Asian Journal of Scientific Research
Volume 10, Issue 4, 2017, Pages 394-399

Cost effective factor of a midimew connected mesh network (Article)

Rahman, M.M.H.[a], Mohd Nor, R.[a], Akhand, M.A.H.[b], Sembok, T.M.T.[c]

[a]KICT, International Islamic University Malaysia (IIUM), Kuala Lumpur, Malaysia
[b]Khulna University of Engineering and Technology (KUET), Khulna, Bangladesh
[c]Cyber Security Center, National Defense University Malaysia, Kuala Lumpur, Malaysia

Abstract

View references (21)

Background and Objective: Hierarchical Interconnection Network (HIN) is very much essential for the practical implementation of future generation Massively Parallel Computers (MPC) systems which consists of millions of nodes. It yields better performance with low cost due to reduction of wires and by exploring the locality in the communication\and traffic patterns. The main objective of this paper is to analyze the static cost effective factor of Midimew connected Mesh Network (MMN). Materials and Methods: A Midimew connected Mesh Network (MMN) is a HIN comprised of numerous basic modules, where the basic modules are 2D-mesh networks and they are hierarchically interconnected using midimew network to assemble the higher level networks. Results: This study, present the architecture of a MMN and evaluate the cost effective factor of MMN, TESH (Tori-connected Mesh), mesh and torus networks. The results shows that the cost effective factor of MMN was trivially higher than that of mesh and torus network. Conclusion: It was revealed that the proposed MMN yields a little bit high cost effectiveness factor with small diameter and average distance. Overall, performance with respect to cost effective factor with small diameter and average distance suggests that the MMN will be a promising choice for next generation MPC systems. © 2017 M.M. HafizurRahman et al.

Author keywords

Hierarchical interconnection network Massively parallel computers Mesh network

Funding details

Funding number	Funding sponsor	Acronym	Funding opportunities
	Ministry of Higher Education, Malaysia		See opportunities
	Ministry of Education		See opportunities

Funding text

This present study is supported by the research project FRGS grant No. 13-065-0306, Ministry of Education, Government of Malaysia. The authors are grateful to the respected reviewers for their valuable suggestions and comments to improve the quality of the study.

ISSN: 19921454
Source Type: Journal
Original language: English
DOI: 10.3923/ajsr.2017.394.399
Document Type: Article
Publisher: Asian Network for Scientific Information

1 Adhikari, N., Tripathy, C.R.
The folded crossed cube: A new interconnection network for parallel systems
(2010) *Int. J. Comput. Applic*, 4, pp. 43-50. Cited 12 times.

2 Faisal, F.A., Rahman, M.M.H., Inoguchi, Y.
A new power efficient high performance interconnection network for many-core processors

(2017) *Journal of Parallel and Distributed Computing*, 101, pp. 92-102.
http://www.elsevier.com/inca/publications/store/6/2/2/8/9/5/index.htt
doi: 10.1016/j.jpdc.2016.11.007

View at Publisher

3 Andújar-Muñoz, F.J., Villar-Ortiz, J.A., Sanchez, J.L., Alfaro, F.J., Duato, J.
N-dimensional twin torus topology

(2015) *IEEE Transactions on Computers*, 64 (10), art. no. 6980092, pp. 2847-2861. Cited 9 times.
http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=12
doi: 10.1109/TC.2014.2378267

View at Publisher

4 Awal, M.R., Rahman, M.M.H., Akhand, M.A.H.
A new hierarchical interconnection network for future generation parallel computer

(2014) *16th Int'l Conf. Computer and Information Technology, ICCIT 2013*, art. no. 6997341, pp. 314-319. Cited 13 times.
ISBN: 978-147993497-3
doi: 10.1109/ICCITechn.2014.6997341

View at Publisher

5 Awal, Md.R., Rahman, M.M.H., Mohd Nor, R., Bin Tengku Sembok, T.M., Akhand, M.A.H.
Architecture and network-on-chip implementation of a new hierarchical interconnection network

(2015) *Journal of Circuits, Systems and Computers*, 24 (2), art. no. 1540006. Cited 6 times.
http://www.worldscinet.com/jcsc/jcsc.shtml
doi: 10.1142/S021812661540006X

View at Publisher

6 Beckman, P.
Looking toward exascale computing
(2008) *Proceedings of the 9th International Conference on Parallel and Distributed Computing, Applications and Technologies, December 1-4 2008*. Cited 9 times.
Dunedin, New Zealand

