Office of Science
Notice 99-09

Next Generation Internet
Applications, Network Technology, and Network Testbed Partnerships

Department of Energy
Office of Science

Office of Science Financial Assistance Program Notice 99-09;
Next Generation Internet--Applications, Network Technology, and Network Testbed Partnerships

Agency: U.S. Department of Energy

Action: Notice inviting research grant applications.

SUMMARY: The Office of Advanced Scientific Computing Research (OASCR) of the Office of Science (SC), U.S. Department of Energy (DOE), hereby announces its interest in receiving applications for the Next Generation Internet Applications, Network Technology, and Network Testbed Partnerships program. The Next Generation Internet (NGI) is a multi-agency federal research and development program to develop, test, and demonstrate advanced networking technologies and applications. This particular research notice invites research applications for Applications, Network Technology, and Network Testbed Partnerships to focus on integrating advanced applications with leading edge network research to test wide area data intensive collaborative computing technologies through partnerships between the developers of applications and network researchers.

DATES: Applicants are encouraged to submit a brief preapplication. All preapplications, referencing Program Notice 99-09, should be received by DOE by 4:30 P.M., E.S.T., February 12, 1999. A response to the preapplications discussing the potential program relevance and encouraging or discouraging a formal application generally will be communicated within several days of receipt.

Formal applications submitted in response to this notice must be received by 4:30 P.M., E.S.T., March 31, 1999, in order to be accepted for merit review and to permit timely consideration for award in fiscal year 1999.

ADDRESSES: Preapplications, referencing Program Notice 99-09, should be sent by E-mail to scott@er.doe.gov.

Formal applications, referencing Program Notice 99-09, should be sent to: U.S. Department of Energy, Office of Science, Grants and Contracts Division, SC-64, 19901 Germantown Road, Germantown, MD 20874-1290, ATTN: Program Notice 99-09. This address must also be used when submitting applications by U.S. Postal Service Express Mail, any other commercial overnight delivery service, or when hand-carried by the applicant. An original and seven copies of the application must be submitted.

FOR FURTHER INFORMATION CONTACT: Mary Anne Scott, Office of Science, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290, telephone: (301) 903-6368, E-mail: scott@er.doe.gov, fax: (301) 903-7774. The full text of Program Notice 99-09 is available via the Internet using the following web site address: http://www.er.doe.gov/production/grants/grants.html

SUPPLEMENTARY INFORMATION:

The NGI initiative is a multi-agency Federal research and development (R&D) program that is developing advanced networking technologies, developing revolutionary applications that require advanced networking, and demonstrating these capabilities on testbeds that are 100 to 1,000 times faster end-to-end than today's Internet. Partnerships among academia, industry, and governments (Federal, state, local, and foreign) that will keep the U.S. at the cutting-edge of information and communications technologies are encouraged. (Details on submitting applications involving partnerships can be found in the Application Guide for the Office of Science Financial Assistance Program referenced below). The strategic R&D investments are coordinated across the agencies involved and are focused to produce an environment where advanced networking R&D breakthroughs are possible. Information concerning NGI can be found at http://www.ngi.gov/.

Topic Details

DOE's current core programs in network and application research are intended to enhance the Department's ability to satisfy mission requirements through advanced technologies such as distributed computing, national collaboratories, remote access to facilities, and remote access to petabyte-scale datasets with complex internal structure. The DOE NGI Applications, Network Technology and Network Testbed Partnerships research will focus on integrating advanced applications with leading edge network research to test wide area data intensive and collaborative computing technologies. The objective of this research is to enable more efficient and smarter use of network

resources, as well as to support higher speeds (that is, end-to-end capacity). The DOE encourages the submission of applications for Applications, Network Technology and Network Testbed Partnerships to address the issues and challenges required to create persistent wide area data intensive and collaborative computing testbed networks. These partnerships should combine the efforts of applications programmers, middleware developers, and network researchers to create persistent testbed networks that can support the diverse set of DOE mission critical applications described below.

