

# **University of Minnesota Supercomputing Services**

---

---

Program Evaluation Division  
Office of the Legislative Auditor  
State of Minnesota

---

## Program Evaluation Division

The Program Evaluation Division was established by the Legislature in 1975 as a center for management and policy research within the Office of the Legislative Auditor. The division's mission, as set forth in statute, is to determine the degree to which activities and programs entered into or funded by the state are accomplishing their goals and objectives and utilizing resources efficiently. Reports published by the division describe state programs, analyze management problems, evaluate outcomes, and recommend alternative means of reaching program goals. A list of past reports appears at the end of this document.

Topics for study are approved by the Legislative Audit Commission (LAC), a 16-member bipartisan oversight committee. The division's reports, however, are solely the responsibility of the Legislative Auditor and his staff. Findings, conclusions, and recommendations do not necessarily reflect the views of the LAC or any of its members.

The Office of the Legislative Auditor also includes a Financial Audit Division, which is responsible for auditing state financial activities.

---

# University of Minnesota Supercomputing Services

---

October 1992

---

Program Evaluation Division  
Office of the Legislative Auditor  
State of Minnesota





STATE OF MINNESOTA  
**OFFICE OF THE LEGISLATIVE AUDITOR**  
CENTENNIAL BUILDING, ST. PAUL, MN 55155 • 612/296-4708  
JAMES R. NOBLES, LEGISLATIVE AUDITOR

---

October 1, 1992

Representative Ann H. Rest, Chair  
Legislative Audit Commission

Dear Representative Rest:

In March, the Legislative Audit Commission directed us to evaluate the relationship between the University of Minnesota and the Minnesota Supercomputer Center, Inc. (MSC). MSC is a private, for-profit corporation created by the University and the University of Minnesota Foundation in 1983 to provide supercomputing services to researchers at the University and in private industry. Legislators wanted to know why the University created MSC, what are the advantages and disadvantages of the arrangement, and how well the University ensures accountability for the expenditure of public funds.

Our overall conclusion is that the University has not achieved an adequate level of accountability in its approach to obtaining supercomputing services. It has allowed MSC to operate with extraordinary secrecy, and it has committed public resources to MSC without adequate involvement from the University's research community and without sufficient scrutiny by the Board of Regents and the state.

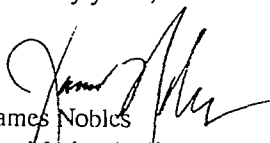
We do not endorse the University's current approach to acquiring supercomputer services, but if the University continues its relationship with MSC, it should be based on greater accountability and openness. The University needs to require better information from MSC, and it needs to demonstrate--rather than just assert--to the Board of Regents and the Legislature that MSC is providing University researchers the most cost effective services possible. It also should require a periodic professional external review of MSC and of its own Supercomputer Institute.

Our report highlights the problems that can occur when a public institution like the University creates a private company. We think the Legislature needs to define the legal status and obligations of publicly created private organizations like MSC.

In conducting this evaluation, we received the full cooperation of the University of Minnesota, particularly the staff members and research fellows of the Supercomputer Institute.

The report was researched and written by Tom Walstrom (project manager) and Jan Sandberg.

Sincerely yours,

  
James Nobles  
Legislative Auditor

  
Roger Brooks  
Deputy Legislative Auditor



---

# Table of Contents

---

	<u>Page</u>
EXECUTIVE SUMMARY	ix
INTRODUCTION	1
1. BACKGROUND AND HISTORY	3
Background Summary	
2. FINANCIAL RELATIONSHIP BETWEEN THE UNIVERSITY AND MSC	11
Purchases of Computers	
Purchase of Services	
Army High Performance Computing Research Center	
Line of Credit and Refund Agreement	
University Purchase of MSC Preferred Stock	
University Purchase of the 1200 Washington Avenue Building	
The University's Space Lease With MSC—1985 to 1992	
The University's Current Lease With MSC	
MSC Purchases Through the University	
Other Relationships	
Conclusions	
3. THE MINNESOTA SUPERCOMPUTER INSTITUTE	25
The Evolution of MSI	
MSI Organization and Policies	
MSI's Governance Structure	
Resource Allocation	
Relationship Between MSC and MSI	
Other Supercomputer Centers	
Summary	
4. SECRECY AND ACCOUNTABILITY	43
What Information About MSC is Not Public and Why?	
How Does the University Ensure Accountability?	
What are MSC's Advantages and Disadvantages?	
Summary	
UNIVERSITY RESPONSE	49
RECENT PROGRAM EVALUATIONS	Back Cover





---

# List of Tables and Figures

---

		<u>Page</u>
Table 2.1	Supercomputer Center University Support Costs	20
Table 3.1	Percent of Total University Supercomputer Usage, By Fellow, 1989-1992	32
Table 3.2	MSI Percent Supercomputer Usage by Department, 1989-1991	33
Table 3.3	Characteristics of Supercomputer Centers	38
Figure 3.1	Minnesota Supercomputer Institute Organization Chart	29



---

# University of Minnesota Supercomputing Services

## EXECUTIVE SUMMARY

---

---

**The University's approach to obtaining supercomputing services has prompted controversy.**

**S**upercomputers are powerful tools for doing complex calculations and a necessary resource in advanced scientific research. The University of Minnesota is among the nation's leading institutions that provide supercomputing services to their scientists. Its achievement in this field--supported, of course, by substantial public funding--is noteworthy and of significant benefit to the state.

But the University's approach to obtaining supercomputing services has prompted concern and even controversy. It involves a University-created private, for-profit corporation, known as the Minnesota Supercomputer Center (MSC), that operates with considerable secrecy. MSC provides services to private customers as well as to the University, and it claims that information about its finances and operations is a "trade secret," and, therefore, not subject to public examination.

In response to recent controversy, the Legislative Audit Commission directed us to evaluate certain aspects of supercomputing services at the University. Since MSC was unwilling to give us unfettered access to its records, the commission decided to defer asking for an examination of MSC's internal operations until it received a more general report on the relationship between the University and MSC. We based our evaluation on information we obtained from the University.

The commission requested that the evaluation focus on the following questions:

- How has the University structured its supercomputing services?
- Why did the University establish MSC? What is the relationship between the University and MSC, how and why has it changed over time? What are the advantages and disadvantages of the relationship?
- How much money has the University invested in MSC and how does it ensure accountability for those funds?

- Why is the University Foundation the principal owner of MSC and what effect does that ownership have on MSC's relationship with the University?
- What information about MSC is not public and why?
- What organizational structures do other major research universities use to provide supercomputing services?

To answer these questions, we interviewed University officials, faculty, and staff, reviewed University records, and talked with national experts on supercomputers. We emphasize that we did not examine records at MSC.

Most of the information we obtained came from the Minnesota Supercomputer Institute. The Institute (MSI) and the Center (MSC) are often confused because of their similar names and because they occupy the same building. They are, in fact, separate and quite different organizations. MSI is a unit within the University. It is the organizational vehicle through which the University purchases computer time from MSC and allocates it among University users. MSI also provides support to the twenty-nine research fellows who are the University's major users of MSC's services.

We examined the structure and activities of the Institute, and we have several recommendations to improve its operations. However, the main focus of our concern is on MSC, rather than MSI.

Our overall conclusion is that the University has not achieved an adequate level of accountability in its approach to obtaining supercomputing services. The source of the problem is that the University created an organization--the Minnesota Supercomputer Center--whose legal status is uncertain. Standards for such a government-created, private organization are not well established, and the University has added to the confusion in the way it has interacted with MSC.

---

**The University  
has not assured  
adequate  
accountability  
for  
supercomputing  
services.**

The University does not hold MSC to the same standards of accountability it applies to University departments and other organizations it creates. Of particular importance, it allows MSC to operate with extraordinary secrecy, and without the kind of outside oversight other units of the University, and other supercomputer centers across the nation, routinely experience.

On the other hand, the University does not treat MSC like a private company either. It does not have an arms-length, business-like relationship with MSC, but rather allows MSC to operate with benefits and privileges it does not provide other companies selling services to the University. The University has taken several steps during the course of this audit to clarify MSC's status. Despite these steps, we believe the University does not treat MSC as a truly independent corporation.

We emphasize, however, that while the structure of the relationship and MSC's ambiguous status make weak accountability more likely, they do not make it inevitable. The University could further strengthen accountability in its relationship with MSC if it wanted to, but the University does not think there is a significant problem. Based on what they told us, University officials are mostly satisfied with the relationship. They talked largely about the benefits it brings to the University and state.

The University created MSC in 1982 as a private, for-profit corporation. At the time, officials argued that a private company could sell services to private customers, take advantage of certain tax provisions unavailable to the University, and provide supercomputing services to the University at an economical price. They also said that the arrangement would offer opportunities for research cross-fertilization that would benefit both the University and private business.

At the request of the University, the University Foundation (a private, non-profit fund-raising organization) became MSC's principal owner. The Foundation controls five of nine MSC board positions, but it is the University's central administration that has directed MSC's development and provided it with essential financial support, not the Foundation.

---

**MSC has been financially dependent on the University and the state.**

In addition, despite MSC's incorporation as a private, for-profit company, it has always been financially dependent on the University and, ultimately, the state. MSC has repeatedly turned to the University and/or the Legislature for loan guarantees and other financial support in order to make large capital investments. For example, a University-leased Cray-1 computer was transferred to MSC in July 1983. In 1985, the University advanced MSC \$4.775 million to purchase a Cray-2, stipulating that the money would be paid back in computer services by mid-1986. In December 1985, the University extended a \$5 million line of credit to MSC, which MSC has drawn on several times between 1985 and 1992. The University, the state, and the city of Minneapolis financed the remodeling of a building for MSC in the Minneapolis High Technology Corridor. In addition, MSC has repeatedly gone to the University and the Legislature to ask for increases in financial support and preferential tax treatment.

Despite its history, officials at both MSC and the University argue that MSC should not be considered a public entity (not even a "quasi-public" entity). They argue that it should be accountable only as a private vendor of services to the University. But we found that the University does not, in fact, treat MSC like an independent business.

For example, the University pays MSC for services in a lump sum at the beginning of the contract year. The University has granted special purchasing privileges to MSC and not collected sales taxes on the transactions. The University has historically charged MSC less-than-market rental rates for space, and the University allowed MSC to pay its "rent" with supercomputer time that the University would have probably received anyway under a previous agreement.

---

**In 1987, MSC refunded \$3.7 million to the University, apparently with money it borrowed from the University.**

The University continues to charge MSC a less-than-market rental rate under the new lease agreement.

We also found that in 1987 a complex series of financial transactions allowed the University to relieve MSC of a \$3.7 million obligation and provide MSC with \$800,000 of additional capital without approval from the Board of Regents and without public disclosure. The transactions began when MSC made a "refund" of \$3.7 million to the University. Though we cannot be sure without having access to MSC's records, we think MSC made the payment with money it borrowed from the University. We know that a few days before the payment was made, MSC borrowed \$4.7 million from the University. Whatever the source of the money used to pay the University, the University deposited the payment in a central reserve account. Interestingly, several weeks later, MSC was able to pay off its debt to the University when the University transferred \$4.5 million to MSC in return for a special issue of "preferred stock." In short, MSC was relieved of its \$3.7 million obligation and provided with \$800,000 in additional cash.

The "refund" transaction was classified confidential until we asked that it be made public. Apparently, the Legislature, the state Department of Finance, and the Board of Regents have not been aware of the transaction until now. In addition, the Board of Regents did not approve the University's \$4.5 million purchase of preferred stock in MSC. In fact, the University was unable to provide us with any documentation to show who authorized the purchase. The refund and stock purchase transactions demonstrate why the relationship between the University and MSC lacks adequate accountability.

---

**The University bought \$4.5 million of preferred shares in MSC without Regents' approval.**

The University argues that it ensures accountability by controlling four MSC board appointments. But the University has allowed one of its positions to remain vacant for over a year, and, since April 1986, the University has used another of its positions to put MSC's president on the board. Therefore, currently the University has only two board appointees who are in any way independent of MSC management, and both are University senior vice presidents with many other demanding responsibilities. Since most information these board members receive about MSC's operations is considered a "trade secret," it is not provided to other University officials or to the Board of Regents for independent analysis. The only exception occurred earlier this year, when the Chair and Vice-Chair of the board were orally briefed on the proposed \$32 million contract between MSC and the University. They were told the approximate effective rate the University would be paying under the proposed contract. But they were not allowed to share this information with other board members or subject it to independent analysis.

Both of the University vice presidents who are MSC board members told us that they are basically satisfied with the quality and quantity of information they receive about MSC's operations from management. They also strongly asserted to us that the information shows that the University "is getting a good deal" in its relationship with MSC. However, we are not convinced that they have had access to information that convincingly shows the University is re-

ceiving a good value for its service payments. For example, they were unaware of the rates that commercial clients are paying for the preferential services they receive. Also, the only analysis of University supercomputer rates that we saw is flawed.

Based on the limited information we had access to, we think assertions about the "good deal" the University is getting from MSC are open to question. But, we cannot publicly discuss the basis of our concern because the information involved is classified a "trade secret" by MSC and the University, and we are legally bound to respect that classification.

Based on the interviews we conducted, MSC appears to be the only national supercomputer center that refuses to disclose information about its finances and the services it provides. Additionally, almost all other centers use various forms of outside review to ensure that their resources are being used effectively.

---

**It is unclear whether the University is getting a "good deal" from MSC.**

We also observed that Minnesota's approach to obtaining supercomputing services has not facilitated interactions between University scientists and private industry users of the machines. Most of the research fellows we talked with noted that MSC prevents them from having contact with MSC private customers, even though the researchers are housed in the same building with MSC. In fact, MSC is currently building a wall that will further separate its operations from University researchers, even though the researchers have protested. Also, neither MSC or the University has facilitated the development of high-tech businesses that were part of the supercomputer initiative's original objectives and the purpose of the state's contribution of \$5 million for the supercomputer center building.

Though we do not endorse the structure and arrangements the University has created, we do not call for the University to end its relationship with MSC. On the other hand, the University should not, in our view, maintain the relationship simply to keep MSC in business if there is a better alternative, especially one that would foster closer collaboration between supercomputer service providers and users. We urge the University to more objectively assess whether or not its approach to obtaining supercomputing services is the most cost-effective alternative and best suited to serve University researchers.

---

**The University should take steps to strengthen accountability in its supercomputing service arrangements.**

If the University maintains the existing arrangement, it should take steps to strengthen accountability and help ensure that public resources are being appropriately and efficiently used. Its first step should be to provide more information about what the University is getting in return for the large sum of public money it provides to MSC. It is inappropriate to ask the Regents, the Legislature, and the public to trust that the University is getting "a good deal." MSC's legitimate trade secrets can and should be protected. But the University has accepted and participated in a level of secrecy about MSC financial operations that is unnecessary and contrary to good public policy. At a minimum, Regents should be given information that would allow them to inde-

---

**MSC and MSI  
should be  
subject to more  
outside review.**

pendently analyze the price of MSC's services and make comparisons with alternative providers.

In addition, the University should better use its positions on the MSC board. It certainly should not allow positions to go unfilled for long periods of time. Nor should it use one of its positions to appoint MSC's president to the board. The University should appoint to the MSC board at least one distinguished researcher familiar with supercomputing services. In our view, the only justification for MSC's existence is to provide services to University scientists. It makes sense, then, to have at least one University scientist involved in supercomputing on MSC's board. Currently, University scientists and even MSI research fellows are not allowed to attend MSC board meetings. In addition, the University should consider appointing a Regent to the board.

We also think that, as a condition of its support, the University should require MSC to undergo periodic review by an outside panel of supercomputer and scientific experts. Peer review is a widely-accepted professional practice in the public and private sectors. And, again, MSC's legitimate "trade secrets" can and should be protected.

---

**The Legislature  
should set  
standards for  
government-  
created private  
and  
"quasi-public"  
organizations.**

As noted earlier, we also examined the operation of the Minnesota Supercomputer Institute (MSI). Our major concern is the way MSI allocates supercomputing resources among University researchers. We found that some large allocations of supercomputing time have not received adequate review, particularly allocations to MSI's director. Therefore, we recommend that the University strengthen accountability for the allocation of supercomputer time. Proposals that involve large amounts of time should receive objective review by experts able to judge their merit. Also, the percentage of total University supercomputing time awarded and used by University researchers should be routinely disclosed and circulated among University scientists.

Finally, we think it is important that the Legislature take action to define the status of private and "quasi-public" organizations created by government. So-called "public/private partnerships" have expanded in recent years, and many have undoubtedly produced considerable benefit. But uncertainty persists about how to make such partnerships, and the organizations they create, accountable.

We think the history of MSC shows the need for the Legislature to set standards and expectations for all organizations created by government, including organizations created by the University.

