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Proxy Based Mobile Networking: End-to-End Reliability and Surviving Proxy Failures

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Abstract

Most of the traffic in the Internet today is carried over the reliable byte stream service provided by TCP. While TCP provides an effective byte stream service between two node endpoints, it does so at the cost of not supporting mobility, since TCP provides no way for an endpoint to change its IP address while remaining party to an existing connection. MSOCKS, an architecture that extends TCP to support mobility in a backwards compatible fashion has been proposed in a previous paper. The architecture proposes to provide mobility support by interposing a Proxy in the middle of the communication path, and by using a Splice and Resplice operation to connect together different reliable byte streams while maintaining reliability over the conjunction of the byte streams. This paper expands and demonstrates the validity of the MSOCKS architecture. Our proposed extensions to MSOCKS preserve end to end semantics of the transport layer over all scenarios of exceptions resulting from mobility, including repeated incomplete reconnections, followed by a successful one. Moreover, we provide the mechanism for recovery from Proxy failure and hot-replacement of proxies. Algorithm description and validation proofs of its properties are also provided.