

CRAY RESPONSE

**TO CUSTOMER CONCERNS
HIGHLIGHTED IN
THE CUSTOMER
SATISFACTION SURVEY**

The goal of this report is to inform Cray customers of the activities Cray has underway to respond to the issues raised in the Cray Customer Satisfaction Survey. As many of you know, the survey was conducted in the summer of 1988. Customers from the U.S. and nine other countries participated in telling Cray what we could do to improve the Cray/customer relationship.

C R A Y R E S E A R C H I N C .

To our customers:

Cray takes very seriously our customers' opinions and responses to the Customer Satisfaction Survey and uses them for planning and prioritizing our efforts. As a result of the survey, we have taken the following actions:

- **Analysis:** Customer surveys were analyzed in-depth and tailored results were formulated for each region. Regions conducted further analysis of region-wide and customer specific needs.
- **Wide distribution/follow-up with customers:** Survey results were presented and distributed throughout the company to raise awareness of customer satisfaction issues and to alert relevant parties to customer concerns. Follow-up actions were taken by account managers and/or on-site or region personnel as needed. On-going customer satisfaction plans are in effect in the regions.
- **Broad-scale action formulation:** All functional group heads (Hardware Development, Software Development, Marketing, Technical Operations, Manufacturing/Quality Control, Finance) reviewed the results and discussed necessary actions to address the concerns. Several groups further analyzed the customer comments and ratings with their staffs to more fully understand the issues. Relevant group leaders (e.g. FORTRAN group leader, UNICOS group leader) then developed action plans to directly address these items. Certain groups contacted individual customers as necessary or designed comprehensive follow-up studies.
- **Progress report to customers:** This "Cray Response" was developed to keep you informed of our progress.

This report is a summary of the key corporate-level issues brought out in the survey and what Cray is doing to address them. It is a synopsis of the activities planned or underway to deal with customer concerns. It will supplement information that customers already may have from their account managers or other sources, and we hope it will give an overview of important activities that are intended to meet customer needs.

If you have questions about this information, please call your account manager or Ed Masi, Senior Vice President of Marketing. We look forward to continued open communication with you through the survey and other channels, and we encourage you to keep us informed of how we are doing to satisfy your computing needs.

Sincerely,

M. A. Gumucio

Marcelo Gumucio
President and COO

Software

Customers were pleased with recent changes in the software organization, and many cited better software and software support as reasons for improved satisfaction in the past year. Better quality and functionality of software releases and timely communications are still needed, however.

Hardware

In the past, customers have rated Cray's hardware very favorably, and they did so again in 1988. They were especially satisfied with hardware support in general, and also noted improvements in mainframe reliability and escalation and diagnostic procedures. However, they desired additional improvements in hardware diagnostic tools and peripheral reliability.

Competition

Cray rated well compared to three U.S. companies: IBM, DEC and CDC/ETA. In fact, Cray rated significantly higher than DEC and CDC/ETA in all categories: hardware and software maintenance, system performance and marketing support. We scored equal to IBM on hardware/software maintenance, and higher than IBM on marketing support and system performance.

