



## **A Class of Practical Reliable Failure Detection Schemes for Cloud Communication Networks**

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**July 12th Tuesday, 9:30 to 10:30 am**

**Venue - Computer Science Building - Room 327**

**Abstract** - In cloud-based networks, services may be virtualized with specific server hosting details abstracted, with some servers active and available, others busy or heavily loaded, and others are offline for various reasons [1-3]. Users would expect the right and available servers to complete their application requirements. Therefore, in order to provide an effective control scheme and parameter guidance for service conditions and cloud resource, failure detection is essential to meet user service expectations.

This paper [1] first presents a general traffic-feature analysis method for optimizing the existing FDs in cloud fault-tolerant communication networks, and also propose a novel FD, called Exponential Distribution Failure Detector (ED FD), which considers the probability distribution properties of arrival interval periods as exponential distribution.

Most existing Failure Detector (FD) schemes do not automatically adjust their detection service parameters for the dynamic network conditions, thus they couldn't be used for actual application. Thus, this paper [2] explores FD properties with relation to the actual and automatic fault-tolerant cloud computing networks, and find a general non-manual analysis method to self-tune the corresponding parameters to satisfy user requirements. Based on this general automatic method, we propose a specific and dynamic Self-tuning Failure Detector scheme, called SFD, as a major breakthrough in the existing schemes.

## **References:**

[1] N. Xiong, A. V. Vasilakos, Y. Richard Yang, and so on, "General Traffic-Feature Analysis for an Effective Failure Detector in Fault-Tolerant Cloud Communication Networks," ToN, submitted, IEEE/ACM Transactions on Networking (ToN), submitted.

[2] N. Xiong, A. V. Vasilakos, Y. Richard Yang, C. Qiao, Andy, Y. Pan, "A Class of Practical Self-tuning Failure Detection Schemes for Cloud Communication Networks," IEEE/ACM Transactions on Networking (ToN), submitted.

[3] N. Xiong, A. V. Vasilakos, L. T. Yang, L. Song, Y. Pan, and Y. Li, "Comparative Analysis of QoS and Memory Usage of Adaptive Failure Detectors in Healthcare Systems," IEEE Journal on Selected Areas in Communications (IEEE JASC), vol. 27, no. 4, pp. 495-509, May 2009, ISACEM, ISSN 0733-8716. (SCI, EI; Impact factor: 4.249/2010, on dependable communication security)

**Biography:** Naixue Xiong received his both PhD degrees in Wuhan University (about software engineering), and Japan Advanced Institute of Science and Technology, respectively (about dependable networks). Until now, he has worked in Georgia State University as a visiting Assistant Prof. and research scientist for 3 years. His research interests include Security and Dependability, Cloud Computing, Network Architecture, and Optimization Theory. Dr. Xiong published about 100 journal papers. Some of his works were published in IEEE JSAC, IEEE or ACM transactions, ACM Sigcomm workshop, IEEE INFOCOM, and IPDPS. He has been a General Chair, Program Chair, Publicity Chair, PC member and OC member of over 100 international conferences, and as a reviewer of about 100 international journals, including IEEE JSAC, IEEE SMC (Park: A/B/C), IEEE Transactions on Communications, IEEE Transactions on Mobile Computing, IEEE Trans. on Parallel and Distributed Systems. He is serving as an associate editor or editor member for over 10 international journals (including Information Science), and a guest editor for over 10 international journals, including Sensor Journal, WINET and MONET. He has received the Best Paper Award in the 10th IEEE International Conference on High Performance Computing and Communications (HPCC-08) and the Best student Paper Award in the 28th North American Fuzzy Information Processing Society Annual Conference (NAFIPS2009). He is a member of IEEE, IEEE ISATC, IEEE TCPP, and IEEE TCSC, and also a Chair of “Trusted Cloud Computing” in IEEE Computational Intelligence Society (CIS). E-mail: nxiong@cs.gsu.edu, xionгнаixue@gmail.com.