# An Analytical Model for Evaluating Spanning Tree Based Layer 2 Routing Schemes

Zhen Luo*, Changjin Suh**

** School of Computer, Shenyang Aerospace University, China*

***School of Computer Science and Engineering, Soongsil University, South Korea*

luozhen@sau.edu.cn, cjsuh@ssu.ac.kr

***Abstract*—Ethernet has spread its territory into metro and backbone networks. Since spanning tree protocol (STP) is impractical for backbone networks routing, many spanning tree based Layer 2 routing schemes have been proposed, such as multiple spanning tree protocol (MSTP) and MSTP based shortest path bridging (MSTP-SPB). We have developed three analytical models for evaluating these routing schemes, but they failed to analyze Intermediate System to Intermediate System protocol based shortest path bridging (ISIS-SPB), which forwards data from source to destination by multiple shortest path trees. This paper improves previous models by redefining the routing scheme variables, and presents an analytical model for evaluating Layer 2 routing schemes even for multi-path routing. Numerical results from this analytical model verify that the ISIS-SPB is much better than MSTP-SPB and STP..**

***Keyword*—Analytical model, Layer 2 routing, Spanning tree, STP, MSTP, MSTP-SPB, ISIS-SPB**

**Zhen Luo** was born in China in 1981. He received his B.Sc. and M.Sc. from Shenyang Aerospace University, China in 2003 and 2006 respectively, and obtained his Ph.D. in computer communication from Soongsil University, South Korea in 2012.

He has worked as an Assistant Professor at School of Computer Science and Engineering at Soongsil University, South Korea in 2011. He is now a faculty member in School of Computer at Shenyang Aerospace University. His current research interests focus on Carrier Ethernet, switching and routing theory, and embedded systems.

**Changjin Suh** was born in South Korea in 1959. He received his B.Sc. and M.Sc. from Seoul National University, South Korea in 1982 and 1984 respectively, and obtained his Ph.D. in electric and computer engineering from University of Massachusetts in Amherst, U.S.A. in 1996.

From 1985 to 1990, he has worked at ETRI (Electronics and Telecommunications Research Institute), South Korea. In 1997, he joined the School of Computer Science and Engineering in Soongsil University, South Korea. His current research interests focus on sensor networks, Ethernet, switching and routing theory.