Highlights in **2010**

"K computer"*
—Computing to Create a Prosperous Future that Fulfills the Dreams of People

The growing list of complex and challenging problems faced by the world includes global warming, increasingly destructive natural disasters, depleted resources, and the emergence of serious new illnesses. Fujitsu looks toward a prosperous future that fulfills the dreams of people and is committed to rapidly finding solutions for the problems that stand in its way.This will mean gathering wisdom from the whole world and making rapid progress in advanced research.

The key to this is a supercomputer with the ability to process huge volumes of information and reveal to us the unseen future.

Fujitsu is cooperating with RIKEN, an institute of physical and chemical research, as part of the High-Performance Computing Infrastructure (HPCI) initiative led by Japan's Ministry of Education, Culture, Sports, Science and Technology (MEXT), by developing the K computer, with completion planned for 2012.

*"K computer" (or 京, the Japanese character for quadrillion) is the name adopted by RIKEN in July 2010 or Japan's Next-Generation Supercomputer.

Fields in which the "K computer" will be actively employed.

Developing new medical treatments and drugs

R&D for new pharmaceuticals, and simulations to optimize the latest medical treatments and surgical procedures

Demystifying the universe

Discovering new, unknown matter in space and resolving the mysteries of the universe

**Addressing environmental and disaster-prevention problems**

Performing analyses to avert global warming and to strengthen buildings against natural disasters

Developing leading-edge products

Developing much safer aircraft, and automobiles that will minimize the effect of impacts

Developing new materials and energy sources

Developing energy sources and materials with lower environmental burdens
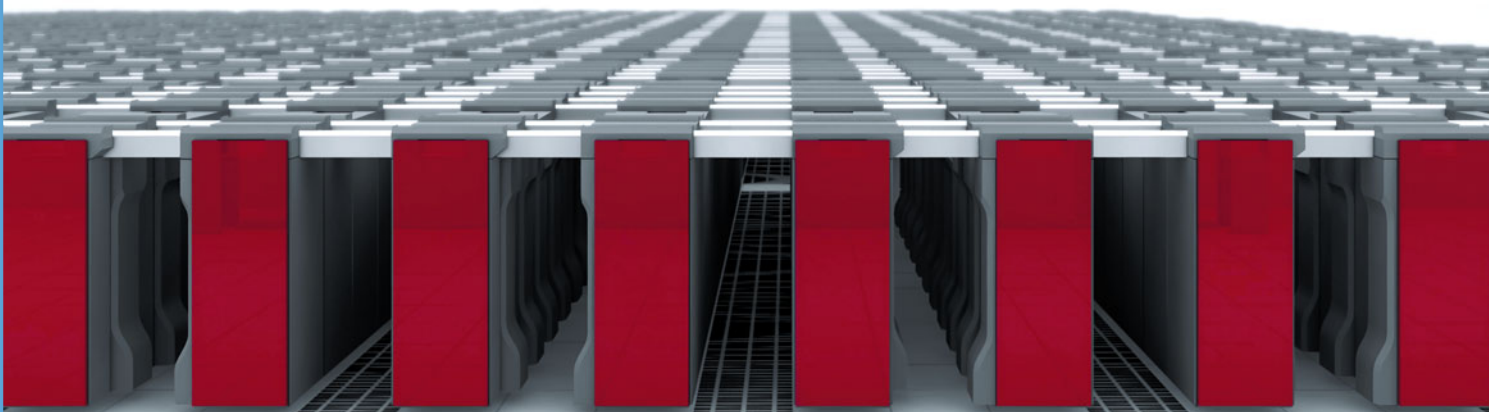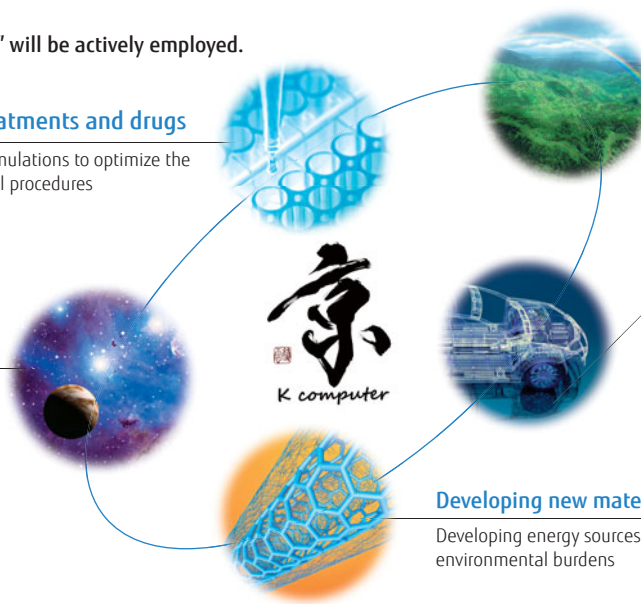
The K computer uses over 80,000 CPUs in parallel that provide high performance and reliability while consuming little power. In June 2011, while still under construction, the incomplete system set a world performance record.

