

## **An Analysis of Linux Scalability to Many Cores**

### **Summary:**

The objective of this paper is to investigate the scaling behavior of applications running on Linux-based systems in general, and propose a solution for the issue related to scalability. Executing numerous system applications on a 48-core computer, it shows that almost all applications cause bottlenecks in scalability. To address this, besides other modest changes for improving scalability, the so-called sloppy counters are adopted, which remove bottlenecks from the Linux kernel or enables avoidance of these by small changes in applications, and experiments show that such modules actually improve scalability.

### **Strengths and Weaknesses:**

The introduction of sloppy counters for scalability improvement seems innovative. However, there are several drawbacks to consider, as admitted by the authors. The paper lacks consideration on the scalability of I/O operations when it comes to performance bottlenecks. Instead of hardware exploitation, improved algorithms for efficient use of hardware resource can lead to increase in performance. Other techniques such as using address ranges, assigning cores to functions, utilizing shared memory for inter-core message transmission, and dedicating data structures onto on-chip caches could also have been considered to increase scalability.

### **Suggestions for Improvement:**

Extensive experiments on the previously proposed methods for scalability increase might be needed to compare with the proposed method. Being mentioned as the authors' future work, the various methods for scalability enhancement can be investigated in the upcoming papers.