Fastest Computers and Operating Systems Used

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ABSTRACT

This paper discusses the fastest computers in the world and the operating systems they use.

Keywords

Fastest, Computer, Supercomputer, Operating, Systems

1. INTRODUCTION

As home computers continue to become more advanced, companies have been continuing research and development projects to build the fastest computers in the world. The fastest computers, which are essentially hundreds of smaller computers smashed together. To maintain such a computer, a powerful operating system is needed.

2. WORLD'S FASTEST COMPUTERS

Since 1993, the TOP500 project[3] has ranked the fastest supercomputers in the world. As of June 2009, eight of the top ten fastest computers in the world have been developed in America. The other two were developed in Germany, the JUGENE by a German division of IBM and the JUROPA by Groupe Bull. IBM is listed as the maker of five of the ten computers on this list and is the maker of the world's fastest computer to date, the Roadrunner.

The Roadrunner[1] has a PowerXCell 8i processor with a theoretical peak of 1.71 petaflops. It contains 103.6 TB of system memory and uses Red Hat Enterprise Linux and Fedora as its operating system. Built from off the shelf parts, you too could own an IBM Roadrunner for only $133 million.

The Jaguar[2], designed by Cray Inc, is second on the 2009 list. Its quad-core AMD processor peaks at only 1.65 petaflops, but it trumps the Roadrunner with 362 TB of memory. The system has a total of 26,604 nodes, each of which runs the SuSE Linux operating system.

3. OPERATING SYSTEMS USED

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Essentially all of the systems listed in the top ten use some distribution of Linux, whether it be a standard distribution or one that was tweaked to fit the supercomputer's unique needs. Regardless, supercomputers rely on the versatility and openness of Linux so they can tweak the operating system to fully harness the power of the hardware.

The most common distributions among supercomputers were Red Hat, Fedora, and variations of SuSE Linux. SuSE Linux, specifically, has been optimized into Computer Node Linux, distributions which have been optimized for supercomputers that take advantage of multi-node processors.

The most important aspect of a supercomputer's operating system is the ability to take advantage of the numerous nodes that they will have. Nodes essentially act as an individual computer, each node containing several processors and an operating system. Combining all of the nodes, configuring all the processors, memory, and operating systems to work together, a supercomputer is created.

4. CONCLUSIONS

Since Linux provides fully developed operating systems that are open and have easy access to hardware manipulations, Linux distributions are most commonly used for the world's fastest computers.

5. REFERENCES

[1] Ibm roadrunner - wikipeia, the free encyclopedia. `http://en.wikipedia.org/wiki/IBM_Roadrunner`, October 2009.

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[3] Top500 list - june 2009 (1-100) | top500 supercomputing sites. `http://www.top500.org/list/2009/06/100`, June 2009.