記錄編號	3341
狀態	NC088FJU00428001
助教查核	
索書號	
學校名稱	輔仁大學
系所名稱	電子工程學系
舊系所名稱	
學號	487506015
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論文名稱(中)	可調整型計算系統的電源管理之模型分析和架構建立
論文名稱(英)	Model Analyzing and Architecture Founding for Power Management of Scalable Computing Systems
其他題名	
指導教授(中)	白英文
指導教授(英)	Ying-Wen Bai
校內全文開放日期	

校外全文開放日期	
全文不開放理由	
電子全文送交國圖.	
國圖全文開放日期.	
檔案說明	
電子全文	
學位類別	碩士
畢業學年度	88
出版年	
語文別	英文
關鍵字(中)	可調整型計算系統 多重處理機系統 多媒體系統 能量效率 狀態轉移模型 電源管理
關鍵字(英)	Scalable Computing System Multiprocessor System Multimedia System State Transition Model Energy Efficiency Power Management
摘要(中)	可調整型電源管理機制是透過一個考慮應用和工作量的控制模式，去動態改變使用單位時間電源消耗量和執行效能，以達到減少現代計算系統的能量消耗。 在一個電源管理的可調整型系統中，當執行各種不同應用時，給予不同形式的系統資源， 達到最低能量消耗的要求。 在這個研究中，我們提出一個計算機系統資源的動態配置的可控制模型，去達到能

	量效率和性能表現的可調整型關係。 在我們的系統中， 我們使用一個控制器(電源管理器)，根據來自硬體、 軟體和使用者的操作資訊，在計算機系統中控制每個資源的使用情形。 從這個模型中, 我們也提出一個有效的最佳化能量使用之電源管理策略。基於我們導出的最佳化能量使用的配置公式，這個控制器能夠為完成各種不同資訊處理應用去選擇不同資源配置量。 此外，我們使用 89C51 多處理機系統的參數以軟體模擬方式去執行一個簡單應用時，結果顯示我們的建議的方法，能夠達到大約 30%~50% 能量節省。 最後, 我們以此模型和策略應用於三個多媒體系統。因為這些系統是小而有限的可調整能力，所以只針對可攜帶性資訊系統運用，我們主要設計關鍵是對於較輕的(較簡單的)工作量，以電源消耗的減少為首要考量，而對於較輕的(較複雜的)工作量，則以提升執行效能為首要考量。 同時，在某些機制中，把電池容量也視為重要狀態轉移條件。 根據隨機模型分析， 在一般情況下，這樣系統所節省的能量在一個可接受的程度。 這個研究的結果，除了可以用來為先進的可調整型計算系統，提供資源配置和電源管理的一個指南， 它也可以用來作為進一步關於計算機系統可調整型電源管理研究的基礎。
摘要(英)	Scalable power management schemes reduce the energy consumption of modern computing systems by trading off power and execution time in a controlled model, taking applications and workloads into account. In a power-managed scalable system it is possible to set different forms of system’ s resources, each matching the lowest-energy request when to perform specific applications. In this research we propose a controlled model specifically designed for dynamic allocation of resources to reach the scalable relationship between energy efficiency and performance of a computing system. In our system, we use the power manager to control every resource in the system according to the operating characteristic information from hardware, software and users. We also present an effective power policy for optimal energy usage. The power manager can select a different number of resources for performing various applications, based on the energy-optimal allocation formulation derived by us. In addition, simulation on a simple application with a certain set of parameters of a 89C51 multiprocessor system shows that our proposed method can save about 30%~50% of energy. Finally, we apply the model and policy to three multimedia systems. Because these are small and of limited scalability, the key design consideration for portability is reduction of energy consumption for light task and raise of throughput for heavy task. Concurrently, the battery capacity is also considered as an important state transition condition in some schemes. By stochastic analysis, systems present acceptable grade of energy saving for general cases. The completion of this research may provide a guide of resource allocation and power management for modern scalable computing system. It may also be used as the basis for further studies about scalable power management schemes.
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論文頁數	102
附註	
全文點閱次數	
資料建置時間	
轉檔日期	
全文檔存取記錄	
異動記錄	M admin Y2008.M7.D3 23:17 61.59.161.35