

異質性系統在XenServer上的資源分配策略

高基育、林仁勇

E-mail: 364854@mail.dyu.edu.tw

摘要

雲端運算在最近已成為發展最迅速的技術之一，雲端運算可以在網際網路上增加新的IT服務、使用和交付模式，並透過網際網路提供動態意擴展的虛擬化資源給客戶，因此虛擬化技術在雲端運算裡占很重要的一環。虛擬化可以讓使用者提升硬體使用率、降低基礎設備的維護費用等。然而隨著IT提供的虛擬作業系統多樣化、虛擬作業系統和實體資源上的分配便是IT所要考慮的問題之一，如何透過系統資源配置來滿足客戶需求是本研究所要探討的問題。本研究經由設計實驗來觀察不同作業系統在XenServer虛擬化平台上的效能，並將實驗結果與一台IBM單核心主機作比較以提供系統資源配置的依據。實驗結果顯示XenServer在資源分配上並不會因為異質性的作業系統而有資源分配不均的問題，但是當虛擬核心數量總和大於實體核心總和時，使用者實際使用的虛擬CPU核心數量將會小於使用者要求的虛擬CPU核心數量，這可能會影響到使用者的滿意度。此外，以一台雙核心主機提供四套虛擬化主機的效能仍可與IBM單核心主機效能相當，這顯示若能適當規畫使用資源可讓硬體資源發揮最大效益。

關鍵詞：雲端運算、虛擬化技術、異質性系統

目錄

封面內頁 簽名頁 中文摘要 iii ABSTRACT iv 誌謝 v 目錄 vi 圖目錄 viii 表目錄 ix 第一章 緒論 1 1.1 研究背景 1 1.2 研究動機及目的 2 1.3 各章提要 4 第二章 相關文獻與探討 5 2.1 雲端運算 5 2.2 虛擬化技術 7 2.2.1 XenServer 8 2.3 測試軟體 9 2.3.1 BurnIn Test 10 2.3.2 Performance Test 12 2.3.3 nbench 13 第三章 實驗設計 15 3.1 硬體設備 16 3.2 測試架構設計 16 3.2.1 管理端實驗架構 17 3.2.2 客戶端實驗架構 19 3.3 實驗架構與目標 20 第四章 實驗結果與分析 22 4.1 同質性虛擬化作業系統 22 4.1.1 虛擬核心數量總和 實體核心數量總和 22 4.2 異質性虛擬化作業系統 27 4.2.1 虛擬核心數量總和 實體核心數量總和 27 4.2.2 虛擬核心數量總和 > 實體核心數量總和 29 4.4 實驗分析與策略分配 40 第五章 結論與未來發展 43 5.1 結論 43 5.2 未來發展 44 參考文獻 45

參考文獻

- [1]S. Zhang, X. Chen, and S. Wu, " Analysis and Research of Cloud Computing System Instance, " International Conference on Future Networks, 2010. ICFN '10. Second, pp.88-92, Jan. 2010.
- [2]C. Gong, J. Liu, Q. Zhang, H. Chen, and Z. Gong, " Analysis and Research of Cloud Computing System Instance, " International Conference on Parallel Processing Workshops, Vol.39, pp.275-279, Sep. 2010.
- [3]L. Zhang, and Q. Zhou, " CCOA: Cloud Computing Open Architecture, " IEEE International Conference on Web Services, pp.607-616, July 2009.
- [4]L. Gen, D. Fu, Z. Jinzy, and G. Dasmalchi, " Cloud Computing- IT as a Service, " IT Professional, IEEE Computer Society, Vol. 11, pp.10-13, Mar. 2009.
- [5]W. Hanqian, D. Yi, C. Winer, and Y. Li, " Network Security for Virtual Machine in cloud computing, " Proc. Of 5th ICCIT Conference, pp.18-21, Dec. 2010.
- [6]S. Ramgovind, M.M. Eloff, and E. Smith, " The Management of Security in Cloud Computing, " Information Security for South Africa (ISSA), pp.1-7, Sep. 2010.
- [7]A. Tripathi, and A. Mishra, " Cloud Computing Security Considerations, " IEEE International Conference on Signal Processing, Communications and Computing (ICSPCC), pp.1-5, Sep. 2011.
- [8]Y. Chu, Y. Chen, Y. Chou, and M. Tseng, " A simplified cloud computing network architecture using future internet technologies, " Asia-Pacific Network Operations and Management Symposium (APNOMS), Vol. 13, pp.1-4, Sep. 2011.
- [9]I. Pratt, K. Fraser, S. Hand, C. Limpach, and A. Warfield, " Xen 3.0 and the Art of Virtualization, " Linux Symposium, pp.65-77, July 2005.
- [10]S.B. Nigmandjanovich, and A. Chang-Won, " Policy-based dynamic resource allocation for virtual machines on Xen-enabled, " Proc. of 2nd ICACC Conference, pp.353-355, June. 2010.
- [11]A. Lenk, and M. Klems, " What ' s inside the cloud? an architectural map of the cloud landscape, " Proceedings of the 2009 ICSE Workshop on Software Engineering Challenges of Cloud Computing , May. 2009.

- [12]R. P. Goldberg, " Architecture of virtual machines, " Honeywell Information Systems, pp.32-38, July 1973.
- [13]I. Kim, T. Kim, and Y. Eom, " NHVM: Design and Implementation of Linux Server Virtual Machine Using Hybrid Virtualization Technology, " Proc. Of Computational Science and Its Applications (ICCSA), 2010 International Conference, pp. 171-175, June. 2010.
- [14]Y.C. Cho, and J.W. Jeon, " Sharing Data Between Processes Running on Different Domains, " Control, Automation and Systems, 2007, International Conference, pp.1255-1260, Dec. 2007.
- [15]X. Shi , C. Liu , S. Wu , H. Jin , X. Wu, and D. Li , " A Cloud Service Cache System Based on Memory template of virtual machine, " Chinagrid Conference (ChinaGrid), 2011 Sixth Annual, pp.168-173, Oct. 2011.
- [16]B. Adamczyk, and A. Chydzinski, " On the performance isolation across virtual network adapters in Xen, " Institute of Computer Sciences, Silesian University of Technology, pp.1-11,Dec. 2010.
- [17]Q. Li, S. Chen, W. Wang, and L. Li, " AnDevice Case Temperature Closed-loop Control System During Burn-in Test, " International Conference on (ICRMS),Vol. 9,pp.1048-1051,June. 2011.
- [18]M. Ku, D. Min,and E. Choi, " Analysis of Virtual Machine Creation Characteristics on Virtualized Computing Environment, " International Conference on Networked Computing and Advanced Information Management (NCM),PP. 1-6 ,June. 2011.
- [19]PassMark Software, <http://www.passmark.com/>.
- [20]Linux/Unix nbench <http://www.tux.org/~mayer/linux/bmark.html>.
- [21]Nbench-維基百科, <http://en.wikipedia.org/wiki/NBench>.
- [22]Information technology-維基百科 http://en.wikipedia.org/wiki/Information_Technology.