

speed from the start of the simulation, as the two variants of scenario 3 have the same value only for a few seconds. Then, the difference in output between the two speeds widens; for a speed of 50 km/h the output registers a maximum value of 8000 bit/sec whereas with a speed of 100 km/h it reaches 11563 bit/sec.

3. Discussion of the Results

In a WiMAX mobile and satellite during a vertical handover networks, the transport protocol plays a fundamental role for creating transparency of passage during a vertical handover between the two networks. We have seen this by comparing the different scenarios shown in this chapter. As we have already noted, SCTP and MSCTP are not reliable protocols for a vertical handover between WiMAX Mobile and DVB-RCS Satellite, as the present reliable flows that are aggravated by the effect of increasing the speed, as well as the number of subscribers in the two networks' coverage zones.

As for CSCTP, this protocol has proven to be very resistant to the effects of a vertical Handover between WiMAX and Satellite networks as it achieves a satisfactory mean output. Nevertheless, increasing the speed of movement involves decreasing the mean output by nearly 33%.

We explain these results by the speed with which the CN is informed when a handoff mode is triggered by the MN using the chunks flags' Hbit. This modification enables the CN to consider simultaneously both the paths defined by the MN (the old and the new) as primaries.

In this case, the CN sends duplicated packets on the two primary addresses to the MN. With the substantial delays satellite communications involve, for MSCTP the data packets are sent from the old IP address before the MN considers the new IP address as a primary address for the association underway.

4. Conclusion

Due to the great difference in performance between the WiMAX Mobile and Satellite systems, interconnection between them has proven to be very complex. In this chapter we have suggested an interconnection model between a spatial network based on the principle of diffusion by satellite, and formed of two combined systems: the DVB-S/RCS and a WiMAX Mobile network. With the aim of achieving transparent passage between these two systems with the both constraints of speed and of the number of subscribers, we have based our study on the use of three transport protocols: SCTP MSCTP and CSCTP

The results of simulations obtained from our model show that the CSCTP transport protocol is better adapted for a vertical Handover between WiMAX Mobile and Satellite networks. Thus, use of the Multihoming concept is more favorable for the output in the context of using the CSCTP protocol than for the MSCTP protocol, which suggests results comparable to those of the SCTP.

5. References

- [1] S. Sadouni, M. Benslama, A. Mebarki, A. Beylot: SCTP-WSN new extension for more reliable sparse wireless sensor networks .2017 13th International Wireless Communications and Mobile Computing Conference (IWCMC) , p. 2109 - 2114, 2017
- [2] S. Sadouni, M. Benslama, A. L. Beylot: New SCTP protocol extension for more robust Ad Hoc mobile networks. 2016 4th International Conference on Control Engineering & Information Technology (CEIT),p. 1 – 6, 2016,
- [3] S. Sadouni, M. Benslama, A. L. Beylot: Increasing the performances of UMTS and WIMAX heterogeneous mobile networks by the integration of Multihoming. 2016, 4th International Conference on Control Engineering & Information Technology (CEIT), p. 1 – 6, 2016,
- [4] L.Xu, P.Wang, Q.Li, et al': Call admission control with inter network cooperation for cognitive heterogeneous networks. IEEE Transactions on Wireless Communications , Vol. 16, n° 3, pp.1963 – 1973, 2017 .
- [5] H. Zhang, P.Dong, S.Yu, et al': A scalable and smart hierarchical wireless communication architecture based on network/user separation. IEEE Wireless Communications , Vol. 24, n° 1, pp. 18 - 24 , 2017.

