Performance Evaluation of Network Link Sharing Using SystemTap

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ABSTRACT

Because of lacking proper tools, traditional kernel profiling requires tedious human efforts and a costly process. The profiling is done a macroscopically that the whole kernel is treated as an indivisible entity and a black box that its performance is solely measured between its aggregative input and output. The approach is obviously insufficient when profiling individual module of the kernel. The novel tool SystemTap that develop recently under join efforts of Linux community provide a new approach in kernel profiling. SystemTap measures performance of individual module of the kernel and hence a microscopic approach. This research adapts SystemTap to profile module of kernel, specifically the HTB module of hierarchical link sharing. Using the SystemTap, dynamic functional call graph from three different operating modes of HTB are derived and performance of each function in different modes are obtained. More specifically, the calling relation, frequencies and execution time of each function form the HTB modules have been recorded. These results serve as a blueprint of how HTB actually work under different network traffic patterns and a direction for future design optimization. The approach taken in this research can be set up as an example and applied to profile other kernel modules as well.

Keywords : Linux Kernel、Link Sharing、HTB、profiling、SystemTap

Table of Contents

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