Throughput Performance Measurement of the MPT-GRE Multipath Technology in Emulated WAN Environment

Szabolcs Szilágyi, Imre Bordán

University of Debrecen, Faculty of Informatics
szilagyi.szabolcs@inf.unideb.hu
bordanimre@gmail.com

Conference on Information Technology and Data Science
November 6–8, 2020
Debrecen, Hungary

Internet architecture enables only a single data path between two communication endpoints within a communication session. On the other hand decent communication equipment (laptops, tablets, phones) are equipped at the factory with several network interfaces (Ethernet, Wi-Fi, 3G, 4G). It does not worth not to use these hardware-given possibilities, which could increase the performance of the communication between two devices, using two or more communication paths. In this paper we presented a possible solution by implementing the MPT-GRE software library [1]. This software was developed under Linux and is based on a totally new architecture, in comparison with the classical TCP/IP model, providing an easy-to-use extension of the current TCP protocol stack. In our previous papers we investigated its performance in various laboratory measurement environments (see e.g. [2–9]). In this paper we tried to do it in a much more realistic environment, using the Dummynet WAN emulation software. The measurement results confirmed that the MPT-GRE multipath solution is able to efficiently aggregate the performance of physical connections in the emulated WAN environment as well.

Keywords: MPT-GRE, multipath communication, Dummynet, throughput, WAN Emulator.

Acknowledgements. This work was supported by the construction EFOP-3.6.3-VEKOP-16-2017-00002. The project was supported by the European Union, co-financed by the European Social Fund.

References

[1] G. Lencse, S. Szilágyi, F. Fejes, M. Georgescu: *MPT Network Layer Multipath Library - Internet Draft v6*, 2020,
URL: `https://tools.ietf.org/html/draft-lencse-tsvwg-mpt-06` (visited on 10/10/2020).

[2] B. Almási, S. Szilágyi: *Throughput Performance Analysis of the Multipath Communication Library MPT*, in: TSP 2013 – The 36th International Conference on Telecommunications and Signal Processing, Rome, Italy, 2013, pp. 86–90,
DOI: `https://doi.org/10.1109/TSP.2013.6613897`.

[3] B. Almási, S. Szilágyi: *Investigating the Throughput Performance of the MPT Multipath Communication Library in IPv4 and IPv6*, International Journal of Advances in Telecommunications, Electrotechnics, Signals and Systems 5.1 (2016), pp. 53–60,
DOI: `https://doi.org/10.11601/ijates.v5i1.148`.

[4] B. Almási, G. Lencse, S. Szilágyi: *Investigating the Multipath Extension of the GRE in UDP Technology*, Computer Communications 103 (2017), pp. 29–38,
DOI: `https://doi.org/10.1016/j.comcom.2017.02.002`.

[5] S. Szilágyi, I. Bordán, L. Harangi, B. Kiss: *MPT-GRE: A Novel Multipath Communication Technology for the Cloud*, in: 9th IEEE International Conference on Cognitive Infocommunications : CogInfoCom 2018 Proceedings, Piscataway (NJ), USA, 2018, pp. 81–86,
DOI: `https://doi.org/10.1109/CogInfoCom.2018.8639941`.

[6] S. Szilágyi, F. Fejes, R. Katona: *Throughput Performance Comparison of MPT-GRE and MPTCP in the Fast Ethernet IPv4/IPv6 Environment*, Journal of Telecommunications and Information Technology 3.2 (2018), pp. 53–59,
DOI: `https://doi.org/10.26636/jtit.2018.122817`.

[7] S. Szilágyi, I. Bordán, L. Harangi, B. Kiss: *Throughput Performance Comparison of MPT-GRE and MPTCP in the Gigabit Ethernet IPv4/IPv6 Environment*, Journal of Electrical and Electronics Engineering 12.1 (2019), pp. 57–60.

[8] S. Szilágyi, I. Bordán, L. Harangi, B. Kiss: *Throughput Performance Analysis of the Multipath Communication Technologies for the Cloud*, Journal of Electrical and Electronics Engineering 12.2 (2019), pp. 69–72.

[9] S. Szilágyi, I. Bordán: *The Effects of Different Congestion Control Algorithms over Multipath Fast Ethernet IPv4/IPv6 Environments*, in: Proceedings of the 11th International Conference on Applied Informatics (ICAI 2020), vol. 2650, Eger, Hungary, 2020, pp. 341–349,
URL: `http://ceur-ws.org/Vol-2650/paper35.pdf`.