The ambiguous status and weak accountability associated with organizations like MSC create a significant potential for abuse. We think the Legislature should set minimum standards of openness and public accountability for these organizations, including disclosure of audited annual financial statements.



---

# Introduction

---

**T**he Legislature has approved special appropriations for supercomputing at the University of Minnesota since 1984. The appropriations are made to the Minnesota Supercomputer Institute (MSI), a unit within the University. But the money is used primarily to purchase supercomputing services from the Minnesota Supercomputer Center (MSC), a private, for-profit corporation created and owned by the University and the University Foundation.<sup>1</sup> In addition to selling service to the University, MSC also sells supercomputing services to other public and private-sector clients.

In February 1992, the University Board of Regents extended the University's relationship with MSC by approving a four-year contract with MSC worth \$8 million per year. The \$32 million contract became controversial largely because MSC was unwilling to provide public information about the services it would be providing the University. In fact, little specific information was available even to Regents, because MSC maintains that most information about its operations is a "trade secret."

In response to the controversy, the Legislative Audit Commission directed our office to develop a proposal for an audit of MSC and supercomputing services at the University generally. At a meeting on April 28, 1992, however, the commission dropped from the proposal any internal examination of MSC. Commission members said that they would reconsider a possible examination of MSC's internal operations after a more general report was completed on the relationship between MSC and the University.

---

**MSC claims that most data about its finances and operations are a "trade secret."**

The commission's action came after MSC and our office were unable to resolve conflicts over audit jurisdiction and access to records at MSC. MSC argues that it is not a part of the University and is subject to audit by the Legislative Auditor only to the degree that other private companies doing business with the University are subject to audit. MSC also claims that any audit—even one focused just on its University-related business—cannot disclose information about MSC's finances and internal operations because they are a "trade secret."

We disagree with the positions MSC takes concerning its obligation to be accountable, and we do not accept the reasoning it uses to justify its broad claim

---

<sup>1</sup> The University of Minnesota Foundation is a private, non-profit organization created to raise money for university activities.

of secrecy. But we will leave it to the Legislative Audit Commission to decide the extent to which MSC will be subject to audit by our office.

The primary purpose of this report is to provide an overview of supercomputing services at the University and an assessment of the relationship between MSC and the University. It does not provide any information about the internal operations of MSC.

Following the directions given to us by the Legislative Audit Commission, our evaluation addressed the following six questions:

- **How has the University structured its supercomputer services?**
- **Why did the University establish MSC? What is the relationship between the University and MSC, how and why has it changed over time? What are the advantages and disadvantages of the relationship?**
- **How much money has the University invested in MSC, and how does it ensure accountability for those funds?**
- **Why is the University Foundation the principal owner of MSC, and what effect does that ownership have on MSC's relationship with the University?**
- **What information about MSC is not public and why?**
- **What other organizational structures do other major research universities use to provide supercomputing services?**

To answer these questions, we reviewed records at the University, and we interviewed over 100 people, including current and former University officials, faculty and staff, and representatives of the national supercomputing community. Consistent with the Legislative Audit Commission's decision on April 28, we did not seek access to records at MSC nor did we interview its officials or staff.

The report is organized into four chapters. Chapter One examines why the University and the University Foundation established the Minnesota Supercomputer Center and the history of the University's relationship with it. Chapter Two examines the University's financial relationship with MSC and identifies how much the University has spent to purchase services and to subsidize the operations of MSC. Chapter Three examines the operations of the Minnesota Supercomputer Institute (MSI), how it has changed over time, and how other universities organize to provide supercomputer services. In Chapter Four we discuss the advantages and disadvantages of the way in which the University has arranged to provide supercomputer services. We discuss what information about MSC is public and how the University ensures accountability for the legislative appropriations to MSI that are transferred to MSC.

---

# Background and History

## CHAPTER 1

---

**I**n this Chapter, we examine why the University and the University Foundation created the Minnesota Supercomputer Center (MSC) and how MSC has changed over time. In addition, we review the history of the interactions between the University and MSC.

### BACKGROUND

Supercomputers are high-performance machines used for extraordinarily demanding computations. Supercomputers are used, for example, in weather and climate modeling, simulations of fluid dynamics, such as air and water flows, nuclear physics, and quantum chemistry. Academic researchers have access to supercomputers through National Science Foundation-funded supercomputer centers, regional supercomputer centers, the U.S. Department of Energy, NASA, or other federal laboratories, and through local university-run centers.

---

**The University of Minnesota was one of the first universities to provide supercomputing services to its researchers.**

The University of Minnesota was one of the first universities to provide access to supercomputing services. Discussions among faculty about supercomputers began in the mid-1970s, and by 1979 some University researchers had begun to use supercomputer services provided by private vendors. In September 1981, University Computer Center (UCC) officials decided they needed a supercomputer to provide cost-effective computing services to University researchers and acquired a Cray-1 supercomputer through a lease-purchase arrangement.<sup>1</sup>

### What Led to MSC's Creation?

During fiscal year 1982, the University Computer Center, the manager of the Cray-1, accumulated a deficit of approximately \$875,000. UCC's budget was affected by the economic recession, cutbacks in academic grants, a \$325,000 cost to install the Cray, and lower-than-anticipated University researcher use of the computer. The UCC director, faced with the necessity of increasing

---

<sup>1</sup> The University Computer Center (UCC) was a unit within the University created to provide instructional and research computer services to the University community. UCC became known as Academic Computing Services and Systems in 1986 and subsequently became part of the University's Computer and Information Services department.

---

**MSC was created in part because of concern about the university's tax liability.**

revenues or reducing expenses by laying off as many as 30 employees, received permission from University officials to market time on the Cray-1 to private companies. UCC was successful, and, as a result, University officials were concerned that UCC might be incurring substantial unrelated business income tax liabilities. According to several former University officials we spoke with, there also were complaints from private sector vendors of supercomputing services that the University was unfairly competing with them.

At the same time in 1982, University officials were concerned about the ability of the University to finance expensive specialized scientific equipment. They decided to explore the possibility of setting up a non-tax-exempt organization "to support research through the acquisition of expensive pieces of research equipment for the joint use of universities and cooperating industrial research laboratories."<sup>2</sup> University officials told the Regents that, with this approach, the University of Minnesota would be following an organizational model established by the University of Wisconsin and Colorado State University to provide for computer services and research equipment.<sup>3</sup> University officials also sought legal opinions on the tax advantages of such for-profit corporations.<sup>4</sup> The Regents gave approval for University administrators to pursue the establishment of a for-profit company with the University Foundation.

## **The Role of the University of Minnesota Foundation**

In 1982, President Peter McGrath and Vice President Kenneth Keller approached the University of Minnesota Foundation about setting up a corporation that would purchase computers and other expensive research equipment for the University. The University proposed to transfer to the company the Cray-1 computer that UCC had acquired a year earlier. The University Foundation was supportive of the idea and the legal counsel for the Foundation, Mr. Burt Ross, formed Research Equipment Inc. (REI), now known as MSC, as a for-profit company in July 1982.<sup>5</sup> Mr. Ross, in consultation with the University counsel and Vice Presidents Frederick Bohen and Kenneth Keller, developed plans for the corporation's structure, operation, and relationship to the

---

<sup>2</sup> Letter from C. Peter McGrath to the University of Minnesota Board of Regents, November 30, 1982.

<sup>3</sup> Representatives of these Universities and their research foundations told us that neither had ever formed a for-profit company to finance the acquisition of computers or research equipment. As far as we could determine, the for-profit corporation organizational model for providing supercomputer services makes the University unique among American universities.

<sup>4</sup> For-profit companies acquiring capital equipment could receive an investment tax credit, use accelerated depreciation, and take advantage of the "safe-harbor leasing" provisions of the Economic Recovery Act of 1981. The safe-harbor leasing election could result in the financing costs of capital equipment being substantially less than if a University leased equipment directly.

<sup>5</sup> REI is still the legal name of the corporation known as the Minnesota Supercomputer Center (MSC). From its incorporation until 1986, it did business as REI. In 1986, it began doing business as MSC. The supercomputer center uses the acronym MSCI to refer to itself. As University of Minnesota Supercomputer Institute (MSI) researchers noted in 1986 when REI's name was changed to MSCI, this name similarity causes confusion between the two entities. To try to avoid confusion, we have referred throughout the report to MSC, even in time periods where it was known as REI.

---

**The University Foundation's role was to contribute \$90 and appoint a majority of MSC's board members.**

University. Shareholder agreements were negotiated for the Foundation to own 90 percent of the common stock and the University to own 10 percent. The Foundation contributed \$90 and the University \$10 for the initial offering of common stock shares. University Foundation officials told us that the \$90 common stock investment is the Foundation's only financial contribution to MSC. The Foundation is entitled to receive its proportionate share of any common stock dividends paid. In 1984, MSC paid a total cash dividend of \$174,608, and, in 1985, it paid a cash dividend of \$323,191. In each year, the Foundation donated its share of the dividend to the University, but there have been no cash dividends declared since 1985.

The MSC Board of Directors consists of 9 members. According to the plan presented to the Board of Regents in January 1983: "The University of Minnesota Foundation would technically control Board membership and policy by choosing 5 of the 9 members from its own Board of Directors (or their designees), and the University will choose a minority of 4 from among its employees or designees." According to Foundation officials, the University Foundation's role in managing MSC has been limited largely to appointing members to MSC's Board of Directors.

## **MSC's Initial Operation**

---

**MSC was created in 1983, but its supercomputer was operated by the University until 1986.**

MSC was formally organized during the first months of 1983. At its first meeting on April 29, 1983, the MSC Board of Directors named the University Vice President for Finance David Lilly as MSC's president, and it named a four-member executive committee consisting of Lilly and the Vice President for Academic Affairs Kenneth Keller from the University and two University Foundation-appointed board members. John Sell, a University Computer Center employee, was appointed the vice president of MSC. On July 6, 1983, MSC designated its registered offices as Room 301 Morrill Hall at the University of Minnesota, where they remained until 1989.

On July 12, 1983, the University transferred its interest in the Cray-1 computer to MSC. The University agreed to provide the support costs for the computer and to make the scheduled lease payments. In return, MSC agreed to grant "unlimited access" on the computer to the University. Since the University researchers were using less than half of the Cray's capacity, it was thought the remaining time would be marketed to commercial clients. The agreement allowed MSC to sell computer time, but commercial use of the computer was not to interfere with the University's use.

Although the ownership of the Cray-1 was transferred to MSC, the actual operation of the computer remained with the University Computer Center (UCC), a unit within the University, where it had been since the computer was acquired in 1981. UCC continued to operate the Cray-1 until January of 1986. In fact, during this time period, MSC had no paid employees and was little more than a shell company. According to UCC's former director, during this time period, "[MSC] consisted of a file in Morrill Hall."

## Minneapolis High Technology Corridor

In 1983, Governor Rudy Perpich and others recognized that two Minnesota companies, Control Data Corporation (CDC) and Cray Research, were at the forefront of high-performance computing in the U.S. and were important for the Minnesota economy. Governor Perpich also expressed concern that the CDC supercomputer spin-off company, ETA Systems, might relocate out-of-state.

Since 1981, faculty groups at the University had been meeting to foster both research using supercomputers and connections with Minnesota supercomputer manufacturers. University administrators were also looking for a new building to house the University Computer Center and University networking and telecommunications services. At the same time, the City of Minneapolis was interested in developing a "high technology corridor" as a means of urban redevelopment and economic development.

In November 1983, all of these factors led the Governor's Office and the University of Minnesota to announce a new Minnesota Supercomputing Institute initiative, with a building to be located in the Minneapolis high technology corridor. The Governor announced the initiative at a press conference, confirming that ETA Systems would remain in Minnesota. The University's original plans envisioned that the Institute would both operate the supercomputers and run a research program using the supercomputers, as well as perform various functions related to high technology economic development. The University's plans called for the Institute and all University academic computing to be located in the high technology corridor.

The University's supercomputer initiative was approved by the 1984 Legislature. The Legislature appropriated \$2.6 million to the Minnesota Supercomputer Institute, and a total of \$5 million to remodel a building in the high technology corridor to house the Institute and the University Computer Center and telecommunications system. The City of Minneapolis was expected to contribute approximately \$3.5 million, while the University would contribute an additional \$3.5 million to remodel the building. The financing and ownership of the building in the high technology corridor is discussed in more detail in the next chapter.

## National Science Foundation Support

In the early 1980s, several prominent scientific panels recommended federal government support for high-performance computing.<sup>6</sup> The panels were concerned that the U.S. would lose its technology lead to the Japanese without increased supercomputer access for academic researchers. In 1984, Congress appropriated funds to the National Science Foundation (NSF) for a high performance computing initiative. As an interim measure, NSF funded researcher

---

<sup>6</sup> See, for example, Peter D. Lax, "Report of the Panel on Large-Scale Computing in Science and Engineering" (Washington DC: National Science Foundation, 1982).

access to existing "supercomputer resource centers" at the University of Minnesota, Purdue University, and Colorado State University. These centers were known as "Phase 1 centers." The University of Minnesota's initial Phase 1 contract with NSF was from July 1, 1984 to September 30, 1985.

In 1985, three additional Phase 1 resource centers (Bocing Computer Services, AT&T Bell Laboratories, and Digital Productions) were added to meet the growing demand for supercomputer resources. Also in 1985, NSF selected Cornell University, Princeton University, the University of Illinois, the University of California at San Diego, and a Carnegie Mellon-University of Pittsburgh-Westinghouse consortium to be "Advanced Scientific Computing Centers," or "Phase 2 centers," to begin operation in 1986.

The University of Minnesota submitted a Phase 2 center proposal to NSF, but the NSF review panel judged Minnesota's plans to operate both an ETA-10 and a Cray-2 to be too ambitious. Although NSF continued to fund national researcher access to the Minnesota Phase 1 center until March 1987, the University's failure to become a NSF Phase 2 center meant that alternative sources of financing for Minnesota's supercomputers would be necessary.

## The Evolution of MSC

---

**In the mid-1980s, MSC evolved from a paper corporation into an operating business.**

In the mid-1980's, MSC gradually evolved from a paper corporation into an operating entity. In 1984, the University began to plan for the replacement of the Cray-1 machine with a faster and larger-memory Cray-2. The University entered into an agreement for a Cray-2 to be delivered in 1985. MSC financed the Cray-2 through a lease arrangement that passed the tax benefits of depreciation and the investment tax credit back to the lessor for a reduction in the lease rate. To secure this financing package, the University was required to act as the guarantor of the loan to MSC as well as the primary user of the equipment. The maximum amount of the guarantee was \$5.4 million per year.

In December 1984, the University Board of Regents approved, in principle, a computing services agreement with MSC. The agreement allowed MSC to acquire a Cyber 205 computer with an upgrade to an ETA-10 computer in 1987. This agreement was signed on July 12, 1985. At the same time, the University and MSC entered into agreements to use the support facilities of MSC and to use the future supercomputing services provided by a Cray-2 computer. The orders for these machines formed the basis for Minnesota's application to NSF to become a Phase 2 national supercomputer center.

During the last half of 1985, the University developed plans to transfer the management of its supercomputing operations from the University Computer Center. The University's plans called for MSC to actually become an operating company, with its revenues coming approximately one-third from the University, one-third from the federal government, and one-third from industrial clients. The University and MSC signed computing services agreements in July 1985, requiring the University to pay \$1.5 million to MSC for computer services on the Cyber 205, and \$4.775 million to reserve access to Cray-2

services. In order for MSC to purchase the Cray-2, the University had to both guarantee the loan and advance MSC \$4.775 million. The reservation agreement called for MSC to refund by June 30, 1986 any of the \$4.775 million not offset by Cray-2 services provided to the University.

In late 1985 and early 1986, the University and MSC entered into a number of agreements that transferred the supercomputer management to MSC. As noted, MSC had no paid employees until May 1985, but by December 1985, 18 staff had been hired (mostly from within the University) and a separate company began to take shape. According to the loan agreement dated December 10, 1985, the University extended a \$5 million line of credit to MSC so that it could hire additional employees and begin its operations. Also in December 1985, the University signed a lease agreement with MSC to provide space in the University computer building in Lauderdale until a new building could be completed in the Minneapolis high-technology corridor. Lease payments could be made in computer time or cash. It was planned that the new building would house the University Computer Services, MSC, the Minnesota Supercomputer Institute, and various smaller startup technology companies. The lease agreement required MSC to pay the University's portion of the construction costs for the new building within 60 days of completion.

The University and MSC also renegotiated their Cray-1 computing services agreement effective January 1, 1986. Under the new agreement, the University gave up its right to unrestricted access to the Cray, and it was relieved of its obligation to make lease and support cost payments. Instead, the University paid MSC a fixed minimum cost and agreed to pay for all services used that exceeded the minimum. According to this agreement, the University no longer had first priority on the use of the Cray-1 or the resources of MSC.

