

The CRAY XMS Minisupercomputer System



CRAY
RESEARCH, INC.

Introducing the CRAY XMS Minisupercomputer System



Cray Research, the supercomputer leader, now offers an unsurpassed range of computing options, from a leading price/performance system to the world's most powerful supercomputer. The CRAY XMS delivers the balanced Cray Research 64-bit vector architecture via the powerful and easy-to-use UNICOS operating system. With the CRAY XMS system, Cray Research now offers you a clear pathway to the unlimited power of large-scale supercomputing.

The CRAY XMS system will meet your needs for:

- ☐ A system suited to departmental budgets
- ☐ A pathway to Cray Research large-scale supercomputer systems
- ☐ A cost-effective UNICOS application development platform
- ☐ A powerful system in a secure environment

The CRAY XMS system is compact, easy to install, and inexpensive to operate. Its low power requirements, high reliability, and high serviceability minimize operating costs. And it offers the most throughput performance in its price range for multi-user technical computing requirements.

Reliable, high-performance software

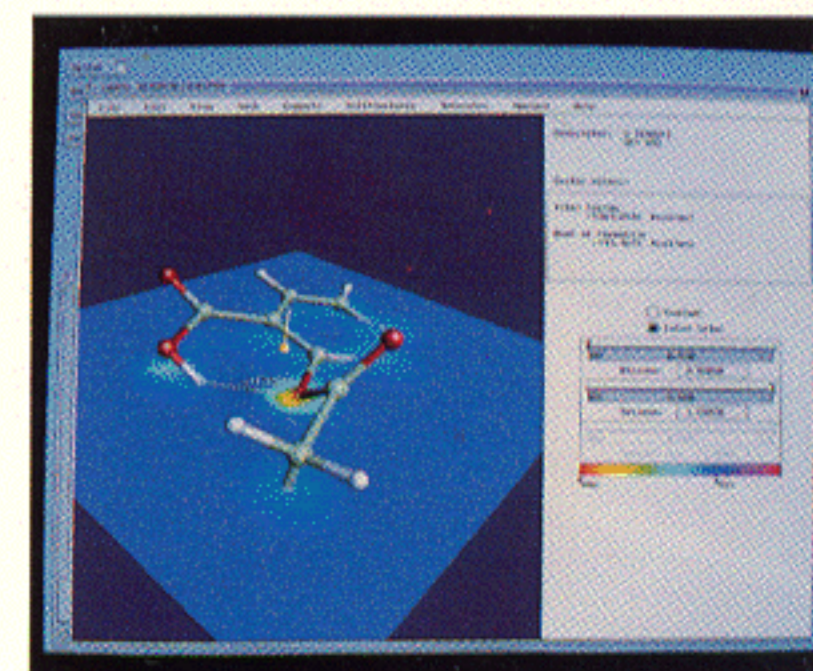
The CRAY XMS system runs the same powerful operating system used by the entire Cray Research product line: the UNICOS operating system. Based on UNIX System V, the UNICOS operating system is easy to use and is the most fully featured, highest-performance UNIX-based operating system available.

