

LIMIN WANG

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EDUCATION

Princeton University Princeton, NJ
Ph.D. candidate in Computer Science, Degree expected Fall 2003.
Advisors: Professor Larry Peterson and Professor Vivek Pai.
Thesis: “Building Robust Network Services Through Efficient Resource Management”.

Princeton University Princeton, NJ
M.A. in Computer Science, January 1999.

Peking University Beijing, China
B.S. in Computer Science, July 1997.

RESEARCH INTERESTS

Improving robustness and performance of large scale network services—Content Distribution Networks, Overlay Networks, Peer-to-Peer Systems and Distributed Storage Systems. Building large scale distributed systems. Large scale network simulation/evaluation. Congestion control in communication protocols, performance analysis, ad hoc networks, sensor networks and network support for streaming media applications.

RESEARCH EXPERIENCE

Research Assistant: Network Systems Group, Princeton University (1999 – present). Work for PlanetLab and Robust Networks Project led by Professor Larry Peterson.

- Built an academic testbed Content Distribution Network (CoDeeN) on PlanetLab. CoDeeN consists of distributed proxy servers running in Linux on different PlanetLab sites. Currently, CoDeeN proxies span about 40 locations in North America and Europe, and CoDeeN keeps expanding to other PlanetLab nodes. These proxies are configured as both request redirectors and server surrogates. They cooperate with each other and collectively provide a fast and robust web content delivery service to CoDeeN users. CoDeeN not only provides research opportunities to get first hand experiences with CDN management, traffic pattern collection and other issues, but also can evolve into a very useful, continuous planetary-scale service.
- Explored the design space of request redirection strategies in Content Distribution Networks (CDNs). Proposed new algorithms balancing server load, locality and network proximity, improving system capacity largely over published CDN technologies and still maintaining response latency low. Developed a new strategy unified with normal request handling to deal with flash crowds and Distributed Denial of Service (DDoS) attacks.

- Designed and implemented a novel hybrid network-server simulator by combining NS-2 and Logsim. This simulator provides detailed modeling at both packet level and operating systems level. Conducted detailed large scale simulations to evaluate different CDN request redirection schemes.
- Used a duality model to study TCP Vegas as a distributed optimization problem, provided insights into how and why TCP Vegas achieves its resource utilization, smoothness and fairness properties. Also investigated remedies for Vegas' buffer occupancy problem.
- Experimented how to provide hop-by-hop support to streaming media applications.

Summer intern at AT&T Labs Research, Florham Park, NJ (summer 1999). Mentors: Fred Douglass and Misha Rabinovich.

- Evaluated how forwarding requests among ISP's reverse proxies can save ISP's backbone bandwidth.

Scalable I/O project led by Professor Kai Li, Princeton University (July 1998 – May 1999)

- Built a Distributed Memory Server system using Virtual Memory Mapped Communication in Windows NT on a PC cluster, employing remote memory as local virtual memory's backing store.
- Thread Scheduling with Memory Server on PC clusters and Intel Paragon. Combined fine grained thread scheduling and memory server to improve out-of-core applications' performance.

Research Assistant: Peking University (February 1997 – July 1997).

- WWW resource searching, indexing and query processing.
<http://e.pku.edu.cn/enindex.htm>

TEACHING EXPERIENCE

Teaching Assistant, COS 471: Computer Architecture and Organization. Princeton University, fall 1998.

Teaching Assistant, COS 496: Information Security. Princeton University, spring 1999.

HONORS

Francis Upton Fellowship, Princeton University, 1997 – 2001.

One of the highest honors for incoming graduate students in Engineering School.

SONY Scholarship for Outstanding Undergraduate Students in Beijing, 1995.

First Class Scholarship, Peking University, 1994.

JOURNAL PUBLICATIONS

Steven Low, Larry Peterson and Limin Wang. Understanding TCP Vegas: A Duality Model. *Journal of the ACM (JACM)*49(2):207-235 (March 2002).

CONFERENCE PUBLICATIONS

Limin Wang, Vivek Pai and Larry Peterson. The Effectiveness of Request Redirection on CDN Robustness. In *Proceedings of the Fifth Symposium on Operating Systems Design and Implementation (OSDI'02)*, Boston, MA (December 2002).

Vivek Pai, Limin Wang, Kyoungsoo Park, Ruoming Pang and Larry Peterson. The Dark Side of the Web: An Open Proxy's View. In Second Workshop on Hot Topics in Networks *HotNets-II*, Cambridge, MA (November 2003), to appear.

Steven Low, Larry Peterson and Limin Wang. Understanding TCP Vegas: A Duality Model. In *Proceedings of SIGMETRICS 2001* (June 2001).

Limin Wang, Fred Douglass and Michael Rabinovich. Forwarding Requests Among Reverse Proxies. *The 5th International Web Caching and Content Delivery Workshop, Poster Session* (May 2000).

Yuanyuan Zhou, Limin Wang, Douglas W. Clark, and Kai Li. Thread Scheduling for Out-of-core Applications with Memory Server on Multicomputers. In *Proceedings of the 6th Workshop on I/O in Parallel and Distributed Systems, IOPADS '99* (May 1999).

TECHNICAL REPORTS

Akihiro Nakao, Limin Wang and Larry Peterson. "MSB: Media Streaming Booster". Princeton University Computer Science Technical Reports TR-666-02 (December 2002).

Limin Wang, Vivek Pai and Larry Peterson. "The Effectiveness of Request Redirection on CDN Robustness". Princeton University Computer Science Technical Reports TR-654-02 (June 2002).

Steven Low, Larry Peterson and Limin Wang. "Understanding TCP Vegas: A Duality Model". Princeton University Computer Science Technical Reports TR-628-00 (November 2000).

Limin Wang, Fred Douglass and Michael Rabinovich. "Forwarding Requests Among Reverse Proxies". AT&T Research Technical Report TD-4LKK5L.

Yuanyuan Zhou, Limin Wang, Douglas W. Clark, and Kai Li. "Thread Scheduling for Out-of-core Applications with Memory Server on Multicomputers". Princeton University Computer Science Technical Reports TR-590-99 (January 1999).

PROFESSIONAL ACTIVITIES

Student Member of ACM SIGOPS, IEEE and USENIX.

Referee for Computer Networks Journal, SOSP'01, OPENARCH'01, OPENARCH'02, GLOBECOM'03, WCW'03, INFOCOM'04.

REFERENCES

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