

Using Cross-layer Information to Improve TCP Performance with Vertical Handover

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Abstract

In this paper we study the performance of TCP with vertical handover between access networks with widely varying link characteristics. TCP being an end-to-end protocol has performance problems as its behaviour depends on the end-to-end path characteristics which are likely to be affected by a vertical handover. We have proposed a set of enhancements to the TCP sender algorithm that make use of the cross-layer information regarding the change in the link characteristics. We carry out a systematic study of TCP behaviour and problems in various handoff scenarios between networks with different bandwidth and delay characteristics. We also apply our enhanced algorithms in the same scenarios. Based on the results we refine the algorithms and come up with an empirical formula for the conditions to invoke the enhancements. Our experiments show that with cross-layer notifications TCP performance in vertical handover scenarios can be improved significantly.