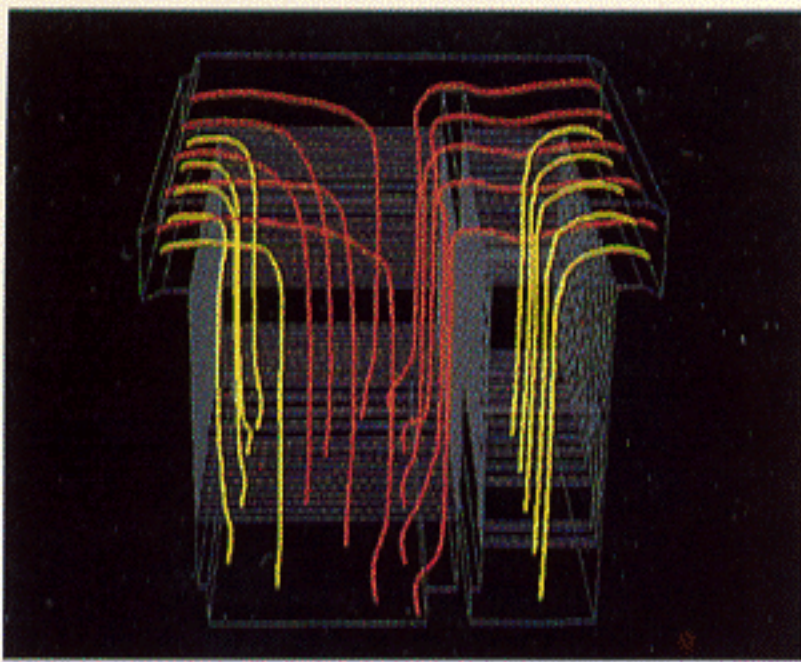
The UNICOS user environment delivers a highly productive combination of optimizing compilers and easy-to-use tools. The CF77 Fortran compiling system and Standard C compiler, along with a variety of library routines and utilities, make the Cray Research programming environment the most dependable and productive software environment available. By adhering to industry standards, the Cray Research software environment provides easy portability for applications users and developers. Because binaries from the CRAY XMS system will run on CRAY X-MP and CRAY Y-MP systems, work is easily scaled to larger Cray Research systems.

Cray Research's UniChem integrates popular computational chemistry techniques under a common user interface that improves user productivity. Its open architecture allows other applications to be attached.

UniChem's direct-manipulation graphical user interface, which runs on a graphics workstation, lets users manage data, import molecular structures or build them from UniChem fragment libraries, choose a computational method, select computational

parameters, control computations, and visualize the results — all in the same framework and style, regardless of the specific application package used. The ability to do all these tasks through one user interface reduces the time to solution, allowing more simulations to be run in a given time.





Cray Research's Multipurpose Graphic System (MPGS) is an interactive, menu-driven graphics tool that improves the user's ability to analyze and interpret results through visualization. MPGS runs on a UNIX-based workstation communicating with the simulation on the CRAY XMS

via TCP/IP. Simulations are post-processed while they are still on the CRAY XMS. Memory and CPU-intensive tasks are processed on a CRAY XMS, while the user interface and local graphics are processed on the graphics

workstation. This distributed processing technique ensures the efficient use of both computer systems, and the visualizations often provide entirely new understandings of results.

Network Supercomputing

The CRAY XMS system can be used as a stand-alone system or as a node in a heterogeneous computing environment. Like all Cray Research systems, the CRAY XMS system supports connectivity to a wide variety of computer systems. This extensive connectivity protects existing network investments and enhances the productivity of users by providing access to a wide range of resources.

