

Performance Evaluation of Routing Protocols in Wireless Mesh Network

Azila Zakaria**, Hafizal Mohamad*, Nordin Ramli* and Mahamod Ismail**

*MIMOS Berhad, Technology Park Malaysia, 57000 Kuala Lumpur, Malaysia

**Universiti Kebangsaan Malaysia (UKM), 43600 Bangi, Selangor, Malaysia

Email: azila.zakaria@mimos.my, hafizal.mohamad@mimos.my, nordin.ramli@mimos.my, mahamod@eng.ukm.my

Abstract—Wireless mesh network has been considered as a viable solution to offer broadband connectivity to rural community due to its ability to provide extended coverage and scalable deployment. However, there are still impediments that need to be addressed in terms of throughput degradation, latency and interference due to multi hop transmission and potential isolated nodes. In this contribution, an investigation of suitable routing protocol in the context of providing rural broadband communication is presented by evaluating various of routing approaches, namely reactive, proactive and hybrid routing protocols. Specifically, performance analysis was simulated for ad hoc on demand distance vector (AODV), optimized link state routing (OLSR) and hybrid wireless mesh protocol (HWMP). The impacts of traffic loads, number of sources and the network size on wireless mesh network have been investigated through the simulation. HWMP has a clear advantage compare to AODV and OLSR in terms of maximizing throughput and minimizing end to end delay.

Keywords: Wireless mesh networks, routing protocols, AODV, OLSR, HWMP.



Hafizal Mohamad received the B.Eng. with First Class Honours and Ph.D. in Electronic Engineering from University of Southampton, UK in 1998 and 2003, respectively. He has been a faculty member at the Multimedia University, Malaysia from 1998 until 2007. He was a visiting fellow at National Institute of Information and Communication Technology (NICT), Yokosuka, Japan in Feb-Mar 2005. He is a Senior Staff Researcher at Wireless Communications Cluster, MIMOS Berhad since May 2007. His current research interests are cognitive radio and mesh network. He has published over 40 research papers and filed 18 patents. He is a Senior Member of IEEE and Executive Committee, IEEE Malaysia Section, Educational Activities (2011-2012). He was a Chairman of IEEE Communication Society and Vehicular Technology Joint Chapter, Malaysia Section (2009 – 2011). He has been involved in organizing a number of conferences including: Technical Program Chair for APCC 2012 (Jeju, Korea), APCC 2011 (Sabah), MICC 2009 (Kuala Lumpur), and Tutorial Chair for ICT 2007 (Penang).



Nordin Bin Ramli received the B.Eng degree in electrical engineering from Keio University, Japan in 1999. He received the M.Eng and Ph.D degrees, both in electronic engineering from The University of Electro-Communications, Japan in 2005 and 2008, respectively. Previously, he was at Telekom Malaysia Berhad (TMB) as network engineer from 1999-2008, and lecturer at Multimedia University, Malaysia from 2008-2009. Currently, he is a staff researcher at Wireless Network & Protocol Research (WNPR), MIMOS Berhad, Malaysia. His current research interests are in the area of cognitive radio, space-time processing, equalization, adaptive array system and mesh networking. He has filed several patents related to wireless communications. He is a IEEE member and also a registered professional engineer under Board of Engineers Malaysia.



Mahamod Ismail joined the Department of Electrical, Electronics and System Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia (UKM) in 1985 and currently he is a Professor in Communication Engineering. He received the B.Sc. degree in Electrical and Electronics from University of Strathclyde, U.K. in 1985, the M.Sc. degree in Communication Engineering and Digital Electronics from University of Manchester Institute of Science and Technology (UMIST), Manchester U.K. in 1987, and the Ph.D. from University of Bradford, U.K. in 1996. He was with the first Malaysia Microsatellite TiungSat Team Engineers in Surrey Satellite Technology Ltd. U.K. from June 1997 until March 1998. In the summer semester 2003, he served as a Guest Professor in Computer Engineering in the University of Duisburg-Essen, Duisburg Germany funded by the German Academic Exchange Services (DAAD). His research interests include mobile and satellite communication, and wireless networking particularly on the radio resource management for the next generation wireless communication network. He is currently Chair of the Institute of Electrical and Electronics Engineers (IEEE), USA Malaysia Section.



Azila Zakaria received the B.Eng (Hons) in Communication and Computer System Engineering from National University of Malaysia in 2011. She is currently a graduate research assistant at Wireless Communications Cluster, MIMOS Berhad since 2011 and also a M.Sc. candidate in Wireless Network and Communication Group (WNCG) Research, Department of Electrical, Electronics and Communications, National University of Malaysia under the supervision of Dr Mahamod Ismail. Her research interests are cognitive radio and wireless mesh network.