The World of Computer Simulations that the Supercomputer Makes Possible

The high processing speeds of which the supercomputer is capable enable it to model complex phenomena.

Such computer simulations make it possible to evaluate the effects of radiation or arrangements in space that would otherwise be dangerous, and to assess the conditions for phenomena on such a vast scale as to make actual experiments difficult.

Safe & Secure Our lives will change.

We will work to save every possible cancer patient.

How drugs work within the human body, and the actual complex mechanisms of life itself, are still not well understood. As the K computer refines our understanding and predictions, we can expect dramatic changes in the development of new pharmaceuticals. For example, experimental evaluations have previously only been performed one by one on the vast numbers of candidate drugs, but once we have an understanding at the molecular level of the proposed remedy and its working on cancer cells, we can look into the fundamental problems in the expectation of developing effective drugs with few side effects.

Detailed weather forecasts will minimize disaster damage.

While the accuracy of weather forecasts is improving year by year, further improvements require more precise data processing. This takes an inordinate amount of time on today's supercomputers, and they cannot keep up with actual weather conditions. The high speeds of which the K computer is capable are expected to make detailed predictions of local heavy rain possible.

Industry The way we make things will change.

Efficiency will increase, without compromise on safety or performance.

Various computer simulations are already used in the complex design and development of rockets and aircraft, but current supercomputers can only calculate on the basis of components such as fuselages and wings, so wind-tunnel facilities built at great expense must be used. The K computer is expected to be able to handle the aircraft as a whole, reducing both the time and cost of development, while offering the decisive advantage of constructing aircraft with superior performance.

Basic Science The unknown will be rendered visible.

We want to know how the universe was formed and its future.

Various theories have been proposed for how the universe was formed. However, present technologies do not enable us to visit distant stars or galaxies for experimental proof. But this is where computer simulation comes into its own. The number of stars and the periods of time that can be handled are highly dependent upon the speed of data processing, and high performance supercomputers are essential. The K computer will give us glimpses of the distant future of the Earth and of humankind by simulating the phenomena of the universe.

A Word from Fujitsu

We are contributing to a prosperous "dream" future through Supercomputer Development.

Throughout recorded history, humankind has always dreamed of predicting the future, starting with the weather, typhoons and frost damage. In every age, sundials and astronomical observations were the most advanced technologies of their time, and aimed to discover the laws of Nature and to prepare for its vagaries. The high regard in which fortune-tellers and shamans were held by the rulers of their day tells us of the great importance that was attached to predictions.

Today, supercomputers have made it possible to grasp changes on many different scales, from the formation of the universe to the motions of nuclear particles, and to make very precise predictions. We want to be a major resource in solving humankind's common problems, from measures against global warming and natural disasters, through saving resources and energy to curing serious illness. Through Fujitsu's supercomputer development and usage, we want to work with our customers to contribute to a prosperous and dream-inspiring future.

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Unit