The important issues for applications programmers are:

- Support for advanced applications that address the needs of the DOE community including, but not limited to, distributed visualization of large data sets, remote access to Petabyte scale data archives of high energy physics experiments, and distributed collaborations to study functional genomics.
- Definition of what network services (e.g., bandwidth, latency, QoS) are required.
- Definition of what middleware services are required to permit these applications to effectively run over wide area networks.

The important issues for the middleware developers are:

- Provide a rich set of features that applications can select and use to obtain the level of service they need to operate.
- Define the features and the API's necessary to allow the application and middleware to communicate.
- Define the specific network service calls that properly provision the underlying network for the applications needs.
- Tight integration of the middleware API's with the applications and also the physical services provided by the network layer.

The important issues for the network researchers are:

- Integration of SAN, LAN, MAN, and WAN technologies to create distributed collaboratories.
- High performance network interfaces for super-computers to enable Gbps data rates between communicating applications.
- Management and control of network components (e.g., routers, switches, WDM's) to dynamically change network configurations in reasonable time frames (minutes to hours).
- Integration of Differentiated Services, or other Quality of Service functions, into wide area networks.

- Integration of these new technologies into the existing production networks as rapidly as possible without compromising the existing production network services.

Running advanced applications over leading edge networks in a persistent manner requires research and development in many areas. It also requires the joint efforts of applications programmers, middleware developers, and network researchers to create persistent testbed networks that can support the diverse set of goals described above. This program notice seeks joint applications from these three communities to form partnerships to address the issues and challenges required to create these persistent wide area data intensive and collaborative computing testbed networks. Software tools developed are expected to interoperate with existing middleware tools as well as those under development.

Program Funding

It is anticipated that up to $4 million will be available for multiple awards to be made in FY 1999 in the categories described above, contingent on the availability of appropriated funds. Applications may request project support up to three years, with out-year support contingent on the availability of funds, progress of the research, and programmatic needs. Annual budgets are expected to range from $1,500,000 to $2,000,000 total costs.

Preapplications

A brief preapplication may be submitted. The preapplication should identify on the cover sheet the institution, Principal Investigator name, address, telephone, fax and E-mail address, title of the project, and the field of scientific research. The preapplication should consist of a two to three page narrative describing the research project objectives and methods of accomplishment. These will be reviewed relative to the scope and research needs of the Next Generation Internet University Network Technology Testbeds Program.

Preapplications are strongly encouraged but not required prior to submission of a full application. Please note that notification of a successful preapplication is not an indication that an award will be made in response to the formal application.

Applications will be subjected to scientific merit review (peer review) and will be evaluated against the following evaluation criteria listed in descending order of importance as codified at 10 CFR 605.10(d):

1. Scientific and/or Technical Merit of the Project,
2. Appropriateness of the Proposed Method or Approach,
3. Competency of Applicant's Personnel and Adequacy of Proposed Resources,
4. Reasonableness and Appropriateness of the Proposed Budget.

The evaluation will include program policy factors such as the relevance of the proposed research to the terms of the announcement and an agency's programmatic needs. Note, external peer reviewers are selected with regard to both their scientific expertise and the absence of conflict-of-interest issues. Non-federal reviewers may be used, and submission of an application constitutes agreement that this is acceptable to the investigator(s) and the submitting institution.

Information about the development and submission of applications, eligibility, limitations, evaluation, selection process, and other policies and procedures may be found in 10 CFR Part 605, and in the Application Guide for the Office of Science Financial Assistance Program. Electronic access to the Guide and required forms is made available via the World Wide Web at: http://www.er.doe.gov/production/grants/grants.html. The Project Description must be 20 pages or less, exclusive of attachments. The application must contain an abstract or project summary, letters of intent from collaborators, and short vitaes.

The Catalog of Federal Domestic Assistance Number for this program is 81.049, and the solicitation control number is ERFAP 10 CFR Part 605.

John Rodney Clark
Associate Director of Science
for Resource Management

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