Productivity improvement in the fast changing world of fine-grain semiconductor technology requires high performance computing systems capable of large-volume data processing in the shortest possible time

**System**
- LSI design CAD environment

**Products**
- PRIMEPOWER 650, 200

**Problems**
- An ageing UNIX server environment and the data processing performance reaching its limits
- Fine-grained LSI technology development that was creating a growing data burden on the system
- 24x7 non-stop reliability was needed to ensure computational responsiveness
- Shorter turn-around times were required to handle the growth in data

**Effects**
- PRIMEPOWER’s high reliability ensured stable operation
- PRIMEPOWER’s performance shortened the data processing times for large-scale and critical data

FUJITSU VLSI provides the management, design and development of Fujitsu products based on high-level semiconductor technology

As society embraces the Internet, the road to the “Information Society” is also being aggressively advanced. The goal is ubiquity where everyone can interchange information with anyone, anywhere at anytime. What will support this ubiquitous society are small LSI silicon chips, barely millimeters wide, that integrate the many devices. Although mostly invisible to the user the development and evolution of cutting-edge LSI technology will have a major influence on the future evolution of that ubiquitous society.

Fujitsu VLSI is a total solution provider of electronic devices fully focused on being a major contributor in the development of the coming ubiquitous society. Organized to produce the high-quality very large scale integration (VLSI) devices required by the world market, it consists of three major divisions. The LSI development division designs and develops the LSI logic. The CAS development division provides the software and support for the LSI development, and the Facility development division designs and develops the manufacturing facilities for LSI and other electronic devices.
Fujitsu VLSI divisional overview

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<tr>
<th>LSI logic division</th>
<th>Facility division</th>
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<td>This division designs and makes trial Logic LSI products of based on the theme “The System on Silicon”. CMOS technology is used as the basis of the cutting edge devices that meet customer needs for customized chip systems using LSI.</td>
<td>This Division designs, develops, produces and maintains all the facilities needed for semi-conductor development. Staff from a variety of disciplines, registered architects, software programmers etc., constructs optimal LSI production facilities that satisfy the severe requirements of clean, humidity controlled and oscillation stable environments.</td>
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<th>CAD division</th>
<th>Analog products division</th>
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<td>This division contributes to semi-conductor technology and VLSI development. It consists of four departments. The CAD department develops software tools and integrates Computer Aided Design (CAD) systems. The CAE department (Computer Aided Engineering), develops the robotic EOA (End of Arm) tools and integrates the network infrastructure. The MASK department, supplies data for production and lastly the CI department designs chip layouts using the latest leading-edge technology.</td>
<td>This four division designs and develops analog products using Bip/Bi-CMOS/CMOS technologies. It supplies Integrated Circuits (ICs) with small form factors, low power consumption and high performance, using cutting edge analog IC technology.</td>
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Thorough simulation achieved quality improvement and a short-time delivery

FUJITSU VLSI conducts thorough simulations in designs and developments of semiconductors and related products. Fujitsu CAD products and EDA tools supplied from outside Fujitsu group are used for this simulation. This thorough simulation purposes a provision of high-quality products in a limited time. Other CAD environments for LSI design use two procedures such as terminal-input method and job-queuing method called LSF. These two types of procedures are chosen to finish tasks such as simulations, data creations and data conversions in a short time in a short time.

- **CAD (Computer Aided Design)**
  Design system that use computing and analytical power. They cover many of the design functions such as basic design, detailed design, structural design, thermal load computations, plus the drawing of layouts and wiring diagrams.

- **CAE (Computer Aided Engineering)**
  Computer systems that support design and development processes for industrial products. Specifically they include, product design support systems, analytical systems for computing characteristics of products, plus simulation systems that confirm the functions and performance of products.

- **EDA (Electronic Design Automation)**
  Computer technology for the design of semi-conductors and ICs functionally equivalent to CAD for buildings and industrial products.

- **LSF (Load Sharing Facility)**
  A load balancing and dynamic job scheduling system which in a heterogeneous computing environment allocs jobs to optimal servers. (LSF is a registered trademark of Platform computing Inc.)
PRIMEPOWER’s role and effect

With PRIMEPOWER ranked a top level performer in computing performance, its use as a dedicated computing engine shortened the turn-around time of the large-scale data computing.

LSF system within the CAD environment in LSI design required various tasks, such as simulation and data creation/translation, to be conducted. To perform these tasks efficiently, multiple servers work as dedicated computing engines under each application server.

With operational efficiency degrading due to the obsolete servers, server evaluation led to the customer choosing PRIMEPOWER, with its demonstrable higher performance, for their new computing base. PRIMEPOWER benchmarks place it top in performance and computing capability in a range of tests across all the servers which constitute the LSF system, consisting of several hundreds of CPUs in total. Moreover, PRIMEPOWER was allotted high priority for critical tasks which needed very short turn-around. PRIMEPOWER servers now contribute greatly to the shortening of turn-around times for such tasks.

In addition, all the EDA tools including simulation software needed to be run on the servers. With PRIMEPOWER, software vendors could not only assure the execution of their software products with the Solaris Operating system, but also achieve improved overall performance. Most importantly PRIMEPOWER realized the customer’s mission to shorten lead-times from job submission through to completion.
The aim is to shorten processing time further while adopting new technologies such as Linux.

LSI size is expected to shrink even further. Plus Fujitsu VLSI is aiming to further shortened delivery times and enhance computing power by the take up of new technologies such as Linux.

This time PRIMEPOWER proved its high performance. This has led the customer to considering installing other PRIMEPOWER450 and 250 systems as good cost/performance servers able to ensure even shorter processing times.

The customer is also considering optimizing their computing environment using Linux technology. For instance, there are already Linux tools available that are effective in the design and production of small-scale circuitry. For larger scale circuits, PRIMEPOWER is the effective choice given the larger scale data processing. The customer therefore is looking at the most suitable development environments to minimize processing time.
Interviewees of FUJITSU VLSI LIMITED

Mr. Toshio Yamaguchi, Project Manager of CAE Department, CAD Business Promotion Division at FUJITSU VLSI

Mr. Takanori Hattori, CAE Department, CAD Business Promotion Division at FUJITSU VLSI

[Above explanations refer to both interviewees' titles when Japanese original article had made]