Applications

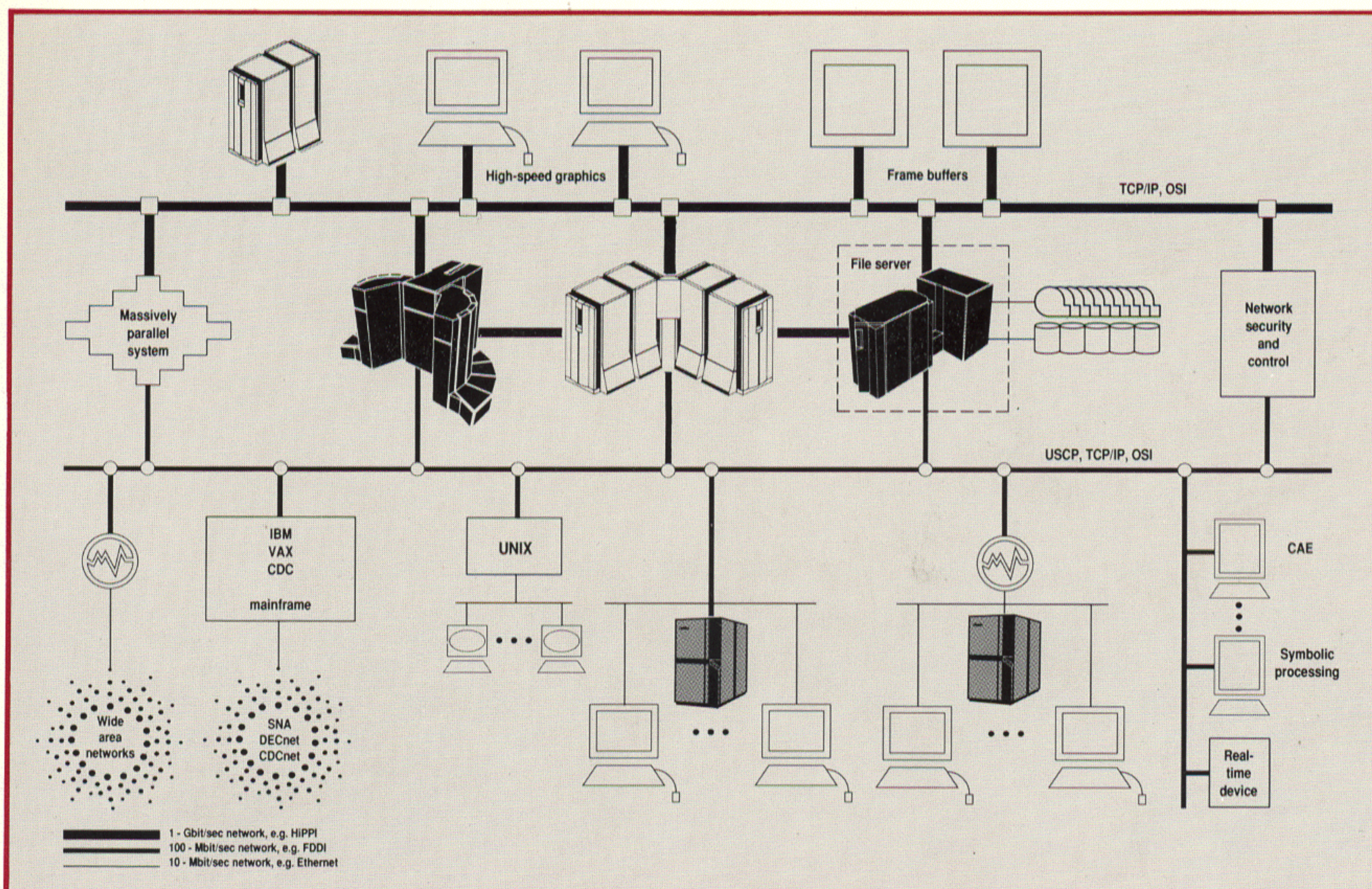
More third-party applications run on Cray Research computer systems than on any other high-performance computer system. Applications for nearly every scientific and engineering discipline, including over 500 third-party programs, will run on the CRAY XMS system. As part of its significant commitment to user productivity, Cray Research offers the UniChem chemistry application environment and the Multipurpose Graphic System (MPGS) for output visualization. Key applications such as MSC/NASTRAN can be run on the CRAY XMS system; then as the problem size increases, the problem can be run on larger Cray Research systems.

User productivity

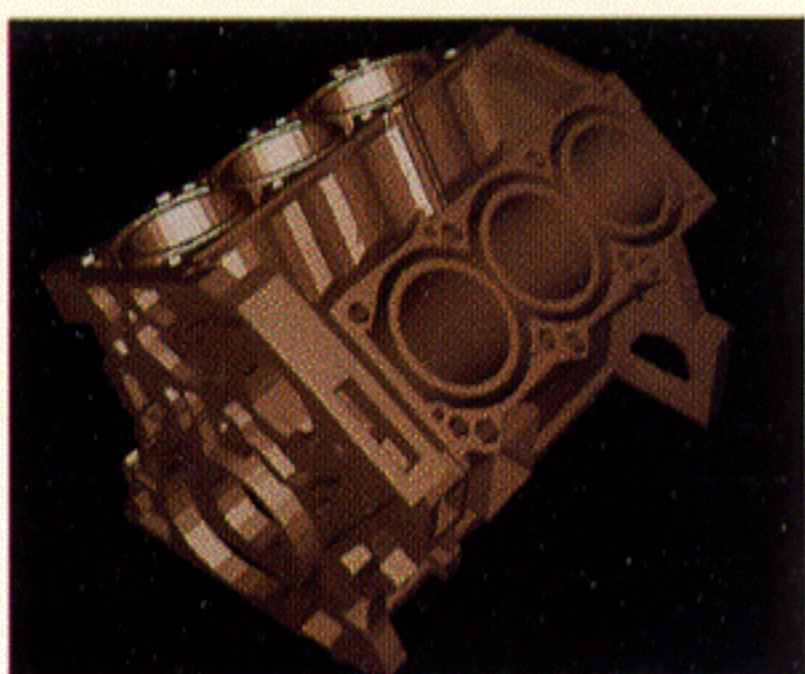
The CRAY XMS provides significant computing capabilities. New Cray Research users will be introduced to a highly productive user environment, along with a cost-effective pathway to large-scale supercomputing. Established Cray Research users will appreciate the compatibility of the CRAY XMS.

