**East Carolina University.**

## Network-Aware Virtual Request Partitioning Based on Spectral Clustering

**Abstract.** The first part of the talk will provide an introduction to network virtualization. The second part will address the virtual request partitioning problem, an essential subproblem of two common problems in virtual networks, namely, virtual network embedding (VNE) and virtual machine placement (VMP). We consider a network-aware variant where the objective is to partition a virtual request so as to minimize the total amount of inter-cluster traffic. To handle the inherent complexity of this problem, we develop a spectral clustering-based partitioning scheme that produces good solutions in a reasonable amount of time. Our solution consists of several components: (a) spectral clustering, (b) a constrained k-means partitioning algorithm that ensures that capacity limits for clusters are met, and for which we present an optimal polynomial-time greedy algorithm, and (c) a greedy refinement algorithm using simulated annealing to further improve the clustering solution. Simulation results indicate that our algorithm outperforms existing partitioning schemes in terms of inter-cluster traffic minimization.

**Biography**. George N. Rouskas is a Professor and the Director of Graduate Programs in the Computer Science Department at North Carolina State University, and an IEEE Fellow. He received a degree in Computer Engineering from the National Technical University of Athens (NTUA), Athens, Greece, and the M.S. and Ph.D. degrees in Computer Science from the College of Computing, Georgia Institute of Technology, Atlanta, GA. His research interests include network architectures and protocols, optical networks, network design and optimization, and performance evaluation. He is co-editor of the book "Next-Generation Internet Architectures and Protocols" (Cambridge University Press, 2011), author of the book "Internet Tiered Services" (Springer, 2009), and co-editor of the book "Traffic Grooming for Optical Networks" (Springer, 2008). He is founding co-editor-in-chief of the Optical Switching and Networking Journal and he has served on the editorial boards of the IEEE/ACM Transactions on Networking, IEEE/OSA Journal of Optical Networking, Computer Networks, and Optical Networks. He was Chair or co-Chair of numerous conferences including IEEE ICNP 2014, IEEE GLOBECOM 2010 ONS, IEEE LANMAN 2004 and 2005, and currently co-chairs IEEE ICC 2017 ONS and IFIP NETWORKING 2004. He is the recipient of a 1997 NSF CAREER Award, the 2004 ALCOA Foundation Engineering Research Achievement Award, and the 2003 NCSU Alumni Outstanding Research Award, and he was inducted in the NCSU Academy of Outstanding Teachers in 2004. In 2016-17 he serves as the Chair of ONTC and the Chair of the IEEE Comsoc Distinguished Lecturer Selection Committee, and was a Distinguished Lecturer for IEEE Comsoc in 2010-11.

**Dr. George N. Rouskas**
Department of
Computer Science
NC State University

rouskas@ncsu.edu
http://rouskas.csc.ncsu.edu/

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Room: SCITEC 0144A

Contact: Dr. Kamran Sartipi
Dept. of Computer Science, ECU
www.cs.ecu.edu/sartipi/CSseminar/