In 1983 Governor Rudy Perpich proclaimed Minnesota as “supercomputer capital of the world.” A “commemorative” license plate gestured to local supercomputing giants Control Data and Cray Research. There was much to celebrate. Two years earlier the University’s Cray-1 (at 100 megaflops) made it the first in the U.S. to acquire a class VI supercomputer. Today the University of Minnesota Supercomputing Institute continues the legacy.

“Bill, you’re only at 512. How are you possibly going to get to 64,000?” Nobody had ever built so large a machine.” Massively parallel supercomputers posed unusual problems. Bill Pulleyblank, head of mathematical sciences at IBM Research, defined protein folding as a grand challenge for Blue Gene. But could Blue Gene scale up as needed?

To realize the promise, engineers at IBM Rochester worked literally side-by-side with scientists from IBM Research at Yorktown Heights, New York. In 2001, IBM gained an important partner in Lawrence Livermore National Laboratory, a supercomputing mecca. Livermore would help with the $100 million development cost and—if all went well—buy the first Blue Gene. While IBM Research proved the concept with a half rack of 512 nodes, engineers at IBM Rochester scaled up the design to 64 full racks and 65,536 nodes. Engineers perfected Blue Gene’s novel chips, cooling, power supply, networking, software, and packaging.

The development rack on display here was used in Rochester for early system development work: verifying the technology, system scaling, software, and manufacturing. With its hot-swappable node cards and power supplies, Blue Gene can run continuously for a year or more. In September 2004, IBM Rochester assembled eight of its Blue Gene racks into the world’s fastest supercomputer. This prototype Blue Gene achieved 36 teraflops on the Linpack benchmark, elbowing aside NEC’s Earth Simulator. Then, Rochester shipped the remaining racks to Livermore to form Blue Gene/L which achieved 280 teraflops with 64 racks. Blue Gene remained first on the TOP-500 list until the debut of IBM’s Roadrunner in June 2008.