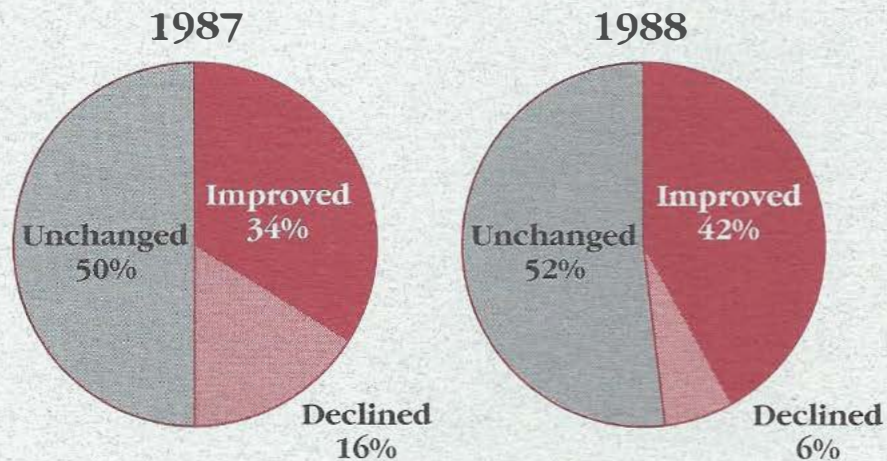
Company Directions

Customers supported Cray's efforts to be responsive to their overall needs and to provide appropriate marketing support. They also felt that progress was made in providing more information on Cray's future directions. Still, it was clear that Cray needs to be more proactive in communicating with customers.

In general, overall satisfaction with Cray has remained high and even improved since 1987, and customers commended our people in their efforts to support them and deal with their concerns.

There were several areas in which customers suggested Cray should improve. Listed first is the area of focus, followed by the actions taken or planned.

Satisfaction Change Over Past Year



*● Overall Satisfaction Improved

AREAS CRAY IS IMPROVING

SOFTWARE

Improved software reliability

Actions Taken/Planned:

- As a result of the following actions, **new releases such as UNICOS 4.0 and CFT 1.15BF3 have had less than half the Software Problem Reports (SPRs) filed against them than the previous release.**
- During 1988, all major software products were supported by periodic revisions which provided fixes to urgent and critical problems. Responsiveness in resolving problems was improved, and mean time to interrupt (MTTI) was increased. **Aggressive MTTI goals for both UNICOS and COS were exceeded.**
- More rigorous testing methods are in place, including enhanced field testing; "exposure" testing to give the products extensive exposure to customer codes before release, and stress testing to stress the systems as customers would prior to release.

Better FORTRAN support, reliability and repair time.

Actions Taken/Planned

- To enhance responsiveness to problem reporting, **the process of supplying and tracking modifications was improved.** New revisions of the FORTRAN compilers fix critical and urgent problems more effectively.
- **CFT77 release 2.0 and 3.0 each compiled 15 to 20% faster than the previous release, and typical CFT77 executable code is about 20-25% faster than CFT or CFT2.**
- In 1988 we focused on CFT reliability. **The CFT 1.15 BF3 release in July 1988, as measured by incoming problem reports, is three times as reliable as CFT 1.15 BF2.**

Better station reliability

Actions Taken/Planned:

- **During 1989 Cray's objective is to reduce the number of outstanding problems to less than 80% of the 1988 level.**
- New development teams were formed to focus on product reliability and quality. This action separates future product development from the maintenance of the existing station products.
- A controlled release process is being instituted that exposes products to a wide variety of customer environments prior to release. This will reduce the number of outstanding problems.

Improved UNICOS functionality

Actions Taken/Planned:

- **UNICOS 4.0 and 5.0 add significant new functionality to the system and provide an effective platform for COS users to migrate their workloads to UNICOS.** Some of the major areas addressed in UNICOS 5.0 are data migration, job recovery, accounting, scheduling, resource control, graceful degradation, online diagnostics, and online tape support.
- **The capabilities of UNICOS will be continually enhanced.** Future UNICOS releases will include disk quotas, extensions to data migration, product accounting, improvements in security, and real-time operations.

Better C performance and reliability

Actions Taken/Planned:

- **C compiler performance and reliability are key result areas for 1989.**
- In November 1988 the Portable C Compiler 4.0 was released. It contained vectorization and stability improvements.
- The initial release of the Standard C compiler, currently in exposure test, will deliver another boost to C vectorization while improving scalar performance.

