Long Gong

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Objective

Internship position in the field of networking (with special interest in software defined networking and data center networking), scheduling in switches, and software engineering. Available: Summer and Fall 2018

Education

Georgia Institute of Technology, Atlanta, GA, USA
Ph.D. Candidate in Computer Science (GPA: 3.91/4.0) 2015.8 - 2020.5 (**Expected**)

University of Science and Technology of China, Hefei, Anhui, China
M.Eng. in Communication and Information Systems (GPA: 3.81/4.3) 2012.9 - 2015.6
B.Eng. in Electronic Information Engineering (GPA: 3.75/4.3) 2008.9 - 2012.6

Intern Experience

Alibaba Group (U.S.) Inc, Bellevue, WA, USA 2018.5 - 2018.8
Intern Mentor: Gang Cheng
Built a highly scalable multi-tenant BGP as an important part of a high-performance and high-availability SDN based hybrid cloud network solution.

AT&T Labs Research, Bedminster, NJ, USA 2016.5 - 2016.7
Research Intern Mentor: He Yan and Zihui Ge
Developed tools to automate the dynamics analysis in services supported by virtualized environment.

Projects

Crossbar Scheduling 2016.2 - Present

• Designed the **first** parallel iterative crossbar scheduling which has constant per-port time complexity and can provably achieve the same performance (both throughput and delay) as the family of maximal matching based schedulers that have at least logarithmic per-port time complexity.

• Designed a crossbar scheduling algorithm, which can exactly emulate the linear-time centralized version (*i.e.,* SERENA) in logarithmic rounds. (IEEE/ACM Transactions on Networking under submission)

• Designed a simple yet effective "add-on" crossbar scheduling algorithm for input-queued switches, which can boost the performance (switch throughput or delay or both) of existing crossbar scheduling algorithms (*e.g.*, iSLIP and SERENA) with almost "no" computational overhead. (SIGMETRICS 2017)

• Built an efficient and flexible input-queued switch simulator in C++.

Time Capsule for Online Social Activities 2015.9 - Present

• Designed a hybrid streaming-sampling algorithm for high accurate measurements of Online Social Networking (OSN) cascade statistics, using limited memory, which decreased the errors (measured in ℓ_2) by more than one order of magnitude. (ICCCN 2017)

Network Virtualization 2012.2 - 2015.6

• Designed a novel virtual network embedding algorithm, which increased the network utilization and decreased the time complexity. (INFOCOM 2014)

• Proposed the **first** integer linear programming formulations for the virtual optical network embedding problems in the contexts of flexible-grid elastic optical networks, and designed efficient algorithms which achieved much better performance. (Journal of Lightwave Technology)

• Proved the **first** inapproximability result of the location-constrained virtual network embedding (LC-VNE) problems, and designed efficient algorithms for solving LC-VNE, which achieved much better

performance (in terms of both resource consumption and fairness). (IEEE/ACM Transactions on Networking)

• Built the **first** OpenFlow-based network virtualization platform in which the underlying infrastructure is the flexible-grid elastic optical networks. (Master Thesis)

Selected Publications [Google Scholar]

1. **Long Gong**, Lanxi Huang, Paul Tune, Jinyoung Han, Chen-Nee Chuah, Matthew Roughan, and Jun Xu. Foreststream: Accurate measurement of cascades in online social networks. **accepted to** ICCCN 2017, 2017
2. **Long Gong**, Paul Tune, Liang Liu, Sen Yang, and Jun (Jim) Xu. Queue-proportional sampling: A better approach to crossbar scheduling for input-queued switches. *Proc. ACM Meas. Anal. Comput. Syst.*, 1(1):3:1–3:33, June 2017
3. Zuqing Zhu, Xiahe Liu, Yixiang Wang, Wei Lu, **Long Gong**, Shui Yu, and Nirwan Ansari. Impairment- and splitting-aware cloud-ready multicast provisioning in elastic optical networks. *IEEE/ACM Transactions on Networking*, 25(2):1220–1234, Apr. 2017
4. **Long Gong**, Huihui Jiang, Yixiang Wang, and Zuqing Zhu. Novel Location-Constrained Virtual Network Embedding (LC-VNE) Algorithms Towards Integrated Node and Link Mapping. *IEEE/ACM Transactions on Networking*, 24(6):3648–3661, Dec. 2016
5. Lulu Yang, **Long Gong**, and Zuqing Zhu. Incorporating network coding to formulate multicast sessions in elastic optical networks. In *2016 International Conference on Computing, Networking and Communications (ICNC)*, pages 1–5, Feb. 2016
6. Huihui Jiang, Yixiang Wang, **Long Gong**, and Zuqing Zhu. Availability-aware survivable virtual network embedding in optical datacenter networks. *IEEE/OSA Journal of Optical Communications and Networking*, 7(12):1160–1171, Dec. 2015
7. Lulu Yang, **Long Gong**, Fen Zhou, Bernard Cousin, Miklós Molnár, and Zuqing Zhu. Leveraging light forest with rateless network coding to design efficient all-optical multicast schemes for elastic optical networks. *Journal of Lightwave Technology*, 33(18):3945–3955, Sept. 2015
8. Jingjing Yao, Ping Lu, **Long Gong**, and Zuqing Zhu. On Fast and Coordinated Data Backup in Geo-Distributed Optical Inter-Datacenter Networks. *Journal of Lightwave Technology*, 33(14):3005–3015, Jul. 2015
9. **Long Gong**, Yonggang Wen, Zuqing Zhu, and Tony Lee. Toward Profit-Seeking Virtual Network Embedding Algorithm via Global Resource Capacity. In *IEEE International Conference on Computer Communications (INFOCOM)*, pages 1–9, Apr. 2014
10. **Long Gong** and Zuqing Zhu. Virtual Optical Network Embedding (VONE) Over Elastic Optical Networks. *Journal of Lightwave Technology*, 32(3):450–460, Feb. 2014
11. Huihui Jiang, **Long Gong**, and Zuqing Zhu. Efficient joint approaches for location-constrained survivable virtual network embedding. In *IEEE Global Communications Conference (GLOBECOM)*, pages 1810–1815, Dec. 2014
12. **Long Gong**, Yonggang Wen, Zuqing Zhu, and Tony Lee. Revenue-driven virtual network embedding based on global resource information. In *IEEE Global Communications Conference (GLOBECOM)*, pages 2294–2299, Dec. 2013
13. **Long Gong**, Wenwen Zhao, Yonggang Wen, and Zuqing Zhu. Dynamic transparent virtual network embedding over elastic optical infrastructures. In *IEEE International Conference on Communications (ICC)*, pages 3466–3470, Jun. 2013
14. **Long Gong**, Xiang Zhou, Xiahe Liu, Wenwen Zhao, Wei Lu, and Zuqing Zhu. Efficient resource allocation for all-optical multicasting over spectrum-sliced elastic optical networks. *IEEE/OSA Journal of Optical Communications and Networking*, 5(8):836–847, Aug. 2013
15. Xiahe Liu, **Long Gong**, and Zuqing Zhu. On the spectrum-efficient overlay multicast in elastic optical networks built with multicast-incapable switches. *IEEE Communications Letters*, 17(9):1860–1863, Sept. 2013