From January 1986 until September 1986, MSC operated the Cray-1 supercomputer in the University's Lauderdale computer facility. In September 1986, MSC moved to a new building at 1200 Washington Avenue in the Minneapolis high-technology corridor.<sup>7</sup>

## Legislative Requests

During the 1985 legislative session, the University requested and the Legislature appropriated \$6 million for fiscal year 1986 and \$6 million for fiscal year 1987 to the Minnesota Supercomputer Institute (MSI). By this time, however, it was clear that appropriations to MSI would, in fact, be used to purchase services from MSC. According to legislators and staff, MSC's president was the chief lobbyist for this special appropriation to the University.

During its 1987 legislative session, the Legislature appropriated \$6.15 million for fiscal year 1988, and \$6.306 million for fiscal year 1989 for the Minnesota Supercomputer Institute. The appropriation included "money for the leasing of two supercomputer architectures." However, MSC was unable to negotiate

<sup>7</sup> As we noted previously, in June 1986 the company then known as REI changed the name under which it does business to the Minnesota Supercomputer Center, Incorporated (MSC).



---

**The University and MSC have approached the Legislature for additional supercomputer funding several times.**

a deal with ETA Systems without additional funds. MSC approached the University to include a \$4.7 million special appropriation request to the 1988 Legislature. The University agreed to do this, but when it became known in March 1988 that the University had a \$70 million central reserve fund, it withdrew its supplemental request from the Legislature. The Regents were then approached to allocate \$4.7 million from the central reserve fund for MSC to enter into a lease agreement for an ETA-10. Acting University President Richard Sauer argued strongly against committing central reserve funds to recurring expense items such as supercomputers, and his point of view convinced the Regents not to approve the expenditure. Subsequently, the 1988 Legislature did appropriate an additional \$1.1 million to the Supercomputer Institute, "available only if the board of regents purchases or enters into a new lease agreement, ... for a second supercomputer architecture."<sup>8</sup> MSC entered into an agreement with ETA Systems in June 1988 to lease an ETA-10E with a later upgrade to an ETA-10G. The lease was contingent upon the University's increasing the level of services purchased from MSC by \$1.7 million, and the Minnesota Legislature providing "an addition to the existing base in the amounts of \$5.3 million in 1989-90 and \$4.7 million each year for the fiscal years FY 91, FY 92, and FY 93."<sup>9</sup> The University transferred the \$1.1 million appropriated by the Legislature to MSC along with \$600,000 of its internal funds.

The University asked the Legislature to increase its special appropriation by \$4.2 million in 1989 to fund the ETA-10. However, the decision by Control Data to close its unprofitable ETA Systems subsidiary in April 1989, and MSC's subsequent decision to terminate its ETA-10 lease, made the request moot.

In 1990, the University and MSC approached the Legislature again for an appropriation in the bonding bill to purchase a new computer. The Senate version of the bonding bill included a \$1.8 million appropriation for a supercomputer, but this provision was dropped in conference committee. MSC also lobbied for an exemption from the sales and use tax for the purchase of a qualifying supercomputer. This provision was included in the 1990 omnibus tax bill and was made retroactive, effective for transactions occurring after December 1, 1989. However, it was intended to be contingent on an appropriation in the bonding bill. Because there was no appropriation, the sales and use tax exemption was repealed by the 1990 Reviser's corrections bill. Because of a drafting error, the effective date of the repealer was for transactions occurring after December 31, 1989. Therefore, purchases of a qualifying supercomputer in December 1989 would have been exempt from the sales and use tax. We do not know if MSC purchased a qualifying supercomputer during this time period.

The 1991 Legislature exempted MSC from paying any real and personal property taxes on property which is "used primarily to manage or provide goods,

---

<sup>8</sup> *Minn. Laws* (1988), Chapter 703, Article 1, Sec. 6, Subd. 2(a).

<sup>9</sup> June 29, 1983 letter from Rama Murthy, Vice Provost and Associate Vice President for Academic Affairs, to Rick Heydinger, Vice President for External Relations.

services, or facilities utilizing or relating to large-scale advanced scientific computing resources to the regents of the University of Minnesota and others."<sup>10</sup>

## SUMMARY

This chapter sets forth the history of the relationship between the University and MSC. In short, the University began selling computer time to commercial customers in 1982 because of a shortfall in the University Computer Center budget. University officials became concerned about unrelated business income taxes and about complaints of unfair competition from private vendors of supercomputing services. At the time, there were tax advantages available to for-profit companies that were unavailable to the University. As a result, University officials decided to set up a for-profit corporation to acquire research equipment, such as supercomputers.

University officials approached the University Foundation, which agreed to facilitate the formation of this company, now known as MSC. In order to take advantage of certain tax benefits, it was necessary that the Foundation own 90 percent of the common stock. The Foundation purchased 90 of the 100 shares of common stock for \$90. This is the Foundation's only capital contribution to MSC. According to Foundation officials, the Foundation's role in managing MSC has been limited largely to appointing members to MSC's Board of Directors. Despite the Foundation owning 90 percent of MSC's common stock, it has been University, not Foundation officials, that have directed MSC's development and provided it with essential financial support.

MSC has evolved from a paper corporation formed in 1982 into an operating company quite different than University officials originally intended. Throughout its history, MSC has been financially dependent on the University and the Legislature. Unlike most private companies, MSC has repeatedly gone to the University and the Legislature to ask for increases in financial support and preferential tax treatment. In the next chapter, we detail the financial relationship between MSC and the University.

---

<sup>10</sup> *Minn. Laws* (1991), Ch. 291, Article 1, Section 10, Subd. 20.

---

# Financial Relationship Between the University and MSC

## CHAPTER 2

---

**T**he University has been a major financial underwriter of the Minnesota Supercomputer Center (MSC) since its inception. In response to direction from the Legislative Audit Commission, we asked:

- What is the financial relationship between the University and MSC? To what extent has the University subsidized the operations of MSC? Is MSC financially independent of the University?

To answer these questions, we examined University financial records, contracts, and agreements with MSC. We interviewed the principals from the University that were involved in many of the transactions with MSC. We also requested that the University compile information on all its financial transactions with MSC, which the University was only partially successful in providing to us.

In many respects, we know only one side of the financial relationship between the University and MSC. We have not had access to any financial records of MSC, and that has made an exact accounting of the relationship difficult to determine. In the following sections, we set forth what we could learn from University records about its financial relationship with MSC.

### PURCHASES OF COMPUTERS

---

**MSC has received money from the University and/or the state when it wanted to make large capital investments.**

As we noted previously, the first computer was acquired by the University and then transferred to MSC as part of a restructuring of the lease-purchase agreement. The University advanced MSC \$4.775 million necessary to buy the Cray-2 and also guaranteed up to \$5.4 million per year of the loan to purchase it. MSC, through the University, also sought additional funds from the Legislature in order to purchase the ETA-10 computer. The University's current commitment of \$32 million in purchases over four years was characterized by several Regents and MSC's Board Chairman as collateralizing MSC's purchase of two new Cray Y/MP computers. Unlike most private companies, MSC has turned to the University and/or the Legislature whenever it has needed to make large capital investments.

## PURCHASE OF SERVICES

The University has been a major customer of MSC. Since 1986, the University has made over \$48 million in service payments to MSC. MSC provides access to supercomputing services to University researchers at a contract rate. The contract rate is currently \$750 per service unit (roughly an hour of processing time) on the Cray-2 and \$550 per service unit on the Cray X/MP.<sup>1</sup> In addition to the contracted amount of service, MSC's board has a policy that all commercially unsold time is made available to University researchers in the form of "special development grants." These special development awards are provided in the form of grants of lower priority computer time.<sup>2</sup> Much of the University's total computer time is provided by MSC on these lower priority queues. The exact proportion of the University's computer time provided on the low- and zero-priority queues is regarded by the University and MSC as a "trade secret."

There are several unusual aspects to the University's purchase of services from MSC. Both the University and MSC claim their relationship is strictly that of a vendor (a supplier of computer services) and a customer. But, we found that:

- The service contract between the University and MSC is not typical of a normal vendor-purchaser relationship.

---

**The University has agreed to artificially high service rates in its contract with MSC.**

The contracted rates for service that the University has negotiated are artificially high. For example, high priority Cray-2 access time at the University of Illinois is offered at a rate of roughly \$200 per hour.<sup>3</sup> The \$750 per hour rate charged the University on MSC's Cray-2 has not changed since 1987. University and federal government centers also routinely advertise computer time on Cray X/MPs for much less than \$550 per hour.<sup>4</sup> The University has argued that if one averages in all of the additional computer time it receives, the University's average rates are below \$200 per hour. Of course, this comparison is

---

1 For simplicity, we generally refer to the computer time purchased by the University as "hours" of computer time. The University actually purchases service units that include support services and central processing time. A service unit includes approximately an hour of central processing time, but this varies depending on the use of support services.

2 The University's contracted service is provided on a high priority computer queue. Special development awards are provided on low- or zero-priority queues where computer jobs must generally wait behind the higher priority queues to run. Some researchers told us that the lower priority queues were sometimes so slow to run that they could not use all of the low-priority time awarded to them. The University notes that it receives some high-priority time from MSC in addition to the contracted amount. However, the bulk of computer time received, above what the contract calls for, is provided in the form of special development awards on low-priority computer queues.

3 Comparing the exact service rates between supercomputer centers can be complicated (although they are certainly possible to make) and many adjustments for differing levels of services, differing charging algorithms, and other factors need to be considered. We have not attempted to make exact comparisons at this time because we would need access to MSC data that we have not yet seen. This comparison is only to illustrate that the University's *contract rate* is well above that charged elsewhere for roughly comparable services. University officials also have acknowledged in presentations to the Regents that the University's true rate is much less than \$750 per hour.

4 Some government centers advertise rates as low as \$50 per low-memory hour for services on Cray X/MP computers.

misleading, because it equally values high-priority and low-priority computer time. Low-priority computer time is routinely discounted at other computer centers.<sup>5</sup> As we mentioned earlier, much of the University's computer time is provided on these low-priority queues.

The University and the Minnesota Supercomputer Center regard the total amount of service units provided to the University as a "trade secret." MSC claims that revealing the true rate the University pays for services would put MSC at a competitive disadvantage, and that its clients would demand rates equal to the University's. We regard these arguments as unsound for several reasons. First, no other supercomputer center that we talked with feels compelled to operate in such a secretive manner. Rates for service at almost all alternative vendors of supercomputer services are public and routinely quoted. As one director of a competing supercomputer center said when we told him about MSC's claim: "What would I use that information for?" Second, economic theory suggests that the University, because of its special relationship with MSC and because it is MSC's largest customer, should receive the lowest rates and the best service. What the University pays for services is irrelevant to commercial customers. Commercial customers are free to seek equivalent or better services and prices from alternative vendors, if MSC charges them too much. In other words, normal market forces determine MSC's competitive situation, not what the University pays for its services. MSC's economic incentives in the current arrangement are for it to regard the University's financial contribution as a given and to focus on commercial business.

---

**The University  
pays MSC in a  
lump sum at  
the beginning  
of the contract  
year.**

Another unusual aspect of the contract for services is the method of payment. The University pays for its services in a lump sum, due at the beginning of the contract year, before more than a small portion of the contract services has been delivered. Some of the other unusual aspects of current and past service agreements and contracts are discussed below.

The University also purchases computer time from MSC under the terms of a research and development agreement with Cray Research. Cray makes cash payments to the University to promote research and development projects which enhance the commercial or academic application of Cray supercomputer systems. Cray routinely includes such grants when it sells supercomputers to universities, and it receives a federal tax credit for these cash awards. The Cray agreements called for \$840,000 in 1989-90, \$560,000 in 1990-91, and \$240,000 for the period February 1991 to January 1993. The University uses these funds to purchase computer time from MSC at the rates of \$750 per Cray-2 hour and \$550 per Cray X/MP hour. As we noted, these are not market

---

<sup>5</sup> For example, the National Center for Atmospheric Research (NCAR) makes interactive supercomputer time available to researchers for a 50 percent premium over the regular rate. Interactive time is available to University researchers on a very limited basis for extremely short jobs only, although it is routinely available to commercial customers. The regular rate at NCAR corresponds most closely with the University researcher high-priority rate at MSC. The low priority rate at NCAR, which corresponds most closely with the University researcher low priority computer grants, is discounted 50 percent from the regular rate. As we have mentioned earlier exact comparisons of rates are complicated. We have not cited in this report any exact rate comparisons we have made between MSC and competing centers. We cite NCAR's rate structure only to document that low priority computer time is less commercially valuable than interactive or high priority time.

rates. This fact also was noted by the MSI director in a letter to MSC's president; he said:

Please note the following comparison of the rates we pay on the Cray University Research and Development Awards at MSC to rates available elsewhere. We pay \$550 per low-memory Cray X-MP-EA hour and \$750 per low-memory Cray-2 hour. Texas A&M charges \$273 per low memory Cray Y-MP hour (equivalent to about \$182 per low memory Cray X-MP-EA hour). NCAR charges \$300 per low-memory Cray Y-MP hour at the *highest* priority, whereas our grants do *not* run at the highest priority available at MSC.<sup>6</sup>

These above market contract rates are another way for the University to subsidize the operations of MSC.

## ARMY HIGH PERFORMANCE COMPUTING RESEARCH CENTER

In 1989, the University of Minnesota won a \$67 million five-year federal contract from the U.S. Army to establish an Army High Performance Computing Research Center (AHPCRC). The contract consists of three parts: an \$8.5 million research program (with roughly \$6.5 spent at the University of Minnesota), \$27 million to acquire advanced computer systems, and \$31 million for infrastructure support. The University has contracted with MSC to perform certain of the infrastructure support and advanced system acquisition. Of the \$31 million in infrastructure support funds, roughly \$5 million is spent at the University, \$25 million at MSC, and \$1 million at Howard University. MSC has subcontracted with Computer Sciences Corporation and Government Services, Inc., two vendors of computer and systems analysis personnel, to provide 19 computer experts to support Army researchers located at various sites around the country. MSC has an additional ten persons that it directly employs to support the AHPCRC computers. The contract pays MSC for the salaries and indirect costs for its ten employees.

MSC also receives roughly \$25 million of the money to acquire advanced systems under the Army contract. MSC has acquired a Thinking Machines CM-2 and a 544 node CM-5 for use by the AHPCRC researchers.

## LINE OF CREDIT AND REFUND AGREEMENT

In 1985, the University extended MSC a \$5 million line of credit. MSC drew on the line of credit for \$250,000 in April 1986 and \$4.7 million in June 1987.

---

<sup>6</sup> Letter from Donald Truhlar to John Sell, September 23, 1991, Page 2.

---

**In 1985, the University granted MSC a \$5 million line of credit.**

On June 25, 1987, MSC officials requested a check for \$3.7 million and another check for \$1 million from the line of credit. We think that MSC used the \$3.7 million check it received from the University to make a refund payment back to the University. As far as we can determine, neither legislators nor the Department of Finance were told that, instead of being used for supercomputer services, the special appropriation was refunded back into the University's central reserve accounts.

The events surrounding the refund are somewhat unclear. We know only what is contained in the University's records, and those records and the memories of those involved are incomplete. MSC has made statements about the refund that we cannot verify, and that are inconsistent with University records we examined.

According to University records we examined, University research fellows became aware for the first time in January 1987 that written contracts governed the services provided by MSC to the University. Previously, inquiries from MSI fellows about the amount of services available had been answered with the vague reply that the University gets "one-third of all machines."

---

**In 1987, MSC drew on its line of credit and made a \$3.7 million "refund" to the University.**

According to documents we examined, approximately \$3 million in services had been paid for but not used in previous years. This carryforward, plus an additional \$4.8 million service payment, entitled the University to approximately \$7.8 million in services during fiscal year 1987. However, when in January 1987 MSC first started providing the University with an accounting of the services it was providing, the documents showed the University had already used a large amount of the services that were available to it in fiscal year 1987. University officials reviewed the billing statements and pointed out a number of large errors. They also challenged MSC's rate structure, noting that it was not consistent with the contracts. As the result of these complaints, a number of credits were granted by MSC and the billing formula was changed. In addition, in March 1987, MSC began a special development award program that gave University researchers access to some of the unused computer time.<sup>7</sup> In June of 1987, for reasons we are unsure of, a refund agreement was negotiated with MSC.

The refund agreement said:

Representatives of the University have advised MSC that they believe the amounts billed by MSC during the fiscal year beginning July 1, 1986 exceed the amounts the University should be required to pay for services received within that period.

The University has conveyed to MSC its position that the value of the computing services it received on the Cray-2 system, particularly during the initial portion of the fiscal year ending June 30, 1987, was significantly reduced due to primary and undeveloped state of the software for that system. In addition, the University has asserted that it did not receive explicit and complete accounting and reporting for the amount of

---

<sup>7</sup> Before this time, any unused time on the computers was not available to University researchers.

