CS554 Project Ideas

NET:MPNet – Improving Network Throughput through Multipath Network Routing Systems

Overview

Traditional routing (single path) has limitations delivering under-utilized networks, and sub-optimal performance in terms of throughput and latency. Multi-path routing can increase throughout and decrease latency by using more available resources concurrently. This project will attempt to prototype a multi-path reliable communication protocol on top of UDP/IP. This work will involve building an overlay network that will enable custom routing to be performed. A TCP-like protocol called MSP (Multi-path Stream Protocol) will be designed and implemented, and allow MSP connections to utilize multiple UDP (or TCP) channels that have different routes from source to destination.

Relevant Systems and Reading Material

- T. Anjali, A. Fortin, G. Calinescu, S. Kapoor, N. Kirubanandan, and S. Tongngam. Multipath network flows: Bounded buffers and jitter. In INFOCOM, 2010 Proceedings IEEE, pages 1-7, march 2010
- F. Devetak, J. Shin, T. Anjali, and S. Kapoor. Minimizing path delay in multipath networks. In Proceedings of IEEE ICC 2011, 2011
- Tricha Anjali Junghwan Shin, Fabrizio Devetak and Sanjiv Kapoor. Delay variance optimization in multipath routing networks. GLOBECOM, 2013
- Junghwan Shin Mohammad Sarwat and Sanjiv Kapoor. Utility optimization in multipath routing cdn. ICC, 2013

Preferred/Required Skills

- Programming language choice: C/C++
- Skills/knowledge: Network protocols

Performance Metrics

Throughput, Latency; testbed Amazon EC2 on up to 64 VM instances

Project Mentor

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