

Campus Cyberinfrastructure - Data, Networking, and Innovation Program (CC*DNI)

PROGRAM SOLICITATION

NSF 15-534

REPLACES DOCUMENT(S):
NSF 14-521, NSF 14-530



National Science Foundation

Directorate for Computer & Information Science & Engineering
Division of Advanced Cyberinfrastructure
Division of Computer and Network Systems

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

March 24, 2015

IMPORTANT INFORMATION AND REVISION NOTES

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 15-1), which is effective for proposals submitted, or due, on or after December 26, 2014. The PAPPG is consistent with, and, implements the new Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance) (2 CFR § 200).

Campus Cyberinfrastructure – Data, Networking, and Innovation (CC*DNI) highlights the integration between data and networking elements of cyberinfrastructure.

The following modifications have been made:

- The solicitation name has changed from CC*IIE to CC*DNI, to reflect the emphasis on integration of data and network infrastructure activities, while maintaining areas of direct investment in campus networking infrastructure and innovation;
- Incorporates into one program solicitation the Campus Cyberinfrastructure program and the Data Infrastructure Building Blocks (DIBBs) - Multi-Campus/Multi-Institution Model Implementations program that was previously Program Solicitation NSF 14-530;
- An "Identity and Access Management" area has been removed; and
- An "Instrument Networking" area has been added.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised NSF Proposal & Award Policies & Procedures Guide (PAPPG) (NSF 15-1), which is effective for proposals submitted, or due, on or after December 26, 2014. The PAPPG is consistent with, and, implements the new Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance) (2 CFR § 200).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Campus Cyberinfrastructure - Data, Networking, and Innovation Program (CC*DNI)

Synopsis of Program:

The Campus Cyberinfrastructure - Data, Networking, and Innovation (CC*DNI) program invests in campus-level data and networking infrastructure and integration activities tied to achieving higher levels of performance, reliability and predictability for science applications and distributed research projects. Science-driven requirements are the primary motivation for any proposed activity.

CC*DNI awards will be made in seven areas:

1. Data Infrastructure Building Blocks (DIBBs) - Multi-Campus/Multi-Institution Model Implementations awards will be supported at up to \$5,000,000 total for up to 5 years.
2. Data Driven Networking Infrastructure for the Campus and Researcher awards will be supported at up to \$500,000 total for up to 2 years.
3. Network Design and Implementation for Small Institutions awards will be supported at up to \$350,000 total for up to 2 years.
4. Network Integration and Applied Innovation awards will be supported at up to \$1,000,000 total for up to 2 years.
5. Campus CI Engineer awards will be made at up to \$400,000 total for up to 2 years.
6. Regional Coordination and Partnership in Advanced Networking awards will be made at up to \$150,000

- for up to 2 years.
7. Instrument Networking awards will be supported at up to \$400,000 for up to two years.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Kevin Thompson, ACI Program Director, telephone: (703) 292-4220, email: CCDNIQueries@nsf.gov
- Joseph B. Lyles, CNS Program Director, telephone: (703) 292-7152, email: CCDNIQueries@nsf.gov
- Bob Chadduck, ACI Program Director, telephone: (703) 292-2247, email: CCDNIQueries@nsf.gov
- Amy Walton, ACI Program Director, telephone: (703) 292-4538, email: CCDNIQueries@nsf.gov
- Anita Nikolich, ACI Program Director, telephone: (703) 292-4551, email: CCDNIQueries@nsf.gov

Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.070 --- Computer and Information Science and Engineering

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant or Cooperative Agreement

Estimated Number of Awards: 25 to 47

Anticipated Funding Amount: \$23,000,000 to \$28,000,000

Funding will span the following seven areas:

1. Data Infrastructure Building Blocks (DIBBs) - Multi-Campus/Multi-Institution Model Implementations awards will be supported at up to \$5,000,000 total for up to 5 years.
2. Data Driven Networking Infrastructure for the Campus and Researcher awards will be supported up to \$500,000 total for up to 2 years.
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4. Network Integration and Applied Innovation awards will be supported up to \$1,000,000 total for up to 2 years.
5. Campus CI Engineer awards will be supported up to \$400,000 total for up to 2 years.
6. Regional Coordination and Partnership in Advanced Networking awards will be made at up to \$150,000 for up to 2 years.
7. Instrument Networking awards will be made at up to \$400,000 for up to 2 years.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI: 1

An individual may serve in the Principal Investigator role on no more than one proposal. **This eligibility constraint will be strictly enforced in order to treat everyone fairly and consistently.** In the event that an individual exceeds this limit, proposals received within the limit will be accepted based on the earliest date and time of proposal submission (i.e., the first proposal received will be accepted and the remainder will be returned without review). **No exceptions will be made.**

There is no limit on number of proposals on which an individual may be listed as co-PI.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
 - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant

Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.

- Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

March 24, 2015

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Standard NSF award conditions apply.

Reporting Requirements: Standard NSF reporting requirements apply.

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I. INTRODUCTION

Campuses today face challenges across multiple levels of Cyberinfrastructure (CI), where meeting the needs of scientific research and education goes far beyond the networking layer in capacity and services, and extends to computing, data services, secure and trustworthy systems, and especially human expertise, collaboration and knowledge sharing. Recognition of the "data driven" nature of scientific advancement and discovery has led to an increased focus in addressing the data challenges posed by the NSF research and education community.

NSF has a rich history of investment in domestic and international networking support for research and education. In recent years, NSF has addressed the growing requirements of the NSF community, and opportunities to innovate, in networking infrastructure through the Campus Cyberinfrastructure program. The Campus Cyberinfrastructure - Network Infrastructure and Engineering Program (CC-NIE) program in 2012 and 2013 focused on campus networking upgrades and re-architecting, and innovative

development and integration of new networking capabilities in support of driving scientific application requirements. The Campus Cyberinfrastructure - Infrastructure, Innovation and Engineering Program (CC*IIIE) program in 2014 expanded these themes to include campus network-related activities including regional coordination, identity management integration and professional engineering support. The program also presented the network research community opportunities to apply successful research outcomes to campus network environments.

The Data Infrastructure Building Blocks (DIBBs) program (see https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504776) has reflected NSF's response to data challenges by encouraging development of robust and shared data-centric cyberinfrastructure capabilities to accelerate interdisciplinary and collaborative research in areas of inquiry stimulated by data. While challenges remain in campus networking infrastructure, opportunities to leverage high performance network paths among campuses today include the integration of new data services, capabilities, and resources directly tied to, and enabling, scientific collaboration.

The Campus Cyberinfrastructure - Data, Networking, and Innovation (CC*DNI) program invests in data and networking infrastructure and integration activities at the campus and regional level, to support a range of scientific data management, transfers and movement. The program also supports Network Integration activities tied to achieving higher levels of performance, reliability and predictability for science applications and distributed research projects.

CC*DNI awards will be made in seven areas:

1. Data Infrastructure Building Blocks (DIBBs) - Multi-Campus/Multi-Institution Model Implementations awards will be supported at up to \$5,000,000 total for up to 5 years.
2. Data Driven Networking Infrastructure for the Campus and Researcher awards will be supported at up to \$500,000 total for up to 2 years.
3. Network Design and Implementation for Small Institutions awards will be supported at up to \$350,000 total for up to 2 years.
4. Network Integration and Applied Innovation awards will be supported at up to \$1,000,000 total for up to 2 years.
5. Campus CI Engineer awards will be made at up to \$400,000 total for up to 2 years.
6. Regional Coordination and Partnership in Advanced Networking awards will be made at up to \$150,000 for up to 2 years.
7. Instrument Networking awards will be supported at up to \$400,000 for up to 2 years.

II. PROGRAM DESCRIPTION

Program-wide Criteria

Science-driven requirements are the primary motivation for any proposed activity. Proposals will be evaluated on the strength of the science enabled (including research and education) as drivers for innovation in data and networking cyberinfrastructure.

A common theme across all aspects of the CC*DNI program is the critical importance of the partnership among campus level CI experts, including the campus Information Technology (IT)/networking/data organization, contributing domain scientists, researchers and research groups and educators necessary to engage in, and drive, new network and data-centric capabilities in support of scientific discovery. Proposals across the program should reflect and demonstrate this partnership on campus. Proposals will be evaluated on the strength of institutional partnerships, as they are expected to play a central role in developing and implementing the eventual network and data infrastructure upgrades.