16. Xiahe Liu, **Long Gong**, and Zuqing Zhu. Design integrated rsa for multicast in elastic optical networks with a layered approach. In *IEEE Global Communications Conference (GLOBECOM)*, pages 2346–2351, Dec. 2013
17. Xiahe Liu, **Long Gong**, and Zuqing Zhu. Spectrum- and energy-efficient multicasting over multicast-incapable eons with member-only flexible relay. In *Asia Communications and Photonics Conference (ACP)*, page AW4H.6. Optical Society of America, 2013
18. Wei Lu, Xiang Zhou, **Long Gong**, Mingyang Zhang, and Zuqing Zhu. Dynamic multi-path service provisioning under differential delay constraint in elastic optical networks. *IEEE Communications Letters*, 17(1):158–161, Jan. 2013
19. Mingyang Zhang, Weiran Shi, **Long Gong**, Wei Lu, and Zuqing Zhu. Bandwidth defragmentation in dynamic elastic optical networks with minimum traffic disruptions. In *IEEE International Conference on Communications (ICC)*, pages 3894–3898, Jun. 2013
20. **Long Gong**, Xiang Zhou, Wei Lu, and Zuqing Zhu. A two-population based evolutionary approach for optimizing routing, modulation and spectrum assignments (rmsa) in o-ofdm networks. *IEEE Communications Letters*, 16(9):1520–1523, Sept. 2012
21. Wei Lu, Xiang Zhou, **Long Gong**, and Zuqing Zhu. Scalable network planning for elastic optical orthogonal frequency division multiplexing (ofdm) networks. In *8th International Symposium on Communication Systems, Networks Digital Signal Processing (CSNDSP)*, pages 1–4, Jul. 2012
22. Xiang Zhou, Wei Lu, **Long Gong**, and Zuqing Zhu. Dynamic rmsa in elastic optical networks with an adaptive genetic algorithm. In *IEEE Global Communications Conference (GLOBECOM)*, pages 2912–2917, Dec. 2012

Selected Talks

1. Queue-Proportional Sampling: A Better Approach to Crossbar Scheduling for Input-Queued Switches, ACM SIGMETRICS 2017, Urbana-Champaign, Illinois, USA
2. Toward Profit-Seeking Virtual Network Embedding Algorithm via Global Resource Capacity, IEEE INFOCOM 2014, Toronto, Canada
3. Revenue-Driven Virtual Network Embedding Based on Global Resource Information, IEEE GLOBECOM 2013, Atlanta, GA, USA
4. Dynamic Transparent Virtual Network Embedding over Elastic Optical Infrastructures, IEEE ICC 2013, Budapest, Hungary

Professional Skills

Programming Languages: C++ (proficient), Python (fluent), Java (prior experience)

Honors and Awards

Student Travel Grant Award
ACM SIGMETRICS 2017

Excellent Graduate
University of Science and Technology of China, Hefei, Anhui, China 2015

National Scholarship (for Master Students)
University of Science and Technology of China, Hefei, Anhui, China 2013

Best Paper Award
ONS Symposium, IEEE GLOBECOM 2013 2013
ONS Symposium, IEEE ICC 2013 2013

Professional Service

Reviewer: IEEE INFOCOM 2016, IEEE Communication Letters, IEEE Transactions on Parallel and Distributed Systems, IEEE/ACM Transactions on Networking, IEEE/OSA Journal of Optical Communications and Networking