---

**MSC says it made the refund "at its own initiative."**

services which the representatives of the University were receiving and incurring during that fiscal year; the University has asserted that MSC bore the responsibility of providing more explicit and timely accounting for those charges under the terms of the Computing Services Agreements. The University relies on the foregoing and the related reasons as the basis for its claim of entitlement to a refund.<sup>8</sup>

MSC officials have a different interpretation of why the refund was made. In a letter to the University, MSC's vice president said:

The system did provide reliable accounting for the usage by University users, both individually and in the aggregate, but this data was not always available nor delivered to the users as the resources were used. As such, we are confident that the University received all of the services it was entitled to receive in return for its service payments during that period. Accounting data is available to demonstrate that fact, and the University received reports of this usage.

After consideration of its financial position and business objectives, the company approached the University with the proposal that \$3,693,000 of the \$4,750,000 paid for services during the 1986-87 fiscal year be refunded to the University. This figure was determined and proposed by the company, on its own initiative, after review by its Board of Directors.<sup>9</sup>

Because the University agreed in 1987 to classify the refund agreement document as confidential, neither legislators nor the Department of Finance were informed about this unusual use of the special appropriation by the University and MSC. At our request, the University has now agreed that the document should be classified as public.

---

**Until recently, the refund agreement was classified as confidential.**

We asked the University for any other information about the refund, for example, how the amount was determined. The University was unable to provide us with any further information about the refund transaction.

### Summary of Transactions Between MSC and University of Minnesota

11/25/86	\$4,225,000	University partial payment to MSC for services in 86-87
1/22/87	525,000	University remaining payment to MSC for services in 86-87
6/22/87	4,700,000	University advance to MSC under line of credit
6/30/87	(3,693,000)	MSC payment of refund to University
7/13/87	5,200,000	University payment to MSC for services in 87-88
7/14/87	(3,713,957)	MSC partial repayment of note principal and interest
7/21/87	(1,005,638)	MSC repayment of note principal and interest in full
7/31/87	4,500,000	University payment for MSC preferred stock

<sup>8</sup> Refund Agreement between the University of Minnesota and MSC, June 30, 1987.

<sup>9</sup> Letter from Bob Williams, MSC Executive Vice President, to Robert Erickson, September 9, 1992, Page 2.



## UNIVERSITY PURCHASE OF MSC PREFERRED STOCK

---

**A \$4.5 million  
stock purchase  
by the  
University gave  
MSC  
additional  
capital.**

One month after MSC made the refund payment, MSC amended its Articles of Incorporation to allow for the issuance of preferred stock, and the University purchased 22,500 shares (for \$4.5 million) of \$10 cumulative nonvoting preferred stock. No preferred stock dividends have ever been paid by MSC. As of June 30, 1992, there will be \$1,125,000 in accumulated preferred stock dividends in arrears, that have not been recognized as income by the University. The University purchased these preferred shares from accounts in its central reserves. Most central reserve transactions were approved by a management committee of senior University officials. However, the University was unable to locate the minutes from the management committee meeting where this transaction might have been approved.

The University has been unable to provide us with any other written documentation about this \$4.5 million expenditure. We talked with three people who were members of the MSC board at the time. Rama Murthy, who had just taken over as board chair, told us that his files had been returned to MSC and that he did not recall the transaction. He thought that it was something that Vice President of Finance David Lilly had negotiated. Ettore Infante, then Dean of the Institute of Technology, recalled the transaction as a cash infusion to an undercapitalized company. We also talked with Carol Campbell, the University's Comptroller and Treasurer at the time. She recalled that the transactions occurred, but she was not a part of the decision-making process. She recalled that it had been negotiated by Vice President Lilly. We contacted David Lilly who did not recall either the refund or the stock purchase transactions.

As far as we can determine, the Regents did not approve the \$4.5 million purchase of MSC preferred stock.

Taking the refund and the purchase of preferred stock transactions together, the University essentially let MSC out of its \$3.7 million obligation and provided MSC with additional capitalization of \$800,000.

## UNIVERSITY PURCHASE OF THE 1200 WASHINGTON AVENUE BUILDING

The University also purchased the building that MSC operates from at 1200 Washington Avenue. According to documents presented to the University Board of Regents, the building cost a total of \$12.361 million to remodel. The City of Minneapolis paid \$5 million, the State of Minnesota paid \$4.95 million, and the University paid \$2.411 million. The University's architects also

served as construction managers for the project. We have no estimate of the cost of providing those services. The purpose of the state's \$5 million contribution was to "promote the development of technology related businesses in Minnesota."<sup>10</sup> It was thought that new high technology businesses would be housed in the building along with the University and the Supercomputer Institute.

The building's development plan called for the University to own approximately 105,000 square feet and for the Minneapolis Community Development Agency (MCDA) to own approximately 25,000 square feet and a parking facility. The joint ownership of the building was set forth in a condominium agreement. It was originally planned that the University would sell the Lauderdale Computer Center building and relocate the academic computer center to the 1200 Washington Avenue building. The University eventually decided not to sell its Lauderdale facility and not to relocate University academic computing or telecommunications to the new building.

For several reasons, after long and complicated negotiations, the University agreed to buy out MCDA's interest in the building. The University paid MCDA \$1.5 million in cash and was "able to negotiate" with MSC to provide 2,500 hours of supercomputer time (valued by MSC at \$1,600 per hour or \$4 million) through MCDA to the Minneapolis Public Schools over a ten year period.

Thus, the University's total cash contribution to the building's capital cost was approximately \$4 million. In addition, the University provides a rent credit to MSC for services provided to MCDA at \$1,600 per hour.

## THE UNIVERSITY'S SPACE LEASE WITH MSC--1985 TO 1992

The University and MSC signed a lease agreement on December 10, 1985 for space in the University's Lauderdale computing facility and for future relocation to substitute premises at 1200 Washington Avenue. The lease agreement appears to give MSC the right to lease all of the premises owned by the University. The terms of the lease called for MSC's rent to be the University's construction costs for the remodeling of the 1200 Washington Avenue building. MSC was to pay the construction costs within 60 days of receiving the University's final cost statement. The University notified MSC on April 4, 1988 that \$2.318 million was due by June 4, 1988, but MSC requested and was granted several extensions of the time to pay this rent obligation. Between September 1, 1986 and November 1, 1990, MSC never made any payments on this lease agreement. Gus Donhowe, the University Senior Vice President for Finance, was quoted as saying: "Since we're kind of kissing

---

<sup>10</sup> *Minn. Laws* (1984), Chapter 654, Article 2, Section 15 (k).

---

**The University's lease arrangements with MSC are unusual.**

cousins, we don't worry about the enforceability of leases. We just worry about equitable relationships."<sup>11</sup>

The University finally renegotiated the lease as part of the buyout of the 1990 MCDA interest in the building. It was agreed that MSC would begin to pay \$20,185 per month in rent (roughly \$4.00 per square foot, far below market rates). According to the University Real Estate Management section, MSC would pay *future rent* in the form of computer services provided to MCDA at \$1,600 per hour.

MSC would also pay the *back rent*, due the University for the period between September 1986 and October 1990 in the form of computer services provided to University researchers. According to the agreement, any computer time used by the Minneapolis Public Schools under their agreement with the University could be credited towards the payment of *current rent* at the rate of \$1,600 per hour (roughly 3 times the University *contract rate* of \$550 per hour on the Cray X/MP).<sup>12</sup>

Under the terms of the previous leases, the University was obligated to pay all costs of operating the building, "including all taxes, premises and physical plant maintenance and repairs, and utilities including electricity, gas, water and telephone." Table 2.1 presents the costs that the University has incurred on behalf of MSC since 1986.<sup>13</sup> The table shows that the University incurred estimated net occupancy costs for MSC of \$1.317 million in fiscal year 1992. In short, the University spent about 5.5 times more on utilities and facilities management than it collected in rent.

In our view, the University's actions as a lessor of space to MSC are odd, if MSC is really a private company. The University charged a less-than-market rate for the space that did not cover the University's facilities management costs, and the University allowed MSC to pay its "rent" with supercomputer time that the University would probably get anyway (since the University gets access to all unused time on MSC's computers).

## THE UNIVERSITY'S CURRENT LEASE WITH MSC

The University signed a new lease with MSC on July 1, 1992. Under the terms of this lease, MSC rents the whole building (approximately 101,000 rentable square feet) from the University for a base rent of \$350,227 plus an

---

<sup>11</sup> "U' will bail out ailing Supercomputer Center," Steve Gross, *Minneapolis Star Tribune*, September 25, 1990, Page B1.

<sup>12</sup> The Minneapolis Public Schools SuperTrck program has used a total of 193 service units since October 1990, all on a Cray X/MP. This amount has been credited by the University toward the rent due from October 1990 to July 1992.

<sup>13</sup> The table does not present the capital costs associated with the building, or the costs of the university supervising construction of the building.

Table 2.1: Supercomputer Center University Support Costs

Type of Service	Projected 1991-92	1990-91	1989-90	1988-89	1987-88	1986-87	1985-86
Fuel	\$ 41	\$ 37	\$ 9	\$ 414	\$ 216	—	—
Electricity	573,000	533,000	523,332	451,631	434,066	191,069	\$ 0
Water	16,140	14,673	19,628	8,795	10,750	2,208	0
Maintenance	149,434	135,849	177,290	163,688	98,472	69,254	0
Custodial	124,225	112,932	100,984	102,884	85,798	59,126	0
Waste	13,752	12,502	16,019	17,807	13,909	1,562	0
Authorizations	73,289	66,626	45,121	8,880	7,933	—	0
Grounds	22,152	20,138	18,349	11,722	—	—	0
Miscellaneous	115,635	105,123	50,981	52,557	18,144	107,122	0
Total Building Costs	\$1,087,668	\$1,000,880	\$951,713	\$818,378	\$669,288	\$430,341	\$ 0
Property Insurance	\$55,659 <sup>c</sup>	\$55,659 <sup>c</sup>	\$ 0 <sup>c</sup>	\$ 0 <sup>c</sup>	\$ 0 <sup>c</sup>	\$ 0	\$ 0
Telecommunications	58,485	56,922	55,135	54,680	54,000	54,000	0
Condo. Assoc. Fees	0	13,822	63,000	73,580	0	0	0
Interest on Building <sup>b</sup>	376,068	197,232	184,329	172,270	161,000	—	0
Total Occupancy Costs	\$1,577,880	\$1,324,515	\$1,254,177	\$1,118,908	\$884,288	\$484,341	\$ 0
Less Institute Portion <sup>a</sup>	260,527	260,527	260,527	260,527	260,527	260,527	—
Net Occupancy Costs	\$1,317,354	\$1,063,989	\$993,651	\$858,382	\$623,762	\$223,815	\$ 0
Service Payment <sup>e</sup>	\$6,454,000	\$7,400,000	\$6,200,000	\$7,000,000	\$5,200,128	\$4,750,000	\$6,533,361
Less Service Payment Returned	—	—	—	—	—	—	—
TOTAL EXPENSES	\$7,771,354	\$8,463,989	\$7,193,651	\$7,858,382	\$5,823,890	\$1,280,815	\$6,533,361

Source: University of Minnesota.

<sup>a</sup>Minnesota Supercomputer Institute, a department of University of Minnesota, uses 13,450 square feet of the 78,687 square feet in use. An additional 21,414 square feet, 12,632 of which is unfinished, is available in the building. The Supercomputer Center provides all services for the Supercomputer Institute space and also permits use of classrooms, conference rooms, etc. without additional charge to the Institute. Historically, this cost has not been broken out since the University has provided most of the occupancy costs as a part of its support for the Supercomputer Center as well as providing space for the University department, the Supercomputer Institute. The Supercomputer Center has incurred additional costs for security, building reception, etc. which are not included in the above occupancy costs. The anticipated rent for the Supercomputer Institute sublease effective July 1, 1992 has been used for the 1991 and preceding years to arrive at a net cost to the University of its support for the Supercomputer Center.

<sup>b</sup>Interest on building was based on the University's funds supplied to purchase the building, to which the University holds title, and will be amortized over a 20 year term effective July 1, 1992. The large increase in interest in FY 1991 was due to the \$1,500,000 payment the University made to Minneapolis Community Development Agency to acquire the building's title. This amount does not include the state's capital contribution of \$4.95 million.

<sup>c</sup>Minnesota Supercomputer Center paid the property insurance expenses through FY 90. When the University acquired title to the building in FY 91, the lease was amended, making the University responsible for the insurance.

<sup>d</sup>Minnesota Supercomputer Center refunded monies to the University of Minnesota per June 30, 1987 agreement.

<sup>e</sup>This amount does not include other University payments made under the Cray Development Grant program and the Army High Performance Computer Research Center subcontract with MSC.

additional rent of \$447,000. The additional rent is not paid in cash, but in the form of the computer services provided by MSC to the Minneapolis Public Schools.<sup>14</sup> The new lease calls for a credit against the additional rent for any services "made available" for use, whether or not the services are actually used.

MSC is responsible for paying most of the building's operating costs, while the University is responsible for paying for structural repairs to the building. In fiscal year 1992, University physical plant work orders and minor maintenance cost approximately \$189,000, an indeterminate amount of which was for structural repairs. The University is also responsible, at MSC's request, for paying up to \$1.1 million in MSC requested improvements or alterations to the building. If the University funds such improvements, the base rent will increase by an amount necessary to amortize the cost over twenty years.

MSC has not yet made up the *back rent* it owes the University from the 1986-90 period. The current lease acknowledges that \$790,191 in past rental obligations remain to be paid.

The University's intent in structuring the lease was to recover the University's approximately \$3.8 million capital investment in the building.<sup>15</sup> According to the University's real estate director, the rental rate is less than a market rate.<sup>16</sup> Thus, the University will continue to subsidize MSC's operations even under the new lease.

---

**The University  
still continues  
to subsidize  
MSC under a  
new lease.**

MSC sublets a portion of the building back to the University for \$352,059. The University's Minnesota Supercomputer Institute (MSI) subleases 13,757 rentable square feet at \$18.80 per square foot. The University also leases some additional space that is currently undeveloped and/or unoccupied. The lease requires MSI to vacate a portion of the space that it had previously occupied and to move to alternate space. MSI must pay for all costs of remodeling the new space. MSC will bear the cost of constructing a wall that will segregate the MSI and MSC spaces.

---

<sup>14</sup> MSC's actual agreement is to provide services to MCDA. MCDA has a separate agreement with the Minneapolis Schools designating it as the primary user of the MSC services.

<sup>15</sup> The lease rate does not provide for the recovery of the state's \$5 million investment.

<sup>16</sup> For example, the University rents one floor of a comparable building next door to MSC from Opus Corporation for a gross rent of \$17.50 per square foot; it rents another floor of the same building for a modified gross rent of \$17.15 (the University pays the electricity). Exactly what a market rate should be for a net lease is difficult to say. However, the building cost \$12.361 million to acquire in September 1986. If the state had issued tax-exempt bonds to finance the building in 1986, a minimum of \$11.37 per rentable square foot would be necessary to amortize the debt service and interest costs over twenty years. This is the most conservative estimate of a market rate. A true market rate would also include an allowance for profit and overhead and a vacancy factor, according to the State of Minnesota's Director of Real Estate Management. The rates for a commercial developer would have to be higher to recover its debt service, interest, profit and overhead.

## MSC PURCHASES THROUGH THE UNIVERSITY

MSC has purchased a variety of computer equipment from the University Bookstore. We have verified \$12,978 in transactions in 1992, and we were told that it may total as much as \$150,000. Bookstore employees told us that purchases in previous years had been larger. The accounting system used by the bookstore makes it difficult to determine exactly how much MSC actually spent at the bookstore. Purchases of computers through the bookstore are supposed to be limited to University faculty, staff, employees, and departments. Items purchased through the bookstore benefit from the University educational discount of approximately 40 percent. The prices available through the University are generally far superior to those of any retail vendors. Also, University departments do not pay sales tax on these transactions.

We have been told by several sources, although we would need access to MSC records to verify it, that MSC represents itself to vendors of workstations and peripheral equipment as a part of the University in order to take advantage of educational discounts. Interestingly, MSC uses two sets of letterhead stationery, one of which identifies MSC as "An Affiliate of the University of Minnesota."

---

**The University  
granted MSC  
special  
purchasing  
privileges.**

In addition, MSC has purchased supplies and consumables from the University Central Stores operation. Again, the University accounting system makes it difficult to track purchases by MSC, however, we have verified \$5,594 in purchases of supplies from University Central Stores between October 1991 and June 1992. In addition, University officials told us that MSC has also made purchases through the University purchasing section.

