

A key technology of national importance

What is a supercomputer?

A supercomputer is an ultra-fast computer that can be used for large-scale scientific calculations across a wide range of fields. Simulations using supercomputers have become vitally important as a third method of research and development, alongside experiments and theory. These supercomputer simulations can be extremely effective in a variety of situations in which experimental approaches are not applicable. Such situations include, for example, those where the object of study is too large or complex for analytical solutions, or in which experimental observation would require excessive time or high cost, or involve extreme or dangerous conditions (for instance radioactivity or high temperature). Simulations are also useful in cases where the subject of study is not amenable to experiment, such as in the case of the natural environment, geographic regions, or societies.

Supercomputers are now used in weather forecasting, in the design of cars and aircraft for analyzing structures and fluid flows, and for a wide range of other purposes. They are indispensable for the future of science and technology and the competitiveness of industry.

Comprehensive and high-level electronics skills in high-performance, low power dissipation semiconductor technology, optical communication technologies, network technologies and quality control technology, are all required in supercomputer development. Japan is at the top of the world in this field, but continued research development is needed to maintain and improve the country's technological capacity.

The Next-Generation Supercomputer: opening up new frontiers

