

Office of Science
Notice 99-08

Next Generation Internet
Research in Basic Technologies

Department of Energy
Office of Science

Office of Science Financial Assistance Program Notice 99-08;
Next Generation Internet Research in Basic Technologies

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 Research in Basic Technologies 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 innovative, fundamental networking research to support DOE-specific activities that include, but are not limited to, very high speed interfaces to connect devices to networks; protocols and techniques for coordinating multiple, heterogeneous network-attached devices; software to allow applications to adapt to changing network conditions; and network performance characterization.

DATES: Applicants are encouraged to submit a brief preapplication. All preapplications, referencing Program Notice 99-08, 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 99-08, should be sent by E-mail to hitchcock@er.doe.gov.

Formal applications, referencing Program Notice 99-08, 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 99-08. 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: Dan Hitchcock, Office of Science, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290, telephone: (301) 903-6767, E-mail: hitchcock@er.doe.gov, fax: (301) 903-7774. The full text of Program Notice 99-08 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 network research described in this notice will focus on developing network-aware middleware and application friendly tools and capabilities for its applications, as well as continuing research in high speed end system interfaces, network management, and differentiated services. 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 innovative, fundamental networking research. The DOE particularly encourages research in the following areas:

- Congestion and flow control techniques to provide applications with easy-to-use tools, capabilities, and interfaces that make efficient use of advanced infrastructure; for example, reliable ordered multicast.
- Multi-gigabit end system interfaces, analyzers, and switches along with mechanisms to reduce operating system overhead for data transfers.
- Protocols and techniques for coordinating multiple, heterogeneous network-attached devices.
- Techniques to support secure and fair user access to and use of network resources, provide secure inter-network peering, perform accounting/costing, and provide secure access to on-line facilities.
- Mechanisms to provide application controlled Class of Service and Quality of Service.
- Techniques for IP, ATM, and WDM network monitoring and analysis.
- Application-friendly, network-aware middleware to provide IP, ATM, and WDM resource and admission control, scheduling, management, prioritization, accounting (such as bidding and costing), authentication, analysis, monitoring, assurance and debugging mechanisms.

A theme common to these research topics is the development of "network aware" and infrastructure manipulating software in middleware, including libraries, system software and tools, that will be available to the application through easy-to-use-application interfaces. Research may focus on providing the "network aware" middleware support required by DOE applications. These applications will be heavily collaborative in nature and will concurrently use distributed resources such as supercomputers, high end storage systems with extremely large scientific data sets, unique on-line facilities, and massive, multi-dimensional datasets in tele-immersive environments. 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 \$2 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 \$200,000 to \$300,000 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 Research in Basic Technologies 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 vitae.

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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