

中文摘要

主計處每年必需編製中央政府總預算書至立法院審議，而目前總預算書的編製是由八百餘家單位預算及分預算機關使用主從式架構的預算編製系統執行編製作業，然後逐層由上級機關彙編而成。本研究欲探討的是若此一主從式架構的系統改採多層式架構時，在其眾多效能的問題之中，討論應用伺服器叢集上的派工法則在工作平均等待時間的表現情況。

使用預算編製作業系統的機關及使用者幾乎是固定而且範圍容易掌握。所以，本研究在此前提下，從部份使用者的作業習慣及資料庫中，估算出模擬模型所需之數據、機率分配及公式。在選擇派工法則的部份，則除了一般常用之「輪流法(Round-robin, RR)、最少連線數法(Least Connections, LC)及最小負載法(Least Load, LL)」之外，本研究另提出「估計負載法(Estimated Load, EL)」。即是因為在瞭解使用者端特性的前提下，事先計算影響負載的數據，便可以估算負載情況並運用在派工法則上。

本研究的結果顯示 EL 法在各項工作的服務時間估算誤差愈小時，其表現的結果愈好，其各項工作的平均等待時間相當接近做為測試基準的最小負載法。

關鍵字：多層式架構、應用伺服器、派工法則、負載平衡

Abstract

The Directorate-General of Budget, Accounting and Statistics (DGBAS) of the Executive Yuan (EY) is responsible to compile the General Budget for Central Government and submit to Legislative Yuan every year. The sources of General Budget are processed by 832 government agencies and subordinate agencies by using the same software that is based on client/server architecture. This paper discusses about performance of dispatching rules on cluster-based application servers when this software architecture transferring to n-tiered architecture.

We carry out the comparative studies using four dispatching rules, namely, Round-robin (RR), Least Connections (LC), Estimated Load (EL), and Least Load (LL). The LL rule is used as the baseline in our analysis and the performance metric is average waiting time. Unlike general web-based software, we know clients who use this software. So we can estimate job arrival rate, job size, and even service time. In view of this, we proposed the EL rule in this paper.

Our analyses indicate that the EL rule performs very well. As long as accuracy in estimating service time getting better, the EL rule is a good choice.

Keywords: n-tiered (n-layer, multilayer, multitiered) architecture, application server, dispatching rule, load balancing