

success story



SAMSUNG

ADVANCED INSTITUTE
OF TECHNOLOGY

**Samsung Advanced
Institute of Technology's
Linux Clustering**

hp makes supercomputer clustering a reality with the introduction of Itanium™ 2-based servers

new systems become the foundation of Samsung Group's computing strategy

Computing systems incorporating Intel® Itanium processors are garnering a lot of attention lately. Based on a new processor architecture called EPIC (Explicitly Parallel Instruction Computing), Itanium processors achieve superb performance at a relatively low price. Because EPIC breaks the computing limit of existing chips, it stands to dominate both the commercial and technical computing markets in the near future. For these reasons and more, Samsung Advanced Institute of Technology (SAIT), a research center specializing in grid computing, is creating a supercomputing environment using 16 HP rx2600 servers based on the Intel Itanium 2 processor running Linux and HP-UX.

SAIT acquires the latest technology and commercializes it for a variety of markets such as energy and biotechnology. To optimize customer value and provide superior solutions, SAIT sets both long- and mid-term technology strategies for Samsung Group. SAIT also resolves technology-related issues and provides a solid technology foundation to help Samsung Electronics, Samsung Corning, and other Samsung companies succeed. As a central research center for Samsung Group, SAIT provides technical advice and investigates and adopts cutting-edge technologies.

Until recently, SAIT's supercomputing environment was based on 128 Alpha chips running Linux. When the lease period for the Alpha cluster system was nearing its end, SAIT decided to introduce a new cluster system based on the most advanced technologies available. There were two primary considerations in selecting a next-generation system for cluster-based computing. First, SAIT needed to verify the Itanium 2 processor. Second, SAIT had to establish suitable long- and mid-term IT technology strategies, including eventually connecting all Samsung company systems into a single computing grid.

monitoring changes in the processor (CPU) market

Before selecting Itanium-based systems, SAIT thoroughly studied future trends in the processor market. As a research center, SAIT must set technology direction, predict future application needs, and ensure system stability. All of these requirements call for an industry-leading strategy.

Existing server processors can be broadly divided into two categories: RISC, used primarily for UNIX®-based systems; and CISC, the 32-bit Intel architecture used mainly for Windows NT®. In general, Windows NT servers offer the advantage of increased compatibility. Software deployment is easier because most companies use systems based on the Intel architecture. One drawback of UNIX operating systems is the lack of compatibility across processors and the need to recompile software to run in different environments.

One realistic solution to this problem is to deploy servers based on the Intel Itanium 2 processor. The Intel Itanium 2 processor can run a mix of operating systems based on the EPIC technology jointly developed in 1993 by HP and Intel. The ability to run multiple operating systems simultaneously gives SAIT the ultimate in compatibility and preserves existing technology investments while enabling high-end performance equivalent to large parallel-processing systems.

partnership

Once SAIT decided to replace its existing Alpha cluster, it considered several possibilities: adopting Intel Pentium® 4 processors, Itanium 2 processors, or a combination of the two. SAIT also carefully analyzed research reports and found that Itanium processors offer superb performance and are predicted to dominate the future processor market.

SAIT completed the first phase of analysis on Itanium by attending various seminars and conferences such as the Intel Developer Forum. "Itanium is a new technology, but it is quickly being proven in various markets around the world," said Doctor Sang-Moon Lee of SAIT. "We are still in the testing phase, but based on early results, we plan to lay a sound business foundation for the Samsung Group companies by introducing Itanium."

strategic partnership with hp

In moving to an Itanium 2-based cluster, SAIT selected HP rx2600 systems running Linux and HP-UX, continuing a strategic partnership with HP formed in 1998. "Technology and price were major points of consideration, but trust built on our strategic partnership with HP was even more important," said Dr. Lee. "What matters most is collaboration on future development."

Dr. Lee refers to the relationship between HP and SAIT as a strategic partnership and a win-win situation. "HP's willingness to share its product/CPU roadmap and establish trust between the two parties led us to select HP rx2600 server based on the Itanium 2 processor," he said.

In total, SAIT acquired 16 HP rx2600 systems. The HP rx2600 servers support up to two processors (900 MHz and 1 GHz) and provide optimal computing density for cluster-based computing.

In benchmark testing using the HP Scalable Processor Chipset zx1, the HP server achieved superior performance compared to similar systems from other vendors. Another important selection criterion was its ability to support a system bus bandwidth of 6.4 GB/s and a main memory bus bandwidth of 8.5 GB/s. The HP system also exhibited superior price/performance compared with existing RISC platforms and efficiently processed complicated, data-intensive work typical of Samsung's customers.

The Itanium 2-based systems from HP also enabled SAIT to pursue a strategy based on multiple operating systems. The interim plan is to run HP-UX on three systems and Red Hat Linux on the rest. The ability to run multiple operating systems is a major benefit for SAIT in terms of streamlining software development. One development environment is used for supercomputing software utilized in commercial environments; the other is for a PC cluster developed in-house. SAIT protects existing development investments by running Linux—the operating system for the previous Alpha cluster. At the same time, SAIT can test operating systems such as HP-UX for supercomputing. The multiple operating system strategy lets SAIT acquire the technology know-how needed to develop, test, and introduce future systems, regardless of operating system.

In introducing Itanium 2-based systems from HP to its environment, SAIT plans to initially focus on system installation and configuration. Thanks to thorough planning, SAIT also provides supercomputer services based on the Intel Itanium 2 processor.





grid computing pursued

The Itanium 2-based cluster is currently being verified using HP Superdome. Once system installation is complete, SAIT will consolidate its servers and simplify its systems to maximize work efficiency and minimize costs.

Meanwhile, SAIT is also drawing a blueprint for grid computing, the next-generation supercomputer technology. Grid computing applies the resources of many computers in a network to a single problem at the same time—usually to a scientific or technical problem that requires a great number of computer processing cycles or access to a huge amount of data.

SAIT is shaping the future of grid computing using two HP Superdome computers—one allocated to SAIT and the other to Samsung Electronics. By networking the two systems, SAIT will create a computing environment that will allow tasks to be performed on any server. Eventually, SAIT will advance its strategy by connecting the systems of all Samsung Group companies.

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