

Gaurav Agrawal

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OBJECTIVE

- ★ Seeking an internship opportunity in the area of Computer Networking and Telecommunications.

EDUCATION

- ★ **Ph.D Candidate in Computer Networking** *Present*
Computer Science and Electrical Engineering Department
University of Missouri-Kansas City, Kansas City, Missouri.
Advisor: Prof. Deep Medhi
Graduation (Expected): May 2006.
- ★ **M.S. in Computer Science** *May'01*
University of Missouri-Kansas City, Kansas City, Missouri.
Emphasis: Computer Networking.
- ★ **B.E. in Civil Engineering** *May'97*
Indian Institute of Technology, Roorkee (formerly University of Roorkee).

RESEARCH INTERESTS

- ★ Internet Traffic Engineering.
- ★ Network Design, Optimization and Performance.
- ★ Multicasting in the Internet.

PUBLICATIONS

- ★ **Peer-reviewed Papers:**
 - ▷ S. Srivastava, G. Agrawal, D. Medhi, M. Pioro, "Determining Feasible Link Weight Systems under various objectives for OSPF Networks using a Lagrangian Relaxation-based Approach", *accepted for publication at eTransactions on Network and Service Management*.
 - ▷ G. Agrawal, J. Agrawal, "The global multicast routing protocol - a new architecture for hierarchical multicast routing," *Proceedings of International Conference on Communications 2003 (ICC'03)*, pp. 98-103, Anchorage, USA, May 2003.

★ **Submitted/Work in Progress:**

- ▷ G. Agrawal, D. Medhi, "Single Shortest Path Based Logical Topologies for Wavelength-Routed IP networks", *under review*.
- ▷ S. Srivastava, G. Agrawal, D. Medhi, "Dual-Based Link Weight Determination Towards Single Shortest Path Solutions for OSPF Networks", *under review*.
- ▷ G. Agrawal, D. Medhi, "Impact of different objectives on design of Logical Topologies for Wavelength-Routed IP OSPF/IS-IS networks".

RESEARCH EXPERIENCE

★ **Traffic Engineering and Design of Packet-based IP Networks** *Jan'02 - Present*

▷ *Weight System for OSPF Networks*

In this work, we present two heuristics to solve the OSPF weight system problem. In the first approach, we present a Lagrangean-relaxation based dual approach. We also consider different objectives and discuss how they impact the determination of link weights and different performance measures. The second approach is based on relaxing the equal-split constraint and then formulating the problem as a Linear programme. We point out that the requirement of unique shortest path ensures that the solution obtained will also solve the OSPF problem.

▷ *Impact of logical (IP layer) topology on routing performance*

We explore the problem of optimal design of logical topologies in wavelength-routed IP over WDM networks, where OSPF/IS-IS is used to route packets on logical topology. The key idea is to design logical topologies such that OSPF/IS-IS routing emulate optimal routing. In the first phase of the work, we propose heuristics to design logical topology, which makes sure that all demands have unique single shortest paths. Currently working on design of logical topologies such that topology migration is minimum with changing traffic conditions and developing a generalized model to find optimal link weight settings that can take in account the dynamic nature of traffic.

★ **Architectures for Infinite Capacity Networks (Funded by Society of Self Fellows, University of Kansas)** *Jan'02 - Dec'02*

In this work, we have defined an architecture for high capacity networks. The underlying idea is to push the intelligence to the edge and keep the core simple. We studied a number of scenarios including traffic shaping and alternate routing as means of handling bursty traffic without losing data.

★ **Global Multicast Routing Protocol** *Jan'00 - Apr'01*

Designed a new multicast routing protocol - Global Multicast Routing Protocol (GMRP) as a part of my Master's thesis work at UMKC. The work includes specifying the detailed working of the protocol, simulating the performance of the protocol and comparing it with existing protocols.

SKILLS

- ★ Programming/Scripting Languages: C++, C, AWK, PERL
- ★ Operating Systems: Linux, Windows XP
- ★ Packages: Cplex, Maple, NS-2, Opnet, Telpack
- ★ Technology Skills: OSPF, IS-IS, MPLS, DWDM, ATM, TCP, UDP

RELEVANT COURSEWORK

- ★ Network Architecture I & II (CS520 & CS521), Multicasting in the Internet (CS590M), Network Routing (CS526)
- ★ Advanced Telecommunication Networks (CS511), Digital Switching (CS517)
- ★ Linear Algebraic Queueing Theory I (CS594), Advanced Teletraffic Analysis (CS590K)
- ★ Theory of Optimization (Directed Reading), Survivable Network Design (CS690N)
- ★ Design and Analysis of Algorithms (CS592)

ACADEMIC HONORS

- ★ Recipient of University Merit Scholarship at IIT-Roorkee (formerly University of Roorkee).

REFERENCES

- ★ Dr. Deep Medhi, Professor, CSEE, UMKC, dmedhi@umkc.edu, (816)-235-2006
- ★ Dr. Cory Beard, Asst. Professor, CSEE, UMKC, beardc@umkc.edu, (816)-235-1550