Sales tax is not charged to departments of the University on purchases through University stores, the bookstore, or central purchasing. The University allows approximately 30 affiliated non-profit organizations, such as fraternities and sororities, student organizations, and government agencies, to make these kinds of purchases. MSC is the only for-profit organization that has these privileges. MSC has represented to the University that it separately filed sales tax returns with the Department of Revenue for these purchases. Because we did not have access to MSC's records, we are unable to verify whether or not MSC paid sales tax on purchases it has made through the University. Also, given the condition of University accounting records, we are not able to determine the total amount of MSC purchases through the bookstore, central stores, and purchasing. To do that we would need access to MSC records.

## OTHER RELATIONSHIPS

MSC has operated in several other respects as a department of the University throughout its history. For example, MSC employees have been issued

University staff ID cards and used them for privileges afforded the University community.<sup>17</sup> MSC and its employees also are listed in the official University staff and faculty phone book.

## CONCLUSIONS

In our view, the University has treated MSC in a way that it would not treat a truly private company. The University capitalized MSC, loaned it money, guaranteed its debt, did not hold it to its financial obligations, and subsidized its operations by providing substantially below-market lease terms, by paying more than market rates for other services, and by allowing it to act in several ways as if it were a department of the University.

---

<sup>17</sup> We understand that these privileges were revoked by MSC during the course of this study and all of the ID cards were recalled.





---

# The Minnesota Supercomputer Institute

## CHAPTER 3

---

**T**he Legislative Audit Commission asked us to examine how the University has structured its supercomputing services. In Chapter One, we examined the evolution of the Minnesota Supercomputer Center (MSC). In this chapter we discuss the history, governance, and policies of the Minnesota Supercomputer Institute (MSI). The Legislature appropriates funds to MSI and it is the vehicle used for the University to purchase supercomputing services for University researchers. Much like MSC, MSI has evolved into something different than the University and the Legislature envisioned in 1984.

We did not attempt to evaluate the effectiveness or the quality of the research program at MSI. We asked:

- What is MSI's governance and accountability structure and what is its relationship with MSC. Are improvements possible?

In order to answer this question, we interviewed 28 of the 29 current MSI fellows, the current and former director, and a number of other University supercomputer users. We reviewed extensive documentary evidence and correspondence relating to the operations of MSI. We also interviewed officials from 14 other universities or centers that operate supercomputers in order to determine the governance, organizational structures, and policies they use. This chapter is organized into three sections: the history of MSI, operations and policies of MSI, and operations and policies of other supercomputer centers.

## THE EVOLUTION OF MSI

The idea for a Minnesota Supercomputer Institute (MSI) began with several different faculty working groups that met a number of times between 1981 and 1984. These meetings culminated in a supplemental budget request to the 1984 Legislature. The objectives of the proposed institute were:

1. To support and stimulate the supercomputer industry and research in the State of Minnesota.

2. To stimulate development in Minnesota of industries, jobs, and services related to and supportive of the supercomputer industry.
3. To work with supercomputer manufacturers pursuant to contractual relationships on research and development activities relating to supercomputer systems and applications software, services, and processes.
4. To provide a showcase of state-of-the-art supercomputer technology from a variety of manufacturers with the latest in supercomputer models and related equipment from each manufacturer.
5. To stimulate and participate in education and training programs at Minnesota educational institutions related to the personnel needs of the supercomputer industry and needs of users and potential users of supercomputers.
6. To provide supercomputer capabilities and services of the Institute to public and governmental organizations as well as public and private educational institutions across Minnesota and elsewhere in the nation and in foreign countries; such services to organizations outside of Minnesota shall be on a full cost recovery basis.
7. To establish appropriate mechanisms whereby the services and supercomputer capabilities of the Institute can be made available to private businesses in Minnesota, the nation, and foreign countries, pursuant to objectives 1,2,3 above; with such services provided on a full cost recovery basis or at rates comparable to those charged by private industry, whichever is higher.
8. To own, lease, operate, or otherwise make available for use, pursuant to appropriate contractual arrangements, supercomputers and related equipment.
9. To solicit and receive contributions and appropriations related to the objectives and responsibilities of the Institute.
10. To work with relevant state agencies and higher education systems in the developing of a statewide data communications network capable of delivering supercomputing as well as other computational capabilities to the state's educational and research community.

The 1984 Legislature appropriated \$2.6 million for the Minnesota Supercomputer Institute. At that time, the University planned to have the Institute both operate computers and administer a research program. The research program would consist of a variety of programs to enhance the use of supercomputers for research, including programs for undergraduate and graduate education, seminars and symposia on supercomputing, visiting scholars, and other efforts to aid the researchers using the supercomputers. During fiscal year 1985, the University conducted a search and hired a new director for MSI. The Univer-

---

**Distinguished  
University  
research  
"fellows" help  
govern the  
Institute.**

sity also hired four prominent scientists skilled in research using supercomputers. Most of the 1984-85 academic year was spent organizing the Institute's programs and developing a campus network to establish better access to the supercomputer for remote users.

The new Institute director began work in June 1985. The director, along with the scientific director, continued the work of planning the academic program of the Institute. One of the first steps was to solicit nominations for a small group of researchers to serve as fellows of the Supercomputer Institute. The fellows are a group of distinguished University computational researchers who are expected to help in MSI's governance by serving on committees and aiding in the goals of the Institute. Fellows are University faculty nominated by their department heads and deans and then voted on by the current fellows. Initially, 20 fellows were selected. Since that time, several fellows have left the University and several more fellows have been recruited by the University. There are currently 29 fellows.

Although the Institute's original plan called for it to both operate the computers and to administer the research program, in the fall of 1985 MSC was given responsibility by the University to operate the supercomputers. The formation of a separate company to operate the computers surprised the original director and some of the initial fellows who found that the concept of the Institute had changed between the time they were recruited and when they arrived.

By 1987, the Institute's original director and scientific director had resigned. The University appointed a new scientific director, who also served as the acting director of the Institute until May 1988, when he officially was appointed to the job.

## MSI ORGANIZATION AND POLICIES

In early 1987, Roger Benjamin, the new University Provost, decided that the Institute should report to the vice president for academic affairs instead of the dean of the Institute of Technology. Rama Murthy, Associate Vice President for Academic Affairs, took over responsibility for all academic computing, including the Supercomputer Institute. In addition, Vice President Murthy was appointed chairman of the Minnesota Supercomputer Center Board of Directors.

One of Vice President Murthy's first steps was to have the Institute's acting director prepare a mission statement and establish a committee structure of fellows to govern various aspects of the Institute's academic program. The

---

**MSI research fellows have little contact with MSC's commercial clients.**

Institute's new mission statement reflected MSI's role as an academic program only, with MSC in charge of managing the supercomputer.<sup>1</sup>

This split in responsibilities between MSC and MSI has had several effects. For example, although it was clearly part of the initial objectives for the Institute, neither MSI nor MSC sees it as part of its mission to promote development of industries and services related to supercomputers, or to engage in any technology transfer activities with local industries. Another effect is that MSI fellows have virtually no interaction with MSC commercial customers. The few interactions with industry have resulted from the efforts of individual fellows and were not facilitated by MSC or MSI. Many of the fellows we talked with thought that increased interaction with the commercial users of the supercomputer would be very beneficial for the University and the state. Several other supercomputer centers told us that the interaction on collaborative projects with industrial partners had been very valuable for their local economies and the universities involved. An official at one center told us that one of its commercial clients established a relationship with his center after rejecting MSC because of MSC's secrecy and the lack of opportunity for collaborative relationships with University researchers.

## MSI'S GOVERNANCE STRUCTURE

The Institute's committee structure established in the 1987-88 academic year remains largely unchanged. Figure 3.1 illustrates the Institute's organization structure.

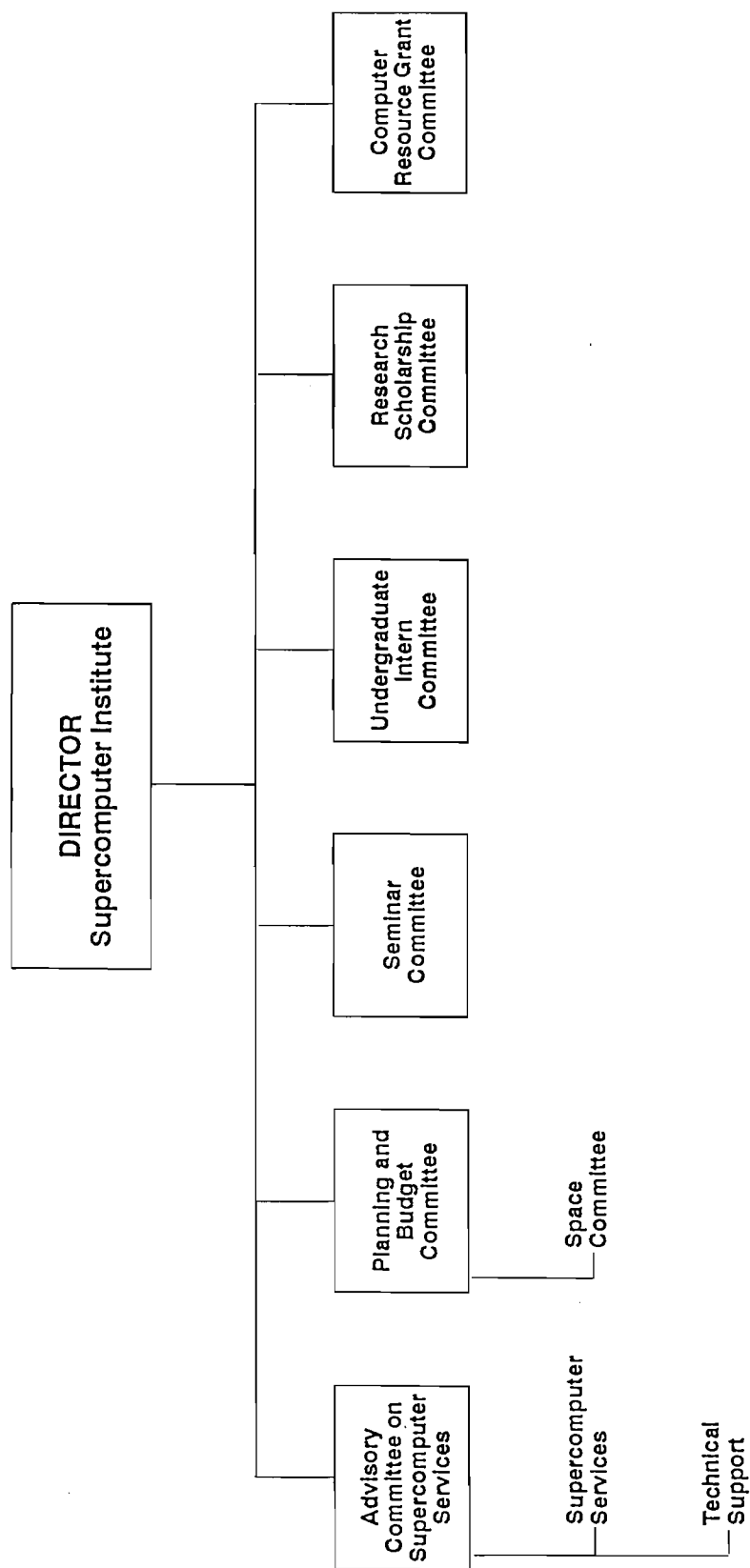
The Institute's operating budget for fiscal year 1993 is approximately \$1.25 million. The Institute employs six full-time administrative staff who administer the research, seminar, undergraduate intern, and publications programs. The Institute also employs one full-time and three part-time technical staff who maintain the Institute computer equipment. In addition, MSC employs two staff who provide full-time technical and graphics support to the University researchers.

The director is appointed by the University to supervise the operations of the Institute and to guide its research program. In many respects, the Institute operates as an academic department of the University. As of July 1, 1992, the director reports to the University's vice president for research. The director appoints committees to help in the Institute's governance. The Advisory

---

<sup>1</sup> The summary of the Minnesota Supercomputer Institute Executive Statement of Mission reads as follows: "The Minnesota Supercomputer Institute (MSI) is an interdisciplinary research program of the University of Minnesota. MSI supports the usage of the supercomputers and other resources of the Minnesota Supercomputer Center, Inc. (MSC) by researchers at the University of Minnesota and other post-secondary educational institutions in the State of Minnesota. The Institute also supports a visitors program and maintains additional resources that complement those of MSC, and it provides these resources to MSI researchers and visitors to create a more favorable supercomputing environment. MSI also provides educational services related to supercomputing and plays an interdisciplinary role in graduate and undergraduate education relating to supercomputing and scientific computing. Thus MSI provides the focal point for collaborative research and education in supercomputing within the University and the State."

Figure 3.1: Minnesota Supercomputer Institute Organization Chart



Source: University of Minnesota.

Committee on Supercomputer Services is a large committee of approximately 30 members, made up primarily of Institute fellows. This committee meets quarterly to discuss general Institute issues and to inform members of upcoming events. This committee has two smaller subcommittees that advise the director and staff on the specific needs of the researchers. The Technical Support, Graphics, and Visualization Subcommittee provides guidance to the Institute's technical staff and administers a small budget for equipment purchases. The Supercomputer Services Subcommittee meets periodically with MSC representatives to share their concerns about the technical details of using MSC's supercomputers. The Planning and Budget Committee formulates the Institute's budget and considers planning issues. The Seminar Committee organizes seminars on various supercomputing issues that are offered throughout the academic year. The Undergraduate Intern Committee selects and runs the internship program. In 1992, there were 33 undergraduates who had internships through the Institute. The Research Scholarship Committee considers nominations for research post-doctoral scholarships. The Institute provides 50 percent of the cost of the scholarships with the remainder from the scholars' home departments. The Space Committee, a subcommittee of the Planning and Budget Committee, meets as needed to deal with issues surrounding the use of the space in the 1200 Washington Avenue building.

## RESOURCE ALLOCATION

The director of the Institute meets every six months with MSC representatives to review the University's projected computer usage during the next period. Every six months, MSC informs the university how much additional low priority computer time will be available under the MSC Board policy of providing all unsold time to University researchers. MSI then solicits grant proposals from University researchers describing their research projects and how they would use the supercomputer.<sup>2</sup> These grant requests are reviewed by a three-person resource allocation committee. The resource allocation committee grades the proposals and then makes a recommendation to the director on the amount of supercomputer time that should be allocated.

We talked with all of the researchers who had recently served on the committee. They told us that the proposals' scientific merit was sometimes difficult to judge because they were not always in areas committee members were familiar with. The committee's review mostly focuses on the appropriateness of using the supercomputer for the research project, although they also consider the researcher's productivity, and whether the researcher's program has been optimized to run on the supercomputer.

The resource allocation committee only considers the research proposals submitted by non-fellows on-time; proposals submitted after the deadline are reviewed by the director. In the most recent six-month period, the committee

---

<sup>2</sup> University officials note that several times in the past they have had to solicit proposals before they knew what supercomputer resources would be available in the next period.

reviewed requests from 115 researchers. The committee recommended that 76 percent of the computer time requested by this group be granted. The director modified the committee recommendation, actually granting 72 percent of the time requested. During the most recent period, there were also 31 late requests that were reviewed by the director. During the most recent period, non-fellows were granted about 21 percent of the total supercomputer time available to the University.<sup>3</sup>

Fellows must also submit proposals. We reviewed the allocation files and found research proposals for all of the fellows except the director. The director had not submitted a research proposal since April 1988. Fellows are also required to file requests for interim grants of computer time. We found documentation of interim grant requests for all fellows except the director and one colleague.

---

**MSI's director  
allocates over  
80 percent of  
the University's  
supercomputer  
time.**

The director personally reviews the fellows' proposals and requests for computer time and expedites the allocations. In the most recent six-month period, the director allocated 79 percent of the total computer time available to 25 fellows. The amount of supercomputer time actually used by University researchers is different than the amount allocated because some users do not or cannot use all of the time allocated. The director also allocates additional time during the period to those that request it. During the most recent period, fellows actually used 85.8 percent of the total time used by University researchers. Table 3.1 shows the pattern of computer time usage by fellows and non-fellows for the last three fiscal years. Table 3.2 shows the usage by academic unit.

Tables 3.1 and 3.2 show that there are some research groups and departments that use a significant portion of the University's supercomputer resource. The four largest users of supercomputer time in the last six month period used 69.7 percent of the resources, and in the previous six month period, these same groups used 64.9 percent. It is not unusual that certain research groups use a much larger share of the supercomputer resources than others. We found this pattern was true at other supercomputer centers also, although the distribution of usage is more skewed towards large users at Minnesota.

However, it is unusual that large allocations of supercomputer time are granted without a more formal review process. We regard the fact that the director personally allocates over 80 percent of the supercomputer time used as problematic and subject to abuse. This is especially true since the director's research group is one of the largest users (during some periods the largest) of the supercomputers. Almost all of the other supercomputer centers we contacted had some form of peer review, with a more rigorous review for large grants.<sup>4</sup> Since some of the largest users are receiving the equivalent of more than

---

<sup>3</sup> These percentages reflect the total number of system units granted and used on MSC's Cray-2 and Cray X/MP computers as a percent of the total available and actually used by the University. The percentages combine the high- and low-priority time available to the University.