7 Dongarra, J.
(2016) *Report on the Sunway Taihu light system*. Cited 15 times.
Oak Ridge National Laboratory

8 Dongarra, J.J., Meuer, H.W., Strohmaier, E.
(2016) *TOP500 supercomputer sites*. Cited 322 times.
June 2016
http://www.top500.org/

9 Feldman, M.
(2016) *HPC in 2016: Hits and misses*
http://www.top500.org

10 Hag, A.A.Y., Rahman, M.M.H., Nor, R.M., Moh, T., Sembok, T.
On uniform traffic pattern of symmetric midimew connected mesh network

(2015) *Procedia Computer Science*, 50, pp. 476-481. Cited 6 times.
http://www.sciencedirect.com/science/journal/18770509
doi: 10.1016/j.procs.2015.04.017

View at Publisher

11 Lai, P.-L., Hsu, H.-C., Tsai, C.-H., Stewart, I.A.
A class of hierarchical graphs as topologies for interconnection networks

(2010) *Theoretical Computer Science*, 411 (31-33), pp. 2912-2924. Cited 28 times.
doi: 10.1016/j.tcs.2010.04.022

View at Publisher

12 Mohanty, S.P., Ray, B.N.B., Patro, S.N., Tripathy, A.R.
Topological properties of a new fault tolerant interconnection network for parallel computer

(2008) *Proceedings - 11th International Conference on Information Technology, ICIT 2008*, art. no. 4731294, pp. 36-40. Cited 8 times.
ISBN: 978-076953513-5
doi: 10.1109/ICIT.2008.64

View at Publisher

13 Nagel, W.E.
From TERA-to PETA-to EXA-scale computing: What does that mean for our community?
(2011) *Keynote speech in the 10th IASTED PDCN, February 15-17 2011*
Innsbruck, Austria

14 (2012) *Introducing Titan*. Cited 2 times.
Advancing the Era of Accelerated Computing
http://www.olcf.ornl.gov/titan/

15 Psarras, A., Lee, J., Mattheakis, P., Nicopoulos, C., Dimitrakopoulos, G.
A Low-power network-on-chip architecture for tile-based chip multi-processors

(2016) *Proceedings of the ACM Great Lakes Symposium on VLSI, GLSVLSI*, 18-20-May-2016, pp. 335-340. Cited 8 times.
ISBN: 978-145034274-2
doi: 10.1145/2902961.2903010

View at Publisher

16 Rahman, M.M.H., Al Faisal, F., Nor, R.M., Sembok, T.M.T., Behera, D.K.Y., Inoguchi
(2017) *Cost Effectiveness Analysis of a Vertical Midimew-Connected Mesh Network (VMMN)*, 556.
Computational Intelligence in Data Mining, Behera, H. and D. Mohapatra (Eds.)., AISC., Springer, Singapore

17 Rahman, M.M.H., Mohd, N.R., Awal, M.R., Sembok, T.M.T., Miura, Y.
(2016) *Long Wire Length of Midimew-Connected Mesh Network*
Distributed Computing and Internet Technology, Bjorner, N., S. Prasad and L. Parida (Eds.). LNCS., Vol. 9581. Springer, Switzerland

18 Rahman, M.M.H., Inoguchi, Y., Faisal, F.A., Kundu, M.K.

Symmetric and folded tori connected torus network

(2011) *Journal of Networks*, 6 (1), pp. 26-35. Cited 10 times.
http://ojs.academypublisher.com/index.php/jnw/article/view/06012635/2545
doi: 10.4304/jnw.6.1.26-35

View at Publisher

19 Rahman, M.M.H., Inoguchi, Y., Sato, Y., Horiguchi, S.

TTN: A high performance hierarchical interconnection network for massively parallel computers

(2009) *IEICE Transactions on Information and Systems*, E92-D (5), pp. 1062-1078. Cited 12 times.
http://www.jstage.jst.go.jp/article/transinf/E92.D/5/1062/_pdf
doi: 10.1587/transinf.E92.D.1062

View at Publisher

20 (2010) *The opportunities and challenges of exascale computing*. Cited 73 times.
Report of the Advanced Scientific Computing Advisory Committee, US Department of Energy, 2010

21 Yokokawa, M., Shoji, F., Uno, A., Kurokawa, M., Watanabe, T.

The K computer: Japanese next-generation supercomputer development project

(2011) *Proceedings of the International Symposium on Low Power Electronics and Design*, art. no. 5993668, pp. 371-372. Cited 57 times.
ISBN: 978-161284659-0
doi: 10.1109/ISLPED.2011.5993668

View at Publisher

Rahman, M.M.H.; KICT, International Islamic University Malaysia (IIUM), Kuala Lumpur, Malaysia