All Cray Research systems adhere to industry standards, providing easy integration into heterogeneous computing environments.

Through its implementation of networking standards, Cray Research provides connectivity to virtually all UNIX-based mainframes, minicomputers, and workstations. These standards include TCP/IP, the X Window System, NFS, the Open Systems Interconnection (OSI) of the International Standards Organization (ISO), and the Fiber Distributed Data Interface (FDDI), as well as other networking standards. Network Supercomputing delivers a powerful and flexible user environment.



The CRAY XMS system integrates into a heterogeneous networking environment.



MSC/NASTRAN is a large-scale, general-purpose digital computer program that solves engineering analysis problems utilizing the finite element method. Analysis capabilities include static and dynamic structural analysis, material and geometric nonlinearity,

heat transfer, aeroelasticity, acoustics, electromagnetism and other types of field problems. It has been used by large and small companies engaged in such fields as automotive, aerospace, civil

engineering, shipbuilding, offshore oil, industrial equipment, chemical engineering, optics, and government research.

Balance: the key to CRAY XMS system performance

Like all Cray Research systems, the CRAY XMS is a blend of architectural components balanced to maximize system throughput.

A wide selection of peripherals are available for the CRAY XMS system. A VME-based I/O subsystem commu-

nicates with the CPU over a 40 Mbyte/sec channel. Cost-effective ESDI disk drives are available, along with a high-performance disk array that can sustain a transfer rate of over 12 Mbytes/sec on large blocks.

As always, Cray Research is committed to fundamental engineering excellence and innovation, and this commitment is plainly evident in the CRAY XMS system.

CRAY XMS system highlights

Hardware

- ☐ 36 MFLOPS peak vector performance; 18 MIPS peak scalar performance
- ☐ One CPU with 128 Mbytes of four-ported, 16-way interleaved Error Correction Code (ECC) memory
- ☐ 576 Mbyte/sec memory bandwidth
- ☐ 40 Mbyte/sec VME-based I/O system
- ☐ Supports a wide variety of high-performance peripheral equipment
- ☐ Fan-cooled; does not require a special environment
- ☐ Effective, low-cost support
- ☐ High reliability due to proven component technology
- ☐ Ethernet and HYPERchannel connections

Software

UNICOS operating system:

- ☐ Based on UNIX System V, with Berkeley extensions
- ☐ Extensive enhancements to UNIX for large-scale scientific computing
- ☐ A wide variety of system utilities
- ☐ Feature-rich
- ☐ Portable

Compilers:

- ☐ Autovectorizing Fortran compiling system
- ☐ Optimized Fortran mathematical and I/O subroutine library
- ☐ Optimized scientific subroutine library
- ☐ Autovectorizing C compiler
- ☐ Ada
- ☐ Autovectorizing ISO Level 1 Pascal
- ☐ CAL, the Cray macro assembler
- ☐ Interlanguage communication support

Images used in this brochure:

UniChem delivers multiple molecular modeling and simulation techniques in a single, integrated software environment. The figure shows the structure and electron density of an aspirin molecule, built, calculated, and visualized using UniChem.

Airflow through a computer cabinet visualized using MPGS. Image depicts the geometry and particle paths in a four-processor HP 9000 Model 850 computer cabinet. Data courtesy of Kent Misegades, Cray Research, Inc. Code: FIDAP

Engine block depicted with shaded images. Data courtesy of General Motors Corporation. Code: MSC/NASTRAN

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