<sup>4</sup> The director maintains that he provides the peer review for the fellows. However, in our view, a truly independent peer review requires an outside examination by someone other than the person allocating the resource.

**Table 3.1: Percent of Total University Supercomputer Usage, By Fellow, 1989-1992**

Principal Investigator	1/1/89- 6/30/89 % Total <sup>a</sup>	7/1/89- 12/31/89 % Total <sup>a</sup>	1/1/90- 6/30/91 % Total	7/1/90- 12/31/90 % Total	1/1/91- 6/30/91 % Total	7/1/91- 12/31/91 % Total	1/1/92- 6/30/92 % Total
Almlof	12.20%	11.46%	19.96%	13.04%	17.24%	21.85%	18.22%
Boley	--	--	--	--	<.01	<.01	--
Chelikowsky	0.19	0.40	0.60	0.81	1.18	1.83	3.86
Davis	3.03	3.36	2.25	5.49	2.14	0.81	2.21
Ferguson	--	--	--	--	--	1.45	0.53
Fox	--	--	--	--	--	--	--
Halley	--	--	--	1.15	2.37	1.33	1.07
Hejhal	0.52	0.52	0.10	0.03	0.13	0.07	0.17
Ibarra	--	--	--	--	--	--	--
Jensen	5.18	5.21	2.78	1.19	1.31	0.28	<.01
Jones	--	--	--	--	--	0.93	0.55
Kain	<.01	<.01	<.01	--	--	--	--
Luskin	0.04	0.02	0.05	0.05	0.15	0.01	0.61
Lybrand	1.76	1.12	0.40	1.05	1.50	--	--
McGehee	--	--	--	--	--	--	--
Moran	--	--	--	--	--	--	--
Patankar	0.47	0.85	0.22	1.02	0.70	0.92	0.76
Petzold	--	--	--	--	<.01	<.01	--
Quarteroni	--	--	--	0.07	0.55	0.22	0.02
Rapp	--	--	--	--	--	--	--
Rosen	0.49	0.94	0.34	0.20	0.15	0.16	0.12
Saad	--	--	--	0.01	0.01	0.03	0.02
Sahni	--	--	--	--	--	--	--
Sameh	--	--	--	--	--	--	<.01
Scriven	3.03	2.39	0.65	1.04	1.24	0.93	0.81
Sell	<.01	<.01	<.01	<.01	<.01	--	--
Sims	0.11	<.01	<.01	<.01	<.01	--	--
Song	--	--	<.01	0.52	0.74	0.91	1.09
Tezduyar	6.37	7.97	18.63	15.08	14.45	11.38	8.14
Thomas	0.85	0.89	0.11	0.42	0.44	0.39	0.11
Truhlar	9.47	12.10	12.64	8.98	12.55	20.39	31.42
Valls	--	0.38	0.87	1.05	1.16	0.97	0.43
Walsh	7.70	6.23	4.14	5.80	1.00	0.45	0.75
Wilcox	1.04	1.10	0.67	0.54	1.62	1.45	0.44
Woodward	7.94	4.46	5.67	2.95	5.48	3.86	2.54
Yuen	<u>9.61</u>	<u>10.77</u>	<u>13.58</u>	<u>19.19</u>	<u>13.68</u>	<u>11.23</u>	<u>11.92</u>
Total Fellows	69.99%	70.17%	83.68%	79.67%	79.79%	81.87%	85.78%
Total Non-Fellows	30.01%	29.83%	16.32%	20.33%	20.21%	18.13%	14.22%

Source: Calculated from data provided by the University of Minnesota.

Note: All years include Cray grant usage, and high and low priority usage, except 1989, which excludes low priority usage.

<sup>a</sup>These periods exclude low priority usage.



**Table 3.2: MSI Percent Supercomputer Usage by Department, 1989-1991**

Department Name	1989	1990	1991	Department Name	1989	1990	1991
3M Company	0.03%	0.34%	0.25%	Information and Decision Sciences		0.01	<.01
Aerospace Engineering & Mechanics	16.20	17.97	14.27	Institute for Mathematics and Its Applications		<.01	0.18
Agricultural Engineering	0.23	0.19	0.11	Laboratory Medicine and Pathology			0.04
Astronomy	4.97	6.06	5.86	MSI Administration	0.03	0.01	0.07
Biochemistry (College of Biological Sciences)	0.14	0.43	0.62	Mankato State University	0.05	0.06	0.01
Biochemistry (Medical School)	0.81	0.55	0.76	Mathematics	0.49	0.27	0.73
Biomedical Engineering Center			<.01	Mayo Foundation	0.71	0.07	0.01
Biometry	0.02	0.01	<.01	Mechanical Engineering	2.50	1.81	1.95
Bioprocess Technology Institute	<.01	0.06	0.14	Medicinal Chemistry	1.93	0.71	1.49
Biostatistics	<.01	<.01		Microbiology	0.23	0.01	0.01
Center for Interfacial Engineering		<.01		Mineral Resources Research Center		0.02	
Chemical Engineering	8.88	10.59	10.24	Operations & Management Science	0.08	0.04	0.13
Chemistry	27.60	30.05	38.84	Oral Science		0.01	0.01
Civil & Mineral Engineering	0.40	1.09	0.15	Orthopedic Surgery	<.01	<.01	0.04
Clinical & Population Sciences			0.01	Otolaryngology			0.01
Computer Science	0.50	0.34	0.25	Pharmaceutics	<.01	0.01	0.04
Division of Cardiovascular & Thoracic Surgery			0.01	Pharmacology	0.53	0.51	1.38
Ecology & Behavioral Biology			0.14	Physics	12.56	7.65	4.72
Economics	0.27	0.21	0.21	Physiology	0.01	<.01	0.17
Educational Psychology	0.05	0.07	0.03	Plant Biology	<.01	<.01	0.07
Electrical Engineering	0.44	1.32	1.77	Psychology	1.75	0.27	0.01
Engineering Mechanics		<.01	<.01	Radiology	0.05	0.04	0.01
Environmental & Occupational Health		0.13	0.10	School of Public Health	0.04	<.01	<.01
Faculty of Sciences			0.04	School of Statistics	<.01	0.01	<.01
Fisheries and Wildlife	0.01	0.23		Soil Science		0.03	
Genetics and Cell Biology	0.05	0.02	<.01	St. Anthony Falls Hydraulic Laboratory	0.42	0.97	0.97
Geology & Geophysics	15.85	16.04	12.35	St. Cloud State University	0.01	0.01	0.01
Geometry Center	0.69	0.64	0.17	St. Olaf College	0.02	<.01	<.01
Gray Freshwater Biological Institute	0.09	0.07		Surgery	0.02	0.08	0.08
Health Services Research and Policy		0.03		Theoretical Physics Institute	1.21	0.72	1.19
Industrial Relations	0.05	0.12	0.22	Underground Space Center	0.05	0.05	0.01
				University of MN - Duluth	0.02	0.03	0.11
				University of MN - Morris	<.01	0.03	0.03
				Total	100.00%	100.00%	100.00%

Source: Calculated from data provided by the University of Minnesota.

Note: All years exclude Cray grant usage and include both high and low priority usage.

\$1 million per year in computer time, we believe a review process involving a wider group of researchers familiar with the scientific merit of the research proposals is prudent. We recommend:

- The University should establish a method of peer review for large grants of computer time. The University should establish a process for allocating time to the director's research group that eliminates the conflict of interest inherent in his allocating time to himself.

We should note that most of the fellows thought the process for allocating time was efficient and that the director did a good job. Most of the researchers were satisfied with the amount of supercomputer time they received, although many noted that they could always use more to improve the quality of the simulations they ran on the computer.<sup>5</sup> Many of the fellows, however, did not realize that their proposals were not peer reviewed. Although policies vary slightly, computer time grants of more than 100 hours are peer reviewed at all of the NSF national supercomputer centers, and peer review of grants is the norm at most centers throughout the country.

None of the fellows knew the details of how much time other fellows received, although the director maintains that this information is available to those who ask. Several of the fellows thought the amount of time awarded to fellows and non-fellows should be published, noting that it was at other centers. We agree. We recommend:

- The percentage of the total University computer time awarded and used by University researchers should be routinely published and distributed.

Grants and usage of computer time should be public, as are other University grants and awards. An open process creates the proper atmosphere for accountability and tends to be self-regulating.

## RELATIONSHIP BETWEEN MSC AND MSI

MSC was incorporated for the sole purpose of acquiring research equipment for the benefit of the University of Minnesota. Despite this fact, we found:

- MSC management has historically had a contentious relationship with the University researchers.

For example, we were told by several fellows and former MSI officials, that MSC never wanted them in the 1200 Washington Avenue building, and in 1987 had proposed that a wall separating MSI and MSC be built. University researchers appealed to the University administration about the appropriateness of a wall in an academic research setting and the wall was never built. Since that time, there have been continual disputes over the University researcher's use of space in the building, as well as MSC's provision of services. Under the terms of the University's new lease with MSC, a wall to separate the University researchers from MSC will be built. MSI will also have to relocate a number of its offices to a non-contiguous part of the building, and it will no longer have access to classrooms and conference rooms in the MSC space. MSI is being forced to build a new classroom that, because of space

---

**There have been continual disputes between MSC and MSI over use of building space.**

---

<sup>5</sup> Most of the researchers are involved in doing simulations that are improved by modeling the phenomena under study in three dimensions with finer time and space matrices. Many fellows said they could use many orders of magnitude more computer time if they chose finer matrices for their simulations.

---

**University researchers have complained that MSC's commercial customers come first.**

constraints, will be less suitable for the academic programs it offers. The new classroom will only seat one-half as many persons for MSI symposiums and lectures. Several of the researchers noted that the wall being built by MSC was symbolic of the researchers' relationship with the company.

University researchers have also had periodic complaints about MSC's provision of services. There has been a consistent concern that MSC preferentially serves its commercial clients to the detriment of University research. For example, University researchers have complained that the commercial customers have access to the vast bulk of MSC's disk storage space. The lack of adequate disk storage has resulted in computer jobs aborting because there is insufficient storage for the data being produced. University researchers are also concerned that MSC commercial customers receive preferential access to the computer, at times making the University computer jobs difficult to run. These concerns have been consistently expressed since the founding of MSC. It is possible that some of these historic concerns will be remedied by the terms of the University's new contract with MSC, which provides for the University to receive the same level of services as commercial clients and access to disk space proportional to its use of the computer time. However, we were told repeatedly, by almost all of the researchers we talked with, that most of the difficulties the University had with MSC were related to the style of MSC's top management.

University researchers have also been concerned by their lack of input into decisions about the type of equipment MSC purchases. Several felt that the University researchers had been virtually ignored when equipment decisions have been made.

One means of improving MSI input into MSC decisions would be to involve University researchers on the MSC Board. The MSC Board has historically lacked anyone with expertise in scientific computing. Since MSC was created as a means to an end, namely to foster research at the University, having distinguished University researchers serve on the Board could be useful in ensuring that the University's research needs are met. Therefore, we recommend that:

- **The University should appoint one or more distinguished researchers to the MSC Board.**

Appointing researchers to the board has been discussed in the University community before, with general agreement among faculty and administrators that it would be a good idea. Distinguished researchers such as Regents Professors, members of the National Academies of Science or Engineering, or Emeritus Professors have been mentioned as candidates. Since the University currently has one vacancy among the appointments it can make, now would be a good time to implement this idea.

A complementary idea that would improve MSC's accountability to the University is to have a periodic review of MSC's operations and future plans by outside national supercomputer experts. Such panels are a routine part of the

---

**Both MSC and MSI should undergo periodic outside review.**

operations of the national supercomputer centers, and many state centers have had similar reviews by national panels or independent consulting groups. We believe MSC's board would benefit from the expertise such a review could offer. The review could incorporate any safeguards necessary to protect the proprietary interests of MSC's commercial customers.

Similarly, the academic program at MSI should undergo periodic review. Review of academic programs is a routine and valuable part of the University's process of improving the research, teaching, and public service goals of the University. As we noted previously, we are not the appropriate group to evaluate the academic program of MSI. However, the research program funded by MSI should be reviewed by an objective outside panel on a periodic basis. All of the fellows that we asked, except the director, thought that such an outside review process would be useful and was a normal part of an academic program.<sup>6</sup> We recommend:

- The University should obtain a periodic objective outside review of the scientific programs funded by MSI.
- The University should recommend that MSC's board adopt a similar review process to ensure that MSC's current operations and future plans will best meet the needs of University researchers.

Review panels are most helpful when the process is independent, unbiased, and objective. Several of those we spoke with noted that review panels must be carefully composed so that they are not predisposed for or against University programs. For example, it would not be helpful if University administrators chose a review committee predisposed to validate the status quo. The University and the MSC Board should remain mindful of the fact that the only reason MSC exists is to benefit the University by selling enough commercial supercomputer time to enable the financing of supercomputer services for University researchers. The ultimate goal of this program is to strengthen the "human capital" of the University and the state, not to foster a private company.

## OTHER SUPERCOMPUTER CENTERS

Academic researchers can access supercomputers operated by government agencies, universities, the National Science Foundation (NSF), and university-affiliated nonprofit organizations. The Legislative Audit Commission asked us to contact other supercomputer centers and determine:

- What organizational structures do other major research universities use to provide supercomputing?

---

<sup>6</sup> In response to our draft report, the director now maintains that outside review "is sometimes useful and should be considered as a possible option."

We interviewed administrators and reviewed materials from 14 supercomputer centers across the United States, including the four national centers funded primarily by NSF. We asked each center about funding sources, available computer resources, commercial users and collaborators, governance structure, and allocation and grant review procedures. Table 3.3 summarizes the characteristics of both NSF and non-NSF centers.

## National Science Foundation Centers

Beginning in 1986, NSF has funded national centers at Cornell University, Princeton University, the University of Illinois, the University of California at San Diego, and the University of Pittsburgh to provide computing capabilities to researchers. The John von Neumann Center at Princeton ceased operations in 1988 when ETA Systems went out of business. The NSF centers generally have larger budgets and more employees than other centers, and make available supercomputer time to the national academic research community.<sup>7</sup>

The NSF centers have similar funding sources, use of peer review, and grant allocation systems. NSF federal funding is a significant component for all four centers, ranging from 60 to 75 percent of their budgets. Other funding sources include university support, state support, and fees from commercial users. NSF permits each center to sell up to 10 percent of its available time to commercial users. Rather than simply selling cycles of time, these centers focus on industrial partnership or affiliation programs. All centers would like to increase industrial research collaboration, but increasing sales of machine time is not considered a priority. Information about the industrial partners is publicly available although each center takes steps to protect any proprietary information.

Requests for supercomputer time exceed available resources, and all four centers use peer review to eliminate some requests and reduce others. Pittsburgh and the National Center for Supercomputing Applications (NCSA) share a Peer Review Board. All have an expedited process to allocate beginning or small grants. NSF committees of nationally recognized researchers review the operation of each center. Each center must submit quarterly reports and a yearly plan, including a budget.

The four centers offer a variety of computer architectures, three of the four have Cray technology, and all four have some type of massively parallel multiple processor machine.

---

<sup>7</sup> The amount of supercomputer time allocated to individual researchers depends on a peer review of the project proposal. Researchers may be required to demonstrate that they have optimized their computer programs to run efficiently on the supercomputer.

