The OSF Research Institute Mission Statement

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The OSF Research Institute (RI) investigates fundamental software technology needed to improve the scalability, portability, and interoperability of open systems. The RI conducts these investigations collaboratively with academia and industry. Our methodology is to develop complete prototypes that can be subjected to rigorous measurement as well as provide a platform for others to build on our work. In some cases, this includes providing a starting point for productization by early adopters. Our mission is to deliver innovation and economy: innovation by addressing difficult areas of system technology and economy by providing a vehicle for shared investment in these investigations.

Our present research is focussed on scalability. We have been pioneering a new generation of microkernel-based technology that can scale from embedded systems to massively parallel supercomputers. These systems have the potential to deliver extraordinary improvements in price/performance to end users. In addition, this new technology can be an economic one for vendors by virtue of its modularity. It is based on an extensible client/server architecture. Scalable technology also has advantages to system administrators by virtue of the seamless system image that it provides across clusters of machines both large and small. Finally, our approach to scalability includes attention to critical system properties such as real-time response, fault tolerance, high availability, and high bandwidth I/O interactions. We are architecting these fundamental system capabilities so that they can be adapted to the special needs of each user community.

Our methodology emphasizes collaboration. This is always an effective and economic working style, but it is especially appropriate for a research site concerned with open systems. We work with leading universities and cutting edge companies. For example, we selected Carnegie Mellon's Mach technology as a starting point in 1989 and have worked closely with them in the ensuing years. This collaboration has proved successful, with the results being transferred to OSF Engineering and directly to over 40 sites. We are especially pleased to collaborate with early adopters. Recently, this has included companies developing a new generation of massively parallel systems. Our technology is also being explored by various vendors as a foundation for multi-personality, low-end operating environments, for high performance, real-time systems, and for clustered computing.

The RI methodology emphasizes the development of complete system prototypes. RI prototypes synthesize ideas and code contributed by universities and leading edge companies as well as our direct efforts. They are sufficiently complete so as to reveal the effects of various architectural elements as systems are tested under conditions of significant load (where load may represent the number of processors, the size and complexity of applications, the number of simultaneous tasks, or other stress imposed by the requirement that open systems technology be scalable). We re-use high quality code from OSF Engineering whereever possible, so as to minimize later productization costs. Several companies have used RI prototypes to accelerate their product schedules.

The RI has an international perspective. Research benefits from cross-fertilization. The RI collaborates with research partners worldwide and makes its technology available on a worldwide basis. About 40% of the RI's 50+ staff members are located in Grenoble, France and the remainder are based in Cambridge, Massachusetts. The RI regularly presents its work at symposia organized for OSF members in Japan, Europe and the U.S. each year. It also acts as a communications channel between these various communities.

The RI is a highly leveraged investment. We are funded by OSF's sponsors, contracts with government agencies (DARPA and Esprit), equipment grants from vendors, and direct contracts with open systems companies. This investment is synergistic as all of it is directed at advanced systems technology. Each contributing company gets at least a factor of 10 in their investment.

The RI produces several kinds of deliverables. We produce analyses, measurements, architectural frameworks and complete system prototypes. These results are delivered to the OSF membership and the OSF Engineering organization. They may be used directly, server as the basis for an OSF technology procurement, or even provide insight into what software techniques are not productive to employ or are not yet ready to be the basis of products.

The RI's results are open. Analyses are reported to the technical community and RI prototypes are available to OSF members as unsupported code. The RI places no limitations on the use of its prototype code in products or as the basis for further research beyond those imposed by whatever licenses were required for the RI to develop this software. The RI hosts several workshops each year and presents its work regularly at conferences.

Conclusion: As the rate of change in the computer industry accelerates, there will be an ongoing need to deliver innovative products rapidly and economically. It is the RI's mission to serve this need through a cost-effective program of shared investment and open results.