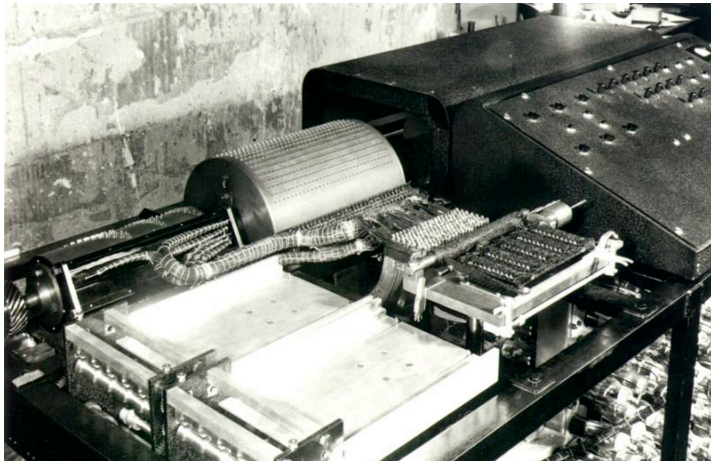


Supercomputers

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A supercomputer is defined as a mainframe computer that is one of the fastest and most powerful. Supercomputers have grown and changed throughout their history. Their speed is unparalleled, their future is exciting, and their uses are nearly limitless.

In 1943, the first supercomputer named Colossus was made in England. It was only able to handle five thousand characters per second. Also in England in 1950, the Manchester Mark I was produced and was able to handle 500 instructions per second. MIT advanced supercomputers by promoting the use of CRT memory and Core memory. IBM dominated the supercomputer industry in the 50s, 60s, and 70s. In 1975, the "father of supercomputing," Seymour Cray earned his nickname for creating the first completely transistorized supercomputer. Cray founded Cray Inc. when he began designing and creating supercomputers. He named his first supercomputer Cray-I. It was a single electronic computer. Cray-I was sold



The Atanasoff-Berry Computer (ABC)

<http://www.computerhistory.org/timeline>

in 1976 to Los Alamos National Laboratory for \$8.8 million. The Cray-1 recorded a speed of 160 million floating-point operations per second (160 megaflops) and contained an 8 megabyte main memory. That means it could hold one million words. Cray used a "C" shaped design to keep the circuits closer together. This created problems because it created more heat. Seymour Cray overcame this obstacle by

using Freon in a new cooling system. The ILLIAC IV was created and used by NASA in 1982. It averaged 100 megaflops. Soon after, in 1982, Cray Inc. developed the first multiprocessor supercomputer. It was called the Cray X-MP. In 1985, the Cray-II was introduced and was immensely more powerful than the original Cray-I. Another breakthrough occurred when a supercomputer was presented that could attain 1 gigaflop on many applications. This occurred in 1988, and the computer was the Cray Y-MP. This supercomputer was improved when a central processor was applied. In the 1990's, supercomputers were created by connecting separate processors to increase speed and memory. 1995 brought the first supercomputer to attain a 1 teraflop processing. A teraflop represents one

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trillion calculations per second. Intel became an industry leader in 1995 with its introduction of the Intel ASCI Red, which performed at 2.15 teraflops. Since 2000, the IBM ASCI White, Earth Simulator, and Blue Gene have been released. They perform at 7.226 teraflops, 35.86 teraflops, and 70.72 teraflops respectively. Now supercomputers are almost exclusively created by connecting multiple computers. They can either share common memory and a common operating system or have their own. No matter the architecture the programs are divided into small portions and divided between all the processors.

MDGrape-3 is the world's fastest supercomputer. Even though it cost \$9 million and about 4 years to build, it is very efficient. Instead of using \$140 per gigaflop (Blue Gene), it cost only \$15 per gigaflop. A gigaflop is a speed of one billion operations per second. It can also determine the effect of any chemical compound on any complex system in the human body in a couple of seconds. MDGrape-3 is used for pharmaceutical research. To develop drugs, you need to look at thousands of chemical compounds to find out how they affect the body, and there is no way a group of people could find that information in a limited time. Even if you had thousands of people, it would still be impossible. Even with regular computers or supercomputers, you can only analyze the "chemicals" and "enzymes" in hours or days. By using MDGrape-3, pharmacists can analyze these things within seconds! This is invaluable, or priceless, information.

The benefits and uses of supercomputers are used in many different fields. For example, supercomputers can predict weather. "Every time you check the weather, you are actually seeing the output of a supercomputer."-video center. You can also use supercomputers for mathematical calculations, seismic activity (earthquakes), nuclear energy research, fluid dynamic calculations, submarine tracking, pattern matching, graph analysis, cryptology (the study of codes in which the key is unknown), data collection, and researching anything on the internet. All data goes through supercomputers and that's why you can find 62,600,000 results of the word "dog" in .04 seconds.



A weather supercomputer at NOAA.
<http://www.computerhistory.org/timeline>

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There are many differences between supercomputers and computers. First of all, supercomputers can cost up to many millions of dollars. On the other hand, regular computers cost hundreds to the low thousands. Supercomputers are much larger than regular computers in reference to size, power, and processing ability.



Supercomputer-

<http://upload.wikimedia.org/wikipedia/commons/c/c7/>



Desktop computer-

<http://www.a1audiovisual.com>

Scientists are already figuring out what the future for supercomputers is going to be like. They are going to be using them more and more for creating stimulus, building airplanes, creating chemical substances, making new materials, and doing crash tests on cars without actually having to crash the car. Some of the stuff that they are improving isn't working but they are revising it. They are also trying to make a computer chip that is powerful enough for a supercomputer- (superchip.) Some of the things that they are thinking of don't have enough technology to make them work, so they are trying to figure out ways to improve the technology. Cooling a supercomputer is another major problem. They are trying to make something to cool a supercomputer that won't cost too much money. Money is a major problem. They are very expensive to use and to make. Another thing to go along with the superchip is they are trying to super-size supercomputers. The scientists are still trying to improve the supercomputers.

As you can see, supercomputers are helpful in many ways. They have numerous benefits and uses, and they are very different from a regular computer. Supercomputers have a long history, and will probably advance in the future. All in all, a supercomputer is a wonderful invention.

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