Table 3.3: Characteristics of Supercomputer Centers

## NATIONAL SCIENCE FOUNDATION CENTERS

	CORNELL THEORY CENTER	NATIONAL CENTER FOR SUPERCOMPUTING APPLICATIONS (UNIVERSITY OF ILLINOIS)	PITTSBURGH SUPERCOMPUTING CENTER	SAN DIEGO SUPERCOMPUTER CENTER
Governance	<ul style="list-style-type: none"> <li>University center</li> <li>Director reports to the Vice President for Research</li> <li>Executive committee is comprised of Cornell faculty</li> <li>Reviewed annually by NSF</li> </ul>	<ul style="list-style-type: none"> <li>University center</li> <li>Director reports to the Vice Chancellor for Research</li> <li>Reviewed annually by NSF</li> </ul>	<ul style="list-style-type: none"> <li>Non-profit corporation, a joint project of two universities and a corporation</li> <li>Board includes members from the two local universities</li> <li>Advisory group includes representatives from 25 other universities</li> <li>Reviewed annually by NSF</li> </ul>	<ul style="list-style-type: none"> <li>Managed by General Atomics, a for-profit government research corporation, for a consortium of 25 universities and NSF</li> <li>Reviewed annually by NSF</li> </ul>
Allocations of Computer Time and Review Process	<ul style="list-style-type: none"> <li>Usage and grants are public</li> <li>Start-up--through director</li> <li>Medium--peer review (written)</li> <li>Large--reviewed by the National Allocations Committee (3 times a year) in addition to written peer reviews</li> </ul>	<ul style="list-style-type: none"> <li>Usage and grants are public</li> <li>Small--local peer review</li> <li>Large--go to the Joint Peer Review Board, meets quarterly, includes Pittsburgh</li> </ul>	<ul style="list-style-type: none"> <li>Usage and grants are public</li> <li>Small--internal review</li> <li>Medium--staff and two outside reviewers</li> <li>Large--Joint Peer Review Board, includes NCSA</li> </ul>	<ul style="list-style-type: none"> <li>Usage and grants are public</li> <li>All grants are peer reviewed by a 12-person allocation committee</li> <li>10% of time is awarded in block grants to consortium members who use their own allocation policies</li> </ul>
Interaction with Industry	<ul style="list-style-type: none"> <li>Corporate identities are public but proprietary data protected</li> <li>Increased sale of hours is acceptable but not a priority</li> <li>Increased collaboration is a goal</li> </ul>	<ul style="list-style-type: none"> <li>Corporate identities are public but proprietary data is protected</li> <li>Attempt to target in-state commercial customers</li> </ul>	<ul style="list-style-type: none"> <li>Corporate identities are public but proprietary data protected</li> <li>Increased collaboration is a goal</li> </ul>	<ul style="list-style-type: none"> <li>Corporate identities are public but proprietary data protected</li> </ul>
Revenue Sources	<ul style="list-style-type: none"> <li>Primarily NSF, corporate, state, and Cornell University, about 2% from commercial users</li> </ul>	<ul style="list-style-type: none"> <li>About 60% NSF, 20% state, 10% commercial, 10% small grants</li> </ul>	<ul style="list-style-type: none"> <li>NSF 75%, 5% state, 10% commercial fees, remainder from vendor collaboration, donations</li> </ul>	<ul style="list-style-type: none"> <li>NSF 66%, state/University of California 24%, commercial fees 10%</li> </ul>
Computer Architecture	<ul style="list-style-type: none"> <li>IBM ES/9000-900, IBM PVS 32 node, Kendall Square KSR1 64 node, scalable cluster of RISC systems</li> </ul>	<ul style="list-style-type: none"> <li>Cray-2 4/128, Cray YMP4/64, Convex C3880, Thinking Machines CM-2 32 node, and CM-5 512 node</li> </ul>	<ul style="list-style-type: none"> <li>Cray YMP8/32, Thinking Machines CM-2 32 node, DEC5000 SuperCluster</li> </ul>	<ul style="list-style-type: none"> <li>Cray YMP8/64, Intel Touchstone, nCUBE 128 node, Alliant Visualization</li> </ul>

Table 3.3: Characteristics of Supercomputer Centers, continued

## NON-NATIONAL SCIENCE FOUNDATION CENTERS

	ALABAMA SUPERCOMPUTER AUTHORITY	ARIZONA STATE	CALIFORNIA INSTITUTE OF TECHNOLOGY	NORTH CAROLINA SUPERCOMPUTER CONSORTIUM
Governance	<ul style="list-style-type: none"> <li>Public nonprofit corporation</li> <li>Contracts with a facilities manager, Boeing, for operations</li> <li>A 16-member policy board includes representatives from each academic unit plus political and corporate members</li> <li>No center review, but a yearly report to the Legislature</li> </ul>	<ul style="list-style-type: none"> <li>University center</li> <li>Director reports to Assistant VP for Information Resource Management</li> <li>All decisions, including capital, are decided at the center level</li> <li>An advisory committee includes representatives from colleges using the computer</li> <li>No center review</li> </ul>	<ul style="list-style-type: none"> <li>Three "separate" organizations co-exist under one Director, who reports to the Provost</li> <li>An informal advisory committee is composed of eight large users</li> <li>The Concurrent Supercomputing Consortium is a partnership of 13 institutions, with a policy board composed of one representative from each partner</li> <li>No formal center review process</li> </ul>	<ul style="list-style-type: none"> <li>Nonprofit corporation</li> <li>The governing board includes university chancellors, CEO's and two Governor's appointees</li> <li>An advisory committee represents for-profit corporations, non-profits and academics</li> <li>Center is reviewed by EPA, state has an informal process. Center has been reviewed by a consultant</li> </ul>
Allocations of Computer Time and Review Process	<ul style="list-style-type: none"> <li>Usage and grants are public</li> <li>Allocations are made semi-annually to each campus which use peer review to make allocations to researchers</li> <li>About 10% of total time is reserved for commercial users</li> </ul>	<ul style="list-style-type: none"> <li>Usage and grants are public</li> <li>Requests up to \$60,000 approved by Dean</li> <li>Requests over \$60,000 go to Advisory Committee</li> </ul>	<ul style="list-style-type: none"> <li>Usage and grants are public</li> <li>70% of total time goes to partner institutions; 30% to local users</li> <li>Peer review used for local requests, possibly by partners</li> <li>Caltech's philosophy favors a smaller number of large users</li> </ul>	<ul style="list-style-type: none"> <li>Usage and grants are public</li> <li>Review is more stringent for larger projects</li> <li>20-person allocation review committee looks at science and computational efficiency for all grant requests (3 times per year)</li> </ul>
Interaction with Industry	<ul style="list-style-type: none"> <li>Corporate identities are public but proprietary data protected</li> <li>They would like more commercial revenue but they are already 98% utilized and cannot accept more until fall '93 upgrade</li> <li>The corporation encourages corporate partnerships</li> </ul>	<ul style="list-style-type: none"> <li>Corporate identities are public but proprietary data protected</li> <li>Commercial service program charges twice university rates, yearly fee, for package of services</li> <li>They encourage other relationships but no special program</li> </ul>	<ul style="list-style-type: none"> <li>Corporate identities are public but proprietary data protected</li> <li>One commercial user</li> <li>They do not sell cycles but packages of time, consulting, and software development</li> <li>Would like to expand participation in their industrial affiliates program</li> </ul>	<ul style="list-style-type: none"> <li>Corporate identities are public but proprietary data protected</li> <li>Corporate usage is part of their mission but they are concerned about protecting research interests</li> <li>They want to work to bring researchers and business together</li> </ul>
Revenue Sources	<ul style="list-style-type: none"> <li>85-90% from the state Special Education Trust Fund, 5-10% commercial users</li> </ul>	<ul style="list-style-type: none"> <li>Almost all state money, no direct federal money, about 1% commercial</li> </ul>	<ul style="list-style-type: none"> <li>About 20% university, 80% from partners (some are federal dollars)</li> <li>They are eligible for state money but do not get any</li> </ul>	<ul style="list-style-type: none"> <li>About 60% of revenue comes from the state, 10% from the EPA, and the remainder from commercial and other federal sources</li> </ul>
Computer Architecture	<ul style="list-style-type: none"> <li>Cray XMP2/16, nCUBE 10</li> </ul>	<ul style="list-style-type: none"> <li>IBM 3090-500E, Cray XMP1/16se to be decommissioned this fall and replaced with workstation network</li> </ul>	<ul style="list-style-type: none"> <li>Massively Parallel MIMD (Intel Touchstone Delta 572 node)</li> </ul>	<ul style="list-style-type: none"> <li>Cray YMP4/64, Convex C220 128MW, IBM 3090</li> </ul>

Table 3.3: Characteristics of Supercomputer Centers, continued

## NON-NATIONAL SCIENCE FOUNDATION CENTERS

	OHIO SUPERCOMPUTER CENTER	TEXAS A&M SUPERCOMPUTER CENTER	U OF TEXAS CENTER FOR HIGH PERFORMANCE COMPUTING	NATIONAL CENTER FOR ATMOSPHERIC RESEARCH
Governance	<ul style="list-style-type: none"> <li>University center</li> <li>Director reports to Board of Regents through a governing board of 6 university presidents and representatives of Battelle and Proctor &amp; Gamble</li> <li>Managed administratively by Ohio State</li> <li>50-member statewide researcher advisory group</li> <li>Formal review of center every two years by a national group of experts</li> </ul>	<ul style="list-style-type: none"> <li>University center</li> <li>The Director reports to the Provost for Computing</li> <li>An allocations committee includes the Deans of the five contributing colleges</li> <li>Center review restricted to audit of funds for graduate students</li> </ul>	<ul style="list-style-type: none"> <li>University center</li> <li>The Executive Committee includes researchers and the VP for Research</li> <li>The regents approve capital purchases</li> <li>Center has no formal review</li> </ul>	<ul style="list-style-type: none"> <li>Nonprofit organization</li> <li>The Board of Trustees meets 4 times per year to set the budget and major capital purchases. Board members are chosen by the University Relations Committee from the 58 consortium members</li> <li>Center is reviewed by national panel of researchers and super-computer experts every 2 years</li> </ul>
Allocations of Computer Time and Review Process	<ul style="list-style-type: none"> <li>Public--published in newsletter</li> <li>All peer reviewed</li> <li>Small--director</li> <li>Medium--state advisory committee</li> <li>Large--state or national peer review</li> </ul>	<ul style="list-style-type: none"> <li>Usage and grants are public</li> <li>Each college "buys" a certain number of hours allocated internally</li> <li>The director awards start-up grants and screens other initial requests before passing them to the Deans</li> <li>All unused time goes into the Goodwill Queue, which may be used by researchers at no cost but zero priority</li> </ul>	<ul style="list-style-type: none"> <li>Usage and grants are public</li> <li>Executive Committee recommends allocations to 15 user communities</li> <li>Within communities, allocations are made by the Dean or peer review</li> <li>10% of the hours withheld for users with special research projects</li> <li>Peer review used within the class of special projects</li> </ul>	<ul style="list-style-type: none"> <li>Usage and grants are public</li> <li>Allocation committee determines available time for user groups</li> <li>Large model class (10%) for projects requiring entire machine, must demonstrate optimized code</li> <li>Proposals are reviewed twice yearly</li> <li>Review intensity is proportional to size of request</li> </ul>
Interaction with Industry	<ul style="list-style-type: none"> <li>Corporate identities are public but proprietary data protected</li> <li>Encourage and facilitate academic interaction with commercial clients</li> </ul>	<ul style="list-style-type: none"> <li>Corporate identities are public but proprietary data protected</li> <li>The number of commercial customers declined with increasing research use</li> <li>They would like more opportunities for collaboration</li> </ul>	<ul style="list-style-type: none"> <li>Their charter does not permit them to sell time to commercial users</li> <li>They may establish a collaboration or consortium program</li> </ul>	<ul style="list-style-type: none"> <li>5% of total hours available for commercial sale</li> </ul>
Revenue Sources	<ul style="list-style-type: none"> <li>70% state, 30% commercial, and small grants</li> </ul>	<ul style="list-style-type: none"> <li>State appropriation for capital and maintenance, five university colleges pay for time (some federal money), vendor grants</li> </ul>	<ul style="list-style-type: none"> <li>University of Texas</li> </ul>	<ul style="list-style-type: none"> <li>Two-thirds from NSF, one-third from other federal grants</li> </ul>
Computer Architecture	<ul style="list-style-type: none"> <li>Cray YMP8/64, Cray YEL, IBM PVS Visualization</li> </ul>	<ul style="list-style-type: none"> <li>Cray YMP2/116</li> </ul>	<ul style="list-style-type: none"> <li>Cray YMP8/64</li> </ul>	<ul style="list-style-type: none"> <li>Cray YMP8/64</li> </ul>

Source: Office of the Legislative Auditor.



## Non-National Science Foundation Centers

Many universities have established supercomputer centers to serve their own researchers or researchers from several universities within a particular state. In most cases, the center is part of a specific university, and the director reports to a university administrator. In several cases, a statute defines the membership of a Board of Directors.

In some instances, the center directly allocates resources to researchers. In other cases, the center allocates a large block of resources to another organization, such as a college, which makes its own researcher allocations. Usage statistics and grant awards are public at all of the centers, and the information is publicly distributed at most. Most centers have several different computer priority queues available to researchers. Computer jobs submitted in off-peak hours are normally charged discount rates. One center offers researchers a goodwill queue at no cost and zero priority.

---

**Most other supercomputer centers use peer review to screen requests for computer time.**

Requests for computer time were almost always peer reviewed. Most institutions had a more formal peer review process for larger amounts of time (generally more than 100 hours). Small initial grants (generally less than 10 hours) are available with little or no review, and are encouraged at most centers.

At most centers, researchers serve in an advisory or decision-making capacity, such as reviewing budgets and long-range plans, and approving capital purchases, including new computers.

Many of these centers have corporate customers. Although their data is treated confidentially, the identity of these customers is generally public information. Almost all centers would like to pursue more collaboration between researchers and industry. However, most of the center administrators said that selling computer time is not a priority in itself. As the computer system becomes more saturated, there is a concern that commercial sales may conflict with research use. In only one case did a center administrator tell us that commercial users receive priority treatment over researchers.

In summary, the centers we contacted differed from MSC in the following ways:

- There are no other for-profit centers; they are either university-run or non-profit corporations.
- In almost all cases the identity of the corporate clients is public information and procedures to protect any proprietary research are in place.
- Grant awards and usage information are public information at all centers.

- Almost all centers use peer review for large requests of computer time.
- The centers emphasize the needs of the research community rather than corporate clients.
- Researchers' computer jobs run at the same priority as commercial users, unless the researcher chooses to run on a lower priority, discounted-rate, queue.
- Other centers welcome and encourage collaboration between business and university researchers.
- The decision-making process at other centers often includes researchers.

We think the University should consider more carefully the experience and practices of other supercomputer centers. As we note in this chapter, there are good reasons for the University to adopt different procedures to govern the allocation of supercomputer time, the composition of the MSC board, and the review of the operations of the supercomputer and the research program. Based on the organizational forms adopted by other states' supercomputer centers, the University may want to rethink whether a for-profit organization continues to best meet the needs of University researchers.

## SUMMARY

The University created MSC and MSI to support the research needs of its faculty and students. In our view, several changes in governance of both MSC and MSI could help ensure that the quality and quantity of the research done using the supercomputer is appropriate. Specifically, we recommend that the University adopt a peer review process for allocating all computer time, publish the results of the allocation process, appoint researchers to the MSC board, and institute a review process for both MSI and MSC. The University should evaluate whether the policies and structure of MSC continue to best serve the research needs of the University.

---

# Secrecy and Accountability

## CHAPTER 4

---

**T**he University has created a complex structure to obtain supercomputing services. Its most unique and controversial feature is the Minnesota Supercomputer Center (MSC), a private, for-profit company that operates with considerable secrecy. In this chapter, we review what information about MSC is not public and why; how the University assures accountability for the legislative appropriations transferred to MSC; and what are the advantages and disadvantages of the approach used by the University to obtaining supercomputing services.

### WHAT INFORMATION ABOUT MSC IS NOT PUBLIC AND WHY?

---

**Very little information about MSC is made public.**

MSC is organized as a for-profit business corporation. According to MSC, "...ordinarily no information regarding such a corporation, including its ownership, operations, finances and/or business relationships is made public".<sup>1</sup> MSC maintains that release of information about its customers would be valuable to its competitors, and is subject to confidentiality agreements with its customers. MSC's board chairman also asserts the need to protect its financial information: "The more information MSC publishes regarding its financial operations, the more information it discloses to the competition for those business accounts."<sup>2</sup>

However, MSC recognizes that the University provides a large portion of its revenues from public funds. As a result, according to its board chairman: "[MSC] has agreed to make public, through authorized agencies of the State such as your office [the Legislative Auditor's Office], information which demonstrates that the University funds paid to [MSC] have been applied in the manner provided in those contracts, and that the services received back by the University have been as represented in those contracts."<sup>3</sup>

We met with MSC representatives in April 1992 to discuss with them the types of information we would need access to for an audit. MSC did not agree to

---

<sup>1</sup> Letter from Stephen Pflaum, Board Chairman MSC to Jim Nobles, July 31, 1992, Page 1.

<sup>2</sup> *Ibid.*

<sup>3</sup> *Ibid.*

provide us the following information: payroll records, a list of fixed assets, organization charts, and a list of job functions performed by employees. Also, they did not want us to examine a sample of disbursements. Although the board chairman had previously agreed to allow us unfettered access to their contracts with commercial customers, the MSC counsel would not agree to allow access to original, unaltered contracts. Initially, MSC did not want us to see its financial statements or make copies, but later agreed that we could have limited access. MSC was reluctant to grant us access to the working papers of their independent CPA firm's past audits. MSC also wanted us to store our working papers in their building.

In short, we were convinced that we would not have unfettered access to the records necessary to conduct an audit. Given the constraints suggested by MSC, we did not think we would be able to assure ourselves that the University was getting a fair share of MSC resources for its financial contribution to MSC, or answer other key questions about MSC's operations.

