneous networks. However, an inefficient management of the network resources may arise poor performance and collision issues, therefore presenting a new set of challenges. In this demo, we will leverage on the Software Defined Networking (SDN) paradigm to show Wi–Balance, an algorithm able to achieve an effective balance of the traffic load in Wi–Fi networks with the aim of providing an optimum distribution of the network resources and improving the global performance.

5G-EmPOWER

Open toolkit for SDN/NFV research in wireless networks that provides a high–level reference system and a wide range of programming abstractions.

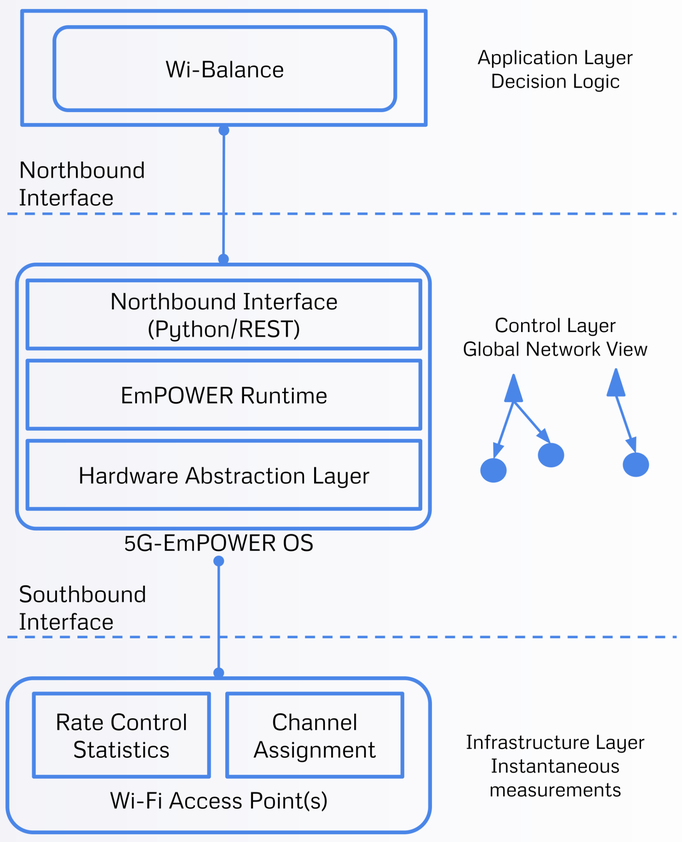


Fig. 1. Wi-Balance system architecture.

Wi-Balance

Effective load-balancing by the scheduling of several phases:

- *Phase 0*: quality map estimation and neighbor discovering.
- *Phase 1*: network traffic estimation. The transmissions bitrate and the signal quality of the clients are calculated at the different points of the network.
- *Phase 2*: Wi-balance is run, the network configuration is redistributed and the traffic flows keep being transmitted.

Demonstration

Considerations of the demo deployment:

- The clients Cl1 and Cl2 transmit some flows to the AP1.
- Both APs operate initially in the same channel.

Demo procedure:

1. The handover of one active client is performed to the AP2.
2. Channel reassignments aim to isolate collisions domains.
3. After one transmission finishes, the algorithm recalculates the network distribution considering the current performance, the network configuration and the clients channel quality.