More reliable debuggers and tools/utilities

Actions Taken/Planned:

- **DRD, DDA, and DBX will be replaced by CDBX to provide interactive, symbolic debugging.** The first release of this new Cray debugger will be in UNICOS 5.0. It will provide 53 fundamental commands and capabilities of DBX plus initial support for multitasking; another 16 commands will complete the initial list of DBX features in CDBX with UNICOS 6.0. It also will provide windowing and satisfy most of the requirements for a UNICOS debugger to provide the key capabilities of the DDT debugger from CTSS.
- **UNICOS 4.0 and 5.0 contain additional features to expand those available from the AT&T UNIX System V and the BSD derivative.** They provide the user with a full set of applications development and support features.

Improved diagnostic tools

Actions Taken/Planned

- **Cray is releasing software with COS 1.17 and UNICOS 5.0 to provide faster problem diagnosis, graceful degradation, and fault isolation.**
- **Increased applications of expert systems to problem diagnosis will be provided** for systems with maintenance work stations.
- Y-MP diagnostics will offer improved usability features such as self-documentation and more intelligent and informative screen displays at the maintenance work station.

Better responsiveness to non-critical problems

Actions Taken/Planned:

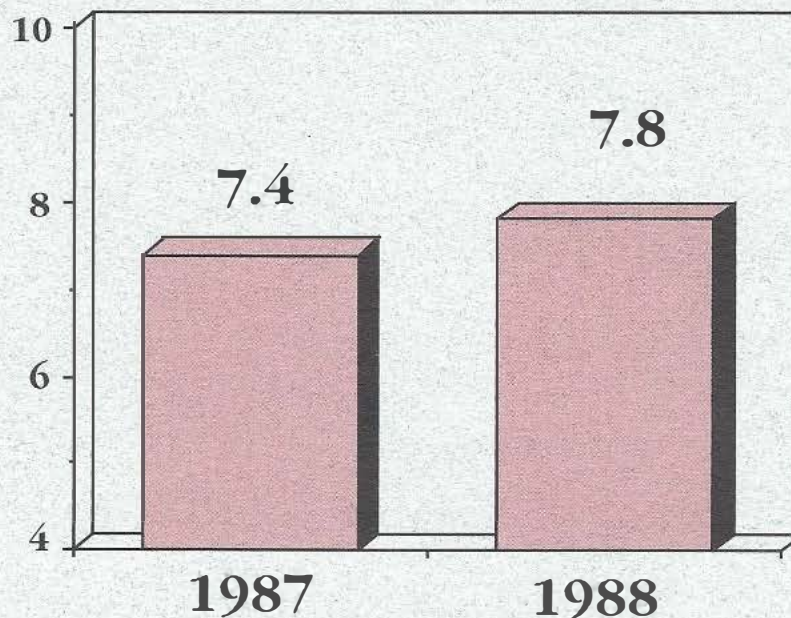
- In early 1988, Cray implemented an extensive tracking procedure to identify the number, status, and age of Software Problem Reports (SPRs).
- Cray reduced the backlog of Software Problem Reports: **by year-end 1988, total open SPRs had been reduced by more than 15 percent compared to 1987.** Greater reductions are targeted for 1989.
- In order to expedite the handling of non-critical SPRs, an URGENT category was established in July 1988 to differentiate the MAJOR problems with critical impact from those with lesser impact.

Improved information about software problem resolution

Actions Taken/Planned:

- In October 1988, the Cray Automated Software Problem Report database (C.A.S.P.R.) was implemented. It is a customer-accessible database showing the status of Software Problem Reports, and is available to all customers.
- In 1989, C.A.S.P.R. will be enhanced to provide more "fix status" information. Customers may obtain more information about this program from their local sales office.