MSC was evidently concerned about giving us access to certain information that it regards as "trade secrets." MSC has asserted that a number of specific items, some of which are in the possession of the University, are "trade secrets." If the University agrees with MSC's trade secret assertion, then data in the possession of the University must be treated as "nonpublic" data under the Data Practices Act.<sup>4</sup> We are bound to prevent the disclosure of nonpublic data that we receive in the course of our audit work. We have repeatedly assured MSC that we have procedures in place to protect the confidentiality of any nonpublic data we receive from the University, other state agencies, or private companies.<sup>5</sup> Despite these assurances, we have not been granted access to MSC's records necessary to conduct an audit.

## HOW DOES THE UNIVERSITY ENSURE ACCOUNTABILITY?

We interviewed current and former University officials who have served in the capacity of MSC Board members or officials of MSI. We were interested to

---

<sup>4</sup> See *Minn.Stat.* Sec. 13.37, Subd. 1 (b).

<sup>5</sup> MSC has maintained that the following types of information are trade secrets under the Data Practices Act:

The identity of MSC's customers other than the Regents of the University of Minnesota (the University);

The actual and proposed terms of MSC's agreements with its customers other than the University;

The actual and proposed terms of MSC's agreements with vendors of computer systems, software, components, and other business goods and services;

Summaries and compilations of usage information revealing the method of distribution of MSC's computing resources among customers or for any individual or group of customers and/or the amount of resources used by its customers;

The specific level of services granted to the University under MSC's policy of making otherwise unused resources available to the University;

MSC's business plans;

MSC's financial statements, both internal and independently audited.

determine how the University ensured that its relationship with MSC is in the University's best interest. Basically, University officials told us that the University ensures accountability of MSC through its four representatives on the MSC board. But, one of these four University-appointed board positions has been vacant for the last year, and since 1986, the University has used one of its positions to appoint MSC's president to the board. While we believe that the University officials appointed to the board have all been well intentioned, they have many other demanding responsibilities, and we are unconvinced that they have demanded sufficient accountability from MSC for the sizable investment the University has made. Moreover, we do not see how appointing the Center's president to the board helps the University ensure accountability.

Also, since most information board members receive is considered a "trade secret," it is not provided to University officials or to the Board of Regents for independent analysis. In fact, the Board of Regents, which is ultimately responsible for deciding University policy and committing University resources, does not receive basic information about MSC's performance, finances, or services to the University. For example, its recent decision to guarantee \$32 million to MSC over four years was made without examining even a financial statement from MSC. The only exception occurred earlier this year, when the Chair and Vice-Chair of the board were orally briefed on the proposed \$32 million contract between MSC and the University. They were told the approximate effective rate the University would be paying under the proposed contract. But they were not allowed to share this information with other board members or subject it to independent analysis.

---

**The University's claim that it is getting a "good deal from MSC" is open to question.**

The University officials that currently serve on MSC's board told us that they are basically satisfied with the quality and quantity of information they receive about MSC's operations. They also strongly asserted to us that the information shows that the University "is getting a good deal" in its relationship with MSC. However, we are not convinced that they have had access to information that convincingly shows the University is receiving adequate value for its service payments. For example, they were unaware of the rates that commercial clients are paying for the preferential services they receive. Also, the only analysis of University supercomputer rates that we saw is flawed.

Based on the limited information available to us, we think the University's assertion about the "good deal" it is getting from MSC is open to question. We asked University officials for all written correspondence, notes, or other materials pertaining to MSC. From our review of these materials and conversations with other supercomputer centers, we have significant questions about whether the University has received reasonable value for its service payments. But we cannot fully examine the assertion without access to MSC records. Nor can we discuss our concerns further here because the limited information we have seen is considered by MSC and the University to be a "trade secret," and we are legally bound to respect that classification.

We believe that the Board of Regents needs to be better informed about the quality and cost-effectiveness of services provided to the University by MSC.

That will require the Regents to examine some of MSC's "trade secrets" in a way that will avoid their disclosure, or it will require MSC to change its position on what information is a "trade secret." In our view, disclosing the amount of service provided to the University and the total payments made by the University for that service would not harm MSC's other business dealings and would be consistent with the practices of other supercomputer centers. Either option would enable the Regents to better monitor the University's relationship with MSC and to receive an independent assurance that the University is, indeed, getting a "good deal."

## WHAT ARE MSC'S ADVANTAGES AND DISADVANTAGES?

---

**The original reasons MSC was formed are less compelling today.**

The Legislative Audit Commission asked us to review the advantages and disadvantages of the current way the University provides supercomputing services to its researchers. After making that review, we conclude that the original reasons that MSC was formed are less compelling today than they were in 1982 or 1985. At that time, there was a tax advantage to organizing MSC as a for-profit organization, but that tax advantage disappeared in 1986. There was also a concern over unrelated business income tax (UBIT) the University might incur. UBIT must be paid by non-profit organizations, such as the University, on income they earn from operations not directly related to their tax-exempt missions. As we noted in the previous chapter, UBIT has not been an issue for other university computer centers operating supercomputers.

The other reason cited by the participants in forming MSC were complaints from private vendors of supercomputer services that the University was unfairly competing with them. This argument is also no longer pertinent since the last major private vendor of supercomputer time and consulting services, Boeing Computer Services, no longer provides commercial supercomputer services. To the extent MSC competes with anyone, it competes with other universities and government laboratories who are selling surplus computer time.

Nevertheless, there are some current advantages to leaving MSC as a for-profit company. The primary advantage that we see is the greater flexibility associated with not having to work directly through the University in personnel matters and in expenditure decisions. The University has also asserted that another advantage of the for-profit organizational form is that in the event of MSC's failure, it would not be responsible for any business liabilities. However, if MSC fails, the University will have lost its substantial investment and it will have to provide alternate means of supercomputer access for its researchers. We believe that there is the real risk that the University could be in a position where it cannot let MSC fail, therefore making it vulnerable to MSC's business liabilities over which the University says it has no direct control.

---

**Because of MSC's secrecy, it is unclear whether MSC is subsidizing its commercial clients.**

One of the major disadvantages of the for-profit organizational form is that it enables MSC to shroud its financial and administrative activities in secrecy, thus diminishing the assurance of accountability for the use of public funds. MSC has asserted that it needs to protect as a "trade secret" almost all of its financial information, including how much computer time the University receives. We have addressed the business reasons for secrecy elsewhere in the report. In short, we are skeptical that the degree of secrecy MSC asserts is necessary for business reasons. The result of the secrecy about financial information is the continual concern that the University and the state are not receiving full value for their financial contributions. The original supercomputing initiative objectives called for computer time to be made available to commercial customers on a "full cost recovery basis." Because of the secrecy, it is unclear whether all costs are recovered or if the University subsidizes commercial clients.

One disadvantage of the current organizational split between MSC and MSI is that neither organization is responsible for the technology transfer and business development activities that were part of the original concept of the supercomputer effort.

Another disadvantage of a for-profit organization, as it is currently run, is the lack of direct input from University researchers on operational and capital expenditure decisions. The for-profit form of organization allows the company to engage in activities that could be detrimental to the research needs of the University.

MSC has also frequently cited the need for secrecy to protect the identities of the clients and to protect the proprietary nature of some of the work the clients do using the center's facilities. This may be a legitimate concern, but it does not necessitate a for-profit form of organization. All the other supercomputer centers we contacted have procedures and mechanisms to protect truly proprietary work of commercial customers. It is interesting to note that the North Carolina Supercomputer Center also was very secretive about its financial dealings and its commercial clients until two or three years ago. After receiving criticism for its secretive policies, the center's governing board made information about the budget, salaries, and commercial clients public, while safeguarding any proprietary work done by commercial clients.<sup>6</sup> According to the Center's director, being open and accountable for the public funds has not presented any problems and it has boosted the confidence of the Legislature and the public in the work they are doing at the center.

## SUMMARY

Our overall conclusion is that the University has not achieved an adequate level of accountability in the way it has organized its supercomputer services.

---

<sup>6</sup> There is a procedure that can be used if there is truly a reason for confidentiality of a commercial client.

It does not hold MSC to the same standards of accountability it applies to departments and institutes that carry out other University functions, and it does not treat MSC as an independent, outside vendor. The most serious accountability issue is raised by MSC's claim, which is accepted by the University, that most information about its finances and operations needs to remain secret. As the result of this secrecy, the Board of Regents has made significant investments in MSC without any independent access to information it needs to assure that the University is receiving cost-effective supercomputing services.



# UNIVERSITY OF MINNESOTA

*Twin Cities Campus*

*Office of the Senior Vice President  
for Finance and Operations*

*301 Morrill Hall  
100 Church Street S.E.  
Minneapolis, MN 55455*

September 23, 1992 612-625-4555

James R. Nobles  
Legislative Auditor  
Office of the Legislative Auditor  
Centennial Building  
St. Paul, Minnesota 55155

Dear Jim:

We are writing in regard to the audit report on Supercomputing Services at the University of Minnesota issued by your office on September 18, 1992. Attached to this letter is an appendix that cites specific statements in the report which we believe are factually inaccurate or unsubstantiated. The University appreciates the opportunity to review this report and to provide this letter and attachments for inclusion with the report.\*

At the outset, we wish to acknowledge and voice our agreement with the importance of one of the report's primary themes, accountability. The University is accountable for its expenditure of public funds. We recognize the University's obligation to the State and we are committed to making sound and reasoned decisions regarding those expenditures for supercomputing services and all other matters. The University will study with great care the recommendations in the report for improving accountability. To the extent that we can take reasoned and reasonable actions to improve the accountability of the University, we most certainly will do so. A number of your recommendations focus on increased disclosure of information about the rates and finances of Minnesota Supercomputer Center, Inc. (MSCI). The University is in the process of evaluating that issue carefully and re-examining with MSCI the balance between increased disclosure and the corporation's concerns about protecting information which, if disclosed, might affect its viability.

The University is pleased that the audit report does not reject in principle the concept of public/private partnerships and, in fact, recognizes that they can be beneficial to the State of Minnesota. We believe the University's partnership with MSCI has greatly benefited the State and the University by providing on-site and very high level supercomputing services to University researchers, researchers at other institutions in the State, and commercial customers, and by helping to attract large University grants and contracts.

Within this context, we cannot but voice our disappointment that the report does not attempt to

\*See auditor's note at the end of this document.

appropriately convey the range, quality and impact of the University's activities in supercomputing. Significant emphasis is placed in the report on a negative evaluation of technology transfer activities (an evaluation with which we do not fully concur, although we are conscious of the need for significant improvements). But no mention is made of positive accomplishments. Among them are:

- Development, from the University supercomputing program, of the Geometry Center as a National Science Foundation funded National Science and Technology Center.
- A multitude of educational activities of the Minnesota Supercomputer Institute (MSI) in undergraduate programs, and development of graduate programs.
- National and international conferences (i.e., Oct. 11-14, The U.S.-Japan Symposium in Large Scale Computational Fluid Dynamics.

Little indication is given in the report of the activities that external funding supports due to the investments by the State that your report describes. The activities of the Army High Performance Computing Research Center are described strictly in financial terms with no mention of the real things that happen there, from the summer program for undergraduates (with over a 50% participation rate by minorities), to the number of graduate students, to the research activities. Again, the Super-Trek program developed by MSCI for the Minneapolis School District is given a characterization in the report that we do not believe is in accord with the reality of its impact; we cannot resist appending an unsolicited letter recently received from the Minneapolis Community Development Agency on this program.

We are most concerned that your report, with its emphasis on problems and concerns, not be read either as a description or as an evaluation of the activities supported by our supercomputing program. In stating this, we most certainly do not wish to imply that everything associated with our supercomputing activities is in wonderful shape; or that some things in the past could not have been done differently and, with the benefit of hindsight, indeed better. Nor do we wish to obscure conflicts and differences of expectations among individuals and organizations.

What is disappointing to us is that we do not believe that the report gives credit for how much has been accomplished in supercomputing with the resources used. Nor does the report make clear that, after a thorough audit, there are no indications of malfeasance by anyone involved with the University's supercomputing program.

As to the question raised whether MSCI is truly a private entity, the University believes that MSCI's legal status as a private for-profit corporation is clear. However, we do acknowledge that some University actions in the past may not have been entirely consistent with this private status. Those actions should be viewed as reflecting the newness of public/private partnerships when MSCI was first formed and by the evolving and maturing nature of this relationship. From its inception as a "spin-off" corporation housed in the University's computer facility at Lauderdale, through its initial occupancy of the "high technology corridor" building owned jointly by the University and the City of Minneapolis in a condominium agreement, to the present lease arrangement where the University is the sole owner of the building, MSCI's relationship with the University has changed over time. To the extent that some University transactions in the past were not fully documented or approved at the Regents level, that may have reflected financial management problems in the 1980's that we believe we have taken large steps since then to correct and which we are committed to do our utmost to prevent their recurrence.

Regarding MSCI, in particular, the University took steps prior to and independent of this audit process to establish a more "arms length" relationship with MSCI reflective of its independent status. These steps included forfeiting the chair's position on MSCI's Board and entering into the current triple net lease with MSCI, which requires the corporation to pay rent necessary to amortize the University's capital investment in the Supercomputer Center building over 20 years with interest, and to pay the costs for building maintenance, routine repairs, operation, insurance, telephone, etc. We do not agree with the report's implication that the rental agreement in force implies a subsidy by the University for MSCI. The University believes these changes should have been acknowledged and considered more prominently in the report for they indicate the evolving nature of the University's relationship with MSCI, and the University's commitment to more specific accountability for this relationship. As the partnership between the University and MSCI continues to evolve, other issues may arise and other changes may be contemplated.

The University had hoped that this audit would resolve for the public the key accountability question of whether the University is obtaining reasonable value for the money it expends to purchase supercomputing services. The report indicates that your office cannot reach a judgment about the University's assertion that it is getting a "good deal" from MSCI without access to MSCI records. We are concerned about this conclusion. The University provided information during

the course of this audit (computing services agreements and usage summaries) which would enable your office to calculate the actual unit price the University pays for supercomputing services. Although MSCI and the University have treated precise rate information as trade secret and not released it publicly, we provided it upon request to your office as the basis for evaluating whether the University is paying a reasonable price for supercomputing services. To our knowledge, MSCI has no more detailed information about the rates paid by the University than we already have provided to your office. It may be that it is extremely difficult to make precise rate comparisons between MSCI and other centers because of differences in equipment, capacity, levels of services, etc. In fact, your report acknowledges that such rate comparisons are complicated to make for this very reason. Assuming this is true, the report should not cite lack of access to MSCI records as the reason for not making a judgment about whether the University is paying a reasonable price for its services. Further, having explicitly said that it is not making rate comparisons, the report goes on to state that the University is paying above market rates for its services. We do not believe this conclusion is either accurate or substantiated.

From the data that was provided to you, you are aware that the unit cost to the University of supercomputers time was, last year, below \$200 per hour. Moreover, you are aware that this also will be the case during the coming year, even on the basis of committed resources. Furthermore, the high level of usage by the University of resources at MSCI renders moot the "high priority - low priority" arguments some attempt to make. The volume and qualitative value of the resources MSCI delivers to the University are certainly superior to the apparent offer by another center at \$200 per rate.

Regarding the report's discussion of the Minnesota Supercomputer Institute (MSI), the University agrees that granting procedures within the Institute should not create a potential for actual or perceived conflict of interest. We have no evidence of any abuse in the review or awarding of supercomputing grants, nor do we understand the audit report to make such a claim. Nevertheless, we believe it is appropriate to convene a group of MSI fellows to establish a mechanism so that all large grants be peer reviewed by a committee. To this end, the Director of MSI has been asked to undertake this task under the oversight of the University's Vice President for Research.


Moreover, we have asked Vice President for Research, Anne Peterson, to organize as soon as possible an external review of all of the University's supercomputing activities

(even though the Army High Performance Computing Research Center has just undergone such a review).

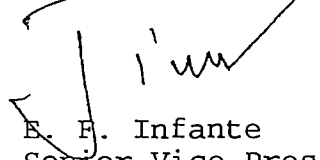
Lastly, we are actively discussing appropriate representation of the University on the Board of Directors of MSCI with the Chair of the Board of Regents and we expect to rapidly address your recommendations in this area.

Please allow us to restate that we are in the process of carefully considering the recommendations contained in your report, and to rapidly implement some of the constructive suggestions for changes regarding University operations. We are also actively engaged in discussions with the Board of Directors of MSCI about appropriate responses by the corporation to the concerns raised in your report. Finally, we wish to again voice to you our own commitment to appropriate University accountability.

Sincerely yours,



Robert O. Erickson  
Senior Vice President for  
Finance and Operations



E. F. Infante  
Senior Vice President for  
Academic Affairs and Provost

ROE/EFI/ljf  
Attachments

[Auditor's note: Due to their length, the attachments--with our response--were not included here but are available from our office as a separate document.]