CHIARO

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Dear Dr. Pitts:

Computer networks have evolved greatly over the last 10 years. From an initial view of just transferring data back and forth, today's networks should really be viewed as an extension of a single computer system to part of the symbiotic and heterogeneous architecture.

Several technologies have been the major enablers of this trend. Perhaps the most dominant is the availability of the cost effective and very high bandwidth transmission systems. Today's technologies permit transmission systems to carry data as fast if not faster, coast to coast, than previous systems provided such data transfer occurred within an integrated computer system. This last point is important—*within an integrated computer system.* Long haul fiber optic systems provided integrated hardware architecture. What is now needed is integrated software architecture to efficiently manage and provide access to geographically distributed data and applications.

If we look back to the 1980's, hardware supercomputer architectures were developed by many organizations. There were vector, very long word (VLIW), and massively parallel. But the main differentiation turned out to be ease of use, generality, and the ability to optimize user cycles as well as processor cycles. In contemporary systems, we need to apply the same efforts to large, distributed heterogeneous computing.

We need to simplify the use in the same way the World Wide Web simplified information sharing over the Internet. This requires research in many areas. These areas include:

● Software architectures that facilitate information flow among applications, libraries, compilers linkers, and runtime systems.

● Software technologies that support development and execution of performance-efficient grid applications. Among these technologies are: scheduling, resource discovery, and communications.

● Mathematical and data structure libraries for applications including numerical methods for control of accuracy and tolerant of the network latency.

● Languages, compilers, and environments that support the creation and maintenance of applications.

● New science and engineering applications that can take advantage of the new technologies as they are developed.

The objectives of the CGrADS proposal meet and exceed the objectives outlined above. In evaluating this proposal, the quality of the principal investigators (PI) must also be assessed. The accomplishments of the participating PI's would fill a book. The title of this book would be: *The Pioneers of the New Information Age in the 1980's and 1990's*. It is clear that with the establishment and full support of the CGrADS center, the title of a new book can become: *The Pioneers of Distributed Infrastructure; Hardware and Software Information Age*

Chiaro Networks will collaborate with CGrADS in many ways. One way will be assistance in understanding and utilizing the underlying networks and their topologies. Chiaro will also provide technical support and evaluation in areas such as: protocol development, security, and performance measurements.

Sincerely,

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