Software Response Time



HARDWARE

Quality

Actions Taken/Planned

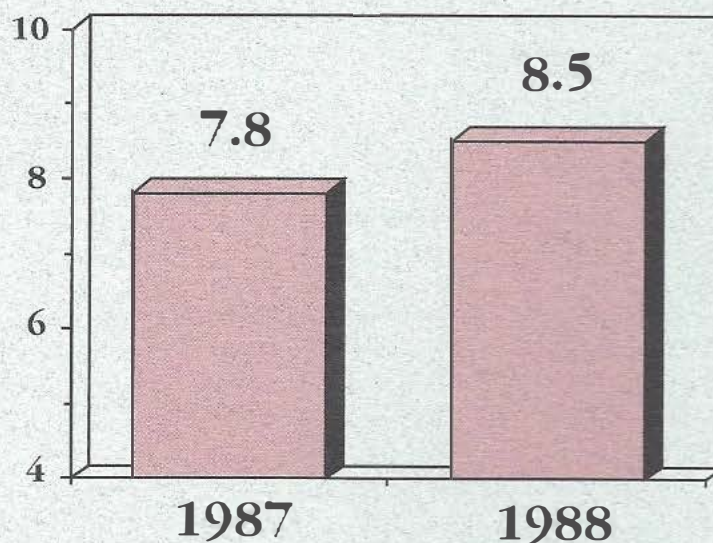
- Development and Engineering groups have incorporated Reliability Engineering, Quality Engineering, Manufacturing Engineering and Technical Operations staff into the design development teams for new products.
- A comprehensive testing and analysis lab was added to insure timely failure analysis and corrective action.
- An employee quality involvement plan has been implemented to emphasize the importance of each individual's contribution to quality.
- A supplier rating system has been enhanced to identify and eliminate inadequate suppliers and to certify high-performing suppliers.

Reliability

Actions Taken/Planned

- **The move toward VLSI technology in all of our future products will result in significant reliability improvements.**
- **Process control and automation of critical areas has been established**, including the wave soldering process, the material handling process, (**resulting in a 50% reduction in handling of materials**); and automated part preparation, inspection stations and various assembly processes.
- More computer simulation is now used for worst case analysis and increased design margin.

Mainframe Reliability



***Overall Improved Reliability**

- The Electro-Static Discharge (ESD) prevention program has been enhanced. This includes employee training and facility design.
- A comprehensive quality audit program has been developed to provide feedback and corrective action for problem resolution.

Better peripheral reliability, especially DD-49's

Actions Taken/Planned

- For current products, a **new surface analysis program has been developed which is five times faster than the previous one.** It allows flaw table updates during preventive maintenance, resulting in more effective use of maintenance time.
- **A major improvement to prevent failures in the DD-49 is the change to lubed media.** Several Field Change Orders are in process to reduce drive board fallout.
- **The DD-40 media has been improved to reduce flaws by 50%.**
- For new products, the head/media interface and the manufacturing process have been improved to build products with significantly higher reliability.
- Additional testing and certification of electronic assemblies has been implemented.
- Future products are being designed to be more fault tolerant, including features such as spindle or head redundancy.
- Current product development includes a Head Disk Assembly design with a 40% increase in MTBF.
- Cray is developing an enhanced reliability test program for on-going reliability measurement.

Reduced recurring costs

Actions Taken/Planned

- **New maintenance procedures will reduce maintenance costs.** These improvements will allow greater flexibility of service options on new products.
- New products using higher density integrated circuits will continue to require less power.

Price/performance

Action Taken/Planned

- **Cray will continue to make significant strides to improve price/performance on all of our systems. The new Y-MP product line provides a major improvement in price/performance. The 6-nanosecond clock cycle enables peak performance ranging from more than 300 megaflops on CRAY Y-MP2 systems configured with a single processor to 2600 megaflops on CRAY Y-MP8 systems configured with eight processors.**

Actions Taken/Planned

- A major review is underway to identify how Cray can best serve our Japanese customers.
- Improved response time through monitoring of system performance is a priority.
- Cray Japan is establishing a Japanese training center with support from the central training organization.
- A Japan Desk was established to strengthen communications between Cray's U.S. and Japanese organizations.

