



Fall 2009 CIS Colloquium Series

Design and Analysis of QoS on Fault-tolerant Large-scale Networking Systems

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11am-12pm, Monday, November 23
4th Floor Conference Room (Wachman Hall, CC 447)

Abstract: Failure detection (FD) is an important issue for supporting dependability in distributed healthcare systems to guarantee continuous, safe, secure, and dependable operation, and often is an important performance bottleneck in the event of node failure. FD can be used to manage the health status of communication for delivering telemedicine services, and then to help distributed healthcare system reduce fatal accident rate and increase the reliability and safety of systems. Ensuring acceptable quality of service (QoS) is made difficult by the relative unpredictability of the network environment.

In this report, first, we compare QoS metrics of several adaptive FDs, discuss their properties and their relation, and then propose several optimizations over the existing methods, called tuning adaptive margin failure detector (TAM FD), ED FD, Kappa FD, Self FD, which significantly improves QoS. Second, we address the problem of most adaptive schemes, namely their need for a large window of samples. So we also analyze the impact of memory size on the performance of FDs, and then prove that the presented scheme is designed to use a fixed and very limited amount of memory for the distributed system. Our experimental results over several kinds of networks (Cluster, WiFi, LAN, Intercontinental WAN) show that the properties of the existing adaptive failure detectors, and demonstrate that the optimization is reasonable and acceptable. Furthermore, the extensive experimental results show what is the effect of memory size on the overall QoS of each adaptive failure detector.

Bio: Naixue Xiong is a research scientist in Department of Computer Science, Georgia State University, USA. He has obtained two PhD Degrees on different research fields in Wuhan University and Japan Advanced Institute of Science and Technology, respectively. Both PhDs are on Information Science. He was a visiting research fellow at University of Yale in 2008. His research interests include Communication Protocols, Network Architecture and Design, Network Technologies, and Distributed and parallel Systems. Until now, Dr. Xiong published over 100 research articles (including about 60 journal articles). Some of his works were published or submitted in IEEE or ACM transactions, JSAC and IEEE INFOCOM. He has been a Program Chair, General Chair, Publicity Chair, PC member and OC member of about 80 international conferences, and was invited to serve as a reviewer for about 63 international journals. Now, he is serving as an Associate Editor, Editorial Board Member, and Guest Editor for about 14 international journals. He is a member of IEEE and IEEE ComSoc.

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