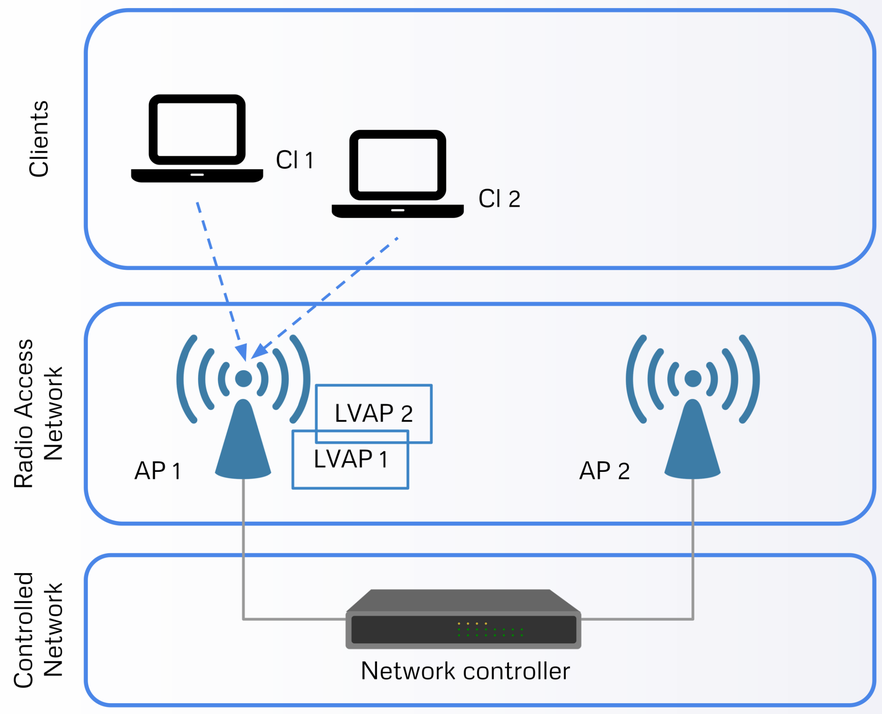
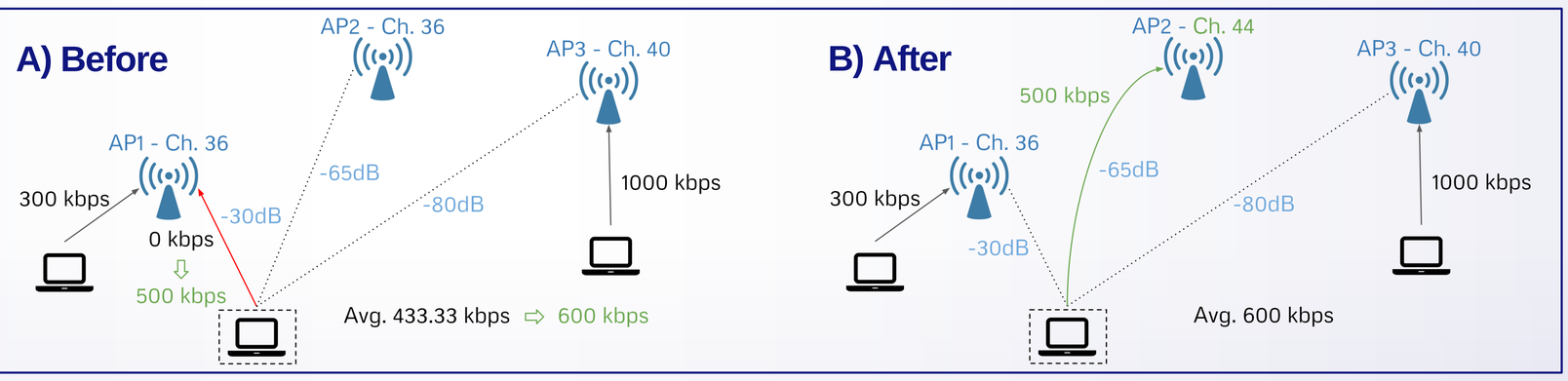


Fig. 3. Wi-Balance system demonstration deployment.

Conclusion

The adequate management of the network flows, the collision domains and the clients signal quality improves the network performance and the user experience.

Network configuration 1. A station begins a transmission. Collisions may occur, so it is moved to a different channel and AP.



Network configuration 2. A station finishes a transmission. It is moved to the AP providing the best RSSI.

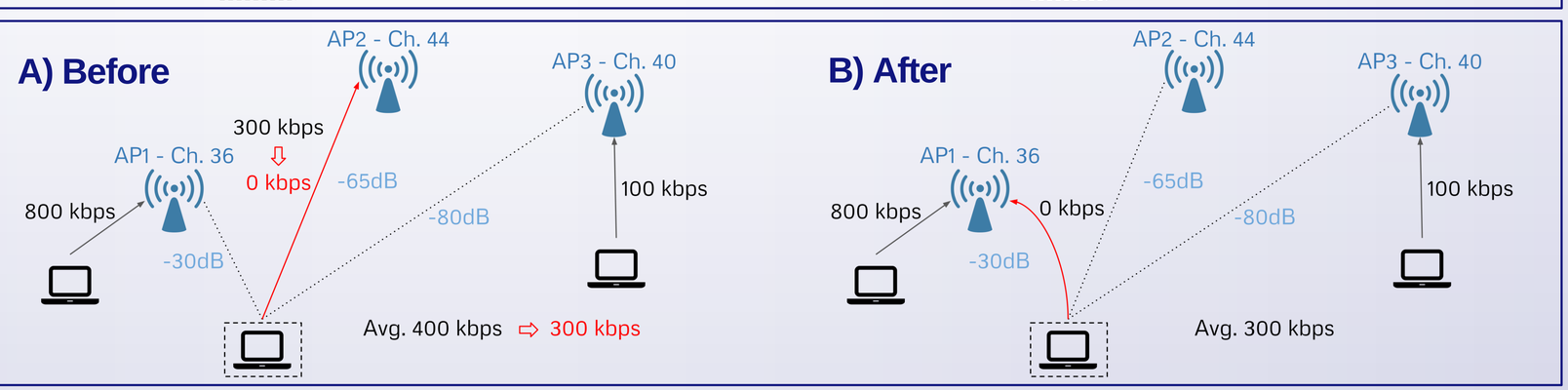


Fig. 2. Examples of the Wi-Balance working mode.

IEEE Conference on Network Softwarization (NetSoft 2017)
Bologna, Italy. 3 - 7 July 2017

Acknowledgments: This work has been supported by the Spanish Ministry of Economy under project TIN2015-66972-C5-2-R and by the European Union's MINECO/FEDER funds under Grant Agreement BES-2013-065457.