FINANCING

Flexibility on customer financing needs

Actions Taken/Planned

- **A new operating lease program was installed** which provided term payment structure and multiple system leasing capability. During 1988 customer response was excellent. Many customers selected Cray leases instead of third party lessor offerings.
- For 1989 and beyond, the following actions are planned:
- Simplification of the lease program to shorten response times.
- **Development of a "rental program" for Japan and Europe**
- Provision of a customer brochure describing our financing offerings. It will help insure that customers find financing offerings to be flexible, user-friendly and competitive.

COMMUNICATIONS

Documentation

Actions Taken/Planned:

- Cray plans to improve its technical publications. These plans include continued improvement of installation procedures, improved and expanded examples within manuals, development and implementation of functional and permuted indexes, new and expanded catalog of user publications, reorganized library documentation, and new and improved debugger documentation.
- **Cray is concentrating heavily on improving both quantity and quality of examples in UNICOS documentation.**
- Site planning manuals were reorganized to enable smoother preparation of customer sites.
- Wherever possible, COS and UNICOS documentation including libraries and compilers will be released in separate manuals.

- A planned CFT77 Users' Guide will emphasize optimization, vectorization, and other aspects of getting the best from the compiler.
- Significant revisions to TCP/IP manuals are scheduled for 1989.

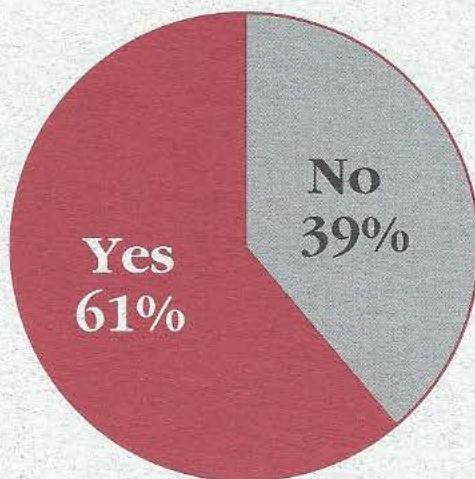
Improved customer information on hardware and software directions

Actions Taken/Planned

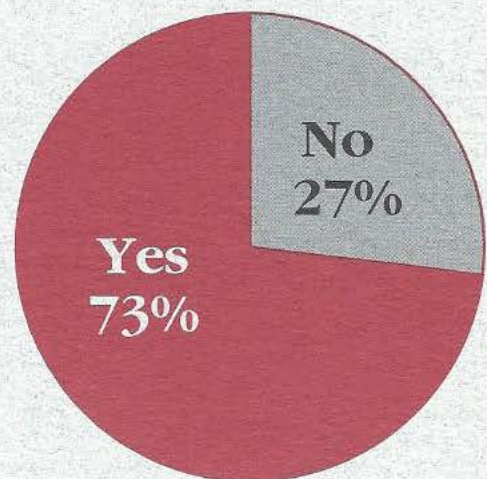
- **Software Training is designing and developing courses specifically aimed at customers with UNIX experience.** The courses will reduce training time and provide a more tailored program.
- Accelerated FORTRAN optimization training that treats site-specific needs is being offered on-site to customer staff.
- The Directory of Applications Software will be put online to provide better information on available applications.
- Beginning in 1989, product announcement materials will be provided to account managers prior to the official announcement date. Account managers will therefore be better informed and conversant about new products.

Customer Communications

**"Are You Kept Informed of
Hardware/Software Directions?"**



1987



1988

CONCLUSION

Cray is committed to enhancing all facets of the Cray/customer relationship. The annual Customer Satisfaction Survey is a valued and important tool to help Cray objectively identify customer needs and to prioritize efforts to meet those needs. Each group within Cray carefully studies the survey responses and the customer viewpoint is communicated throughout the company. The net result of the Customer Satisfaction Survey is a more responsive Cray Research that is focused on the key element of its business: customers.

We are committed to making innovative, high-performing products and to improving customer satisfaction on a continual basis.

