Chapter 4

Connection Machine Software

The Connection Machine system provides a well-designed, thoroughly integrated software environment to facilitate applications programming. The environment seamlessly blends industry standards with data parallel enhancements to provide both high performance and ease of use.

4.1 Base System Software

The use of industry standards begins with the UNIX operating system and its network file system (NFS). Full X11 support provides windowing capability; the NQS batch system allows submission of batch jobs locally or across a network. Networking support includes Ethernet and FDDI for local area networking, and VME and HIPPI for high-performance networking.

Ease of use, meanwhile, is enhanced by Prism, the windowed, integrated development environment for program editing, debugging, and performance analysis. Another CM enhancement, a parallel, high-performance file system, provides excellent I/O performance and allows use of extremely large files.

4.2 Languages and Libraries

For programming, users choose among the popular languages C, Fortran, and Lisp. The CM offers data parallel versions of each language, extending the languages' own constructs in intuitive ways to support the data parallel model.

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In addition, specialized libraries offer support for graphics, communications, and mathematical and scientific programming. All are available from the high-level languages; low-level programming is not required to achieve high performance on the Connection Machine supercomputer.

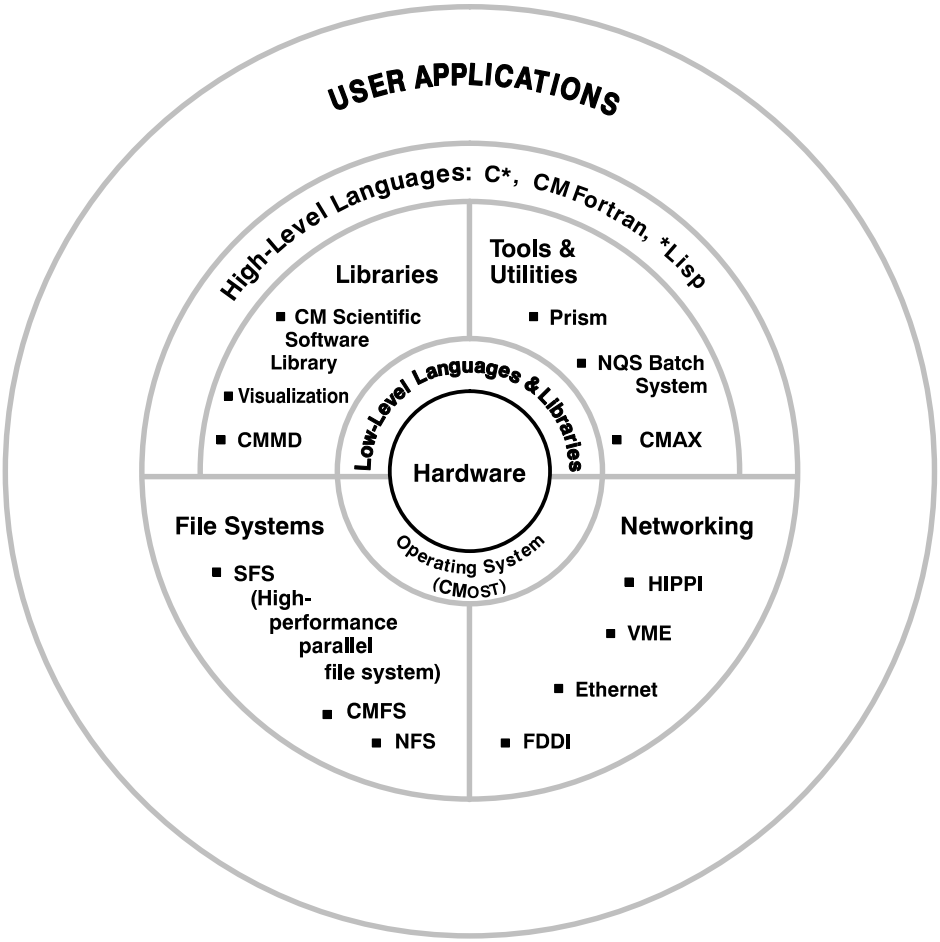

Figure 12. Layered software of the Connection Machine system.

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4.3 CM Software Summarized

Figure 12 summarizes the layered software of the Connection Machine system. This software is discussed in the following chapters:

Operating system, file systems, I/O programming . . . . . Chapter 5

Prism (the development environment) . . . . . Chapter 6

NQS batch system, checkpointing,
the execution environment . . . . . Chapter 7

CMAX converter . . . . . Chapter 8

CM Fortran programming language . . . . . Chapter 9

C* programming language . . . . . Chapter 10

*Lisp programming language . . . . . Chapter 11

CM Scientific Software Library
(linear algebra, Fast Fourier Transforms,
random number generation, histograms) . . . . . Chapter 12

Visualization . . . . . Chapter 13

CMMD (message-passing communications library) . . . . . Chapter 14

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