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On Performance Measurement of 10Gbps High Speed Optical Networks and CRON (Cyberinfrastructure of Reconfigurable Optical Networks) Project

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Abstract:
With the integration of IP and optical technology, fast optical network (of the order of 10Gbps) has emerged to support international research cooperation such as massive scientific data transfer and next generation Internet related research. This talk covers several issues and challenges over 10Gbps high speed networks (HSN). First it shows empirical experiences/challenges at performance measurement experiments and evaluates performance of protocols over 10Gbps HSN. Based on the empirical experiences and challenges over HSN, it presents a NSF project, CRON, which tries to overcome the challenges with a set of softwares and hardwares. Since the accuracy of performance measurement over HSN is critical to development of applications, the talk shares experience and knowledge on the measurement and evaluation of protocols over HSN by explain i) how to determine the suitability of TCP parameters such as Jumbo Frame size, TCP sender and receiver buffer sizes; ii) how to evaluate TCP performance measurement tools and emulation tools over 10Gbps high speed optical networks; and iii) how to compare performance of TCP variants with different metrics, such as throughput and fairness, by varying delays and randomized losses controlled with software emulators. Then this talk will present a NSF project, CRON project to fill up the critical gap between the demands of application users and the deployed high speed networks. The Cyberinfrastructure, CRON, provides integrated and automated access to a wide range of high speed networking configurations. CRON can be reconfigured to emulate such optical networks as a NLR or a LONI configuration or completely user-defined networks having different networking characteristics in bandwidth, latency, and data loss rates. Moreover, users can dynamically reconfigure whole computing resources, such as operating system, middleware, applications, based on their specific demands. Due to the automated and reconfigurable characteristics, all types of experiments over CRON will be repeatable and controllable.

Speaker's Bio:
Seung-Jong Park is an assistant professor in the Computer Science Department and Center for Computation Technology at Louisiana State University. He leads the LSU Advanced NETworking (LANET) group, where he and his students do research in the area of computer networking, such as wireless networks and high speed networks. He received his Ph.D. from The School of Electrical and Computer Engineering at Georgia Institute of Technology, 2004. Prior to that, he had also received a B.S. degree in Computer Science at Korea University, Seoul, Korea and a M.S. degree in Computer Science from KAIST (Korea Advanced Institute of Science and Technology), Teajon, Korea in 1993 and 1995, respectively. From 1995 to 2000, he had worked for Shinsegi Telecomm, which was the first CDMA cellular service provider in the world.

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