All proposals into the CC*DNI program must include a Campus Cyberinfrastructure (CI) plan within which the proposed data and network infrastructure improvements are conceived, designed, and implemented in the context of a coherent campus-wide strategy and approach to CI that is integrated horizontally intra-campus and vertically with regional and national CI investments and best practices. This Campus CI plan must be included as a supplementary document and is limited to no more than 5 pages. Further, proposals are expected to address within the Campus CI plan the sustainability of the proposed work in terms of ongoing operational and engineering costs. The plan should also describe campus IPv6 deployment and use of the In Common Federation global federated system, and if applicable, campus federation approaches to supporting scientific Virtual Organizations. Also, for proposals into the Data Driven Networking Infrastructure for the Campus and Researcher area, the Campus CI plan should address efforts to prevent IP spoofing by potential adoption of "BCP 38". If it is determined that "BCP 38" cannot be deployed due to cost or technical reasons, discussing those reasons is an acceptable form of addressing the issue. More information on this technique can be found at <http://spoofer.cmand.org/index.php>. Proposers are encouraged to test their campuses with the "spoofer" tool, available through the same web site, in ascertaining the current status of IP spoofing prevention in their networks. A web site, at <http://fasterdata.es.net/campusCIplanning/>, contains a number of Campus CI plans provided by existing CC-NIE program awardees as examples.

As a campus CI program, funded activities represent ongoing opportunities for student engagement, education, and training.

Note: Equipment requests for computing resources in this solicitation are allowed only as part of a ScienceDMZ, with appropriate justification. (See <http://fasterdata.es.net/fasterdata/science-dmz/> for more information on the Science DMZ approach.)

Program Areas

The Campus Cyberinfrastructure - Data, Networking, and Innovation (CC*DNI) program welcomes proposals in seven areas: (1) Data Infrastructure Building Blocks (DIBBs) - Multi-Campus/Multi-Institution Model Implementations; (2) Data Driven Networking Infrastructure for the Campus and Researcher; (3) Network Design and Implementation for Small Institutions; (4) Network Integration and Applied Innovation; (5) Campus CI Engineer; (6) Regional Coordination and Partnership in Advanced Networking; and (7) Instrument Networking. These are described in detail below.

(1) Data Infrastructure Building Blocks (DIBBs) - Multi-Campus/Multi-Institution Model Implementations

These awards emphasize the value of sharing data beyond a specific institution to the wider science, engineering, and education communities. This category invests in multi-campus and/or multi-institutional regional cyberinfrastructure, to leverage high performance network paths among campuses to enable integration of new data-focused services, capabilities, and resources to advance scientific discoveries, collaborations and innovations.

Awards will serve as models for potential future national scale network-aware data-focused cyberinfrastructure attributes, approaches, and capabilities. These investments are expected to serve as evaluative resources, leveraging and integrating with existing campus cyberinfrastructure, while developments in sustainability, policy, national scale access, and relevance to advance "data driven" scientific advancements and discoveries continue to evolve.

NSF strongly urges the community to think broadly and not simply rely on traditional models when considering multi-campus and/or multi-institutional regional cyberinfrastructure, for example with respect to general research infrastructure, including distributed network accessible services, data and/or computational resources.

Awards are expected to be science-driven, demonstrating a strong and credible connection to the multi-campus, multi-institutional, and/or regional scientific communities that they serve. Proposals must provide a compelling case for significant impact on the multi-campus, multi-institutional and/or regional scientific environment through direct engagements. Proposals must also specify how adoption and usage will be measured and monitored, and how effectiveness of the resulting cyberinfrastructure implementation will be assessed.

As model implementations that potentially drive future national scale cyberinfrastructure, proposals are expected to:

- Address integrated, end-to-end approaches and methods for assured federated access;
- Explicitly address the integration of innovative, high performance, end-to-end networking services to provide effective, optimized processing and sustainable throughput of ultra-large, heterogeneous data collections across the demonstrated network and associated full system(s) processing data path;
- Be responsive to multi-institution/regional caliber data preservation and access lifecycles, including acquisition; documentation; security and integrity; storage; access, analysis and dissemination; migration and deaccession.

Proposed activities will require collaborations across a range of disciplines, including participating institutions' information technology (IT), networking, available general research infrastructure, data, CI organizations, contributing domain scientists, researchers and educators. Proposals must document explicit partnerships and collaborations.

Note: This category is not the appropriate mechanism for obtaining support for individual faculty research projects. Requests for support of such projects should be directed to NSF's research grant programs.

As a campus CI program, funded activities represent ongoing opportunities for student engagement, education, and training, including the preparation of computer scientists for data science challenges.

Awards in this category are anticipated to be in the form of cooperative agreements. Proposals must identify a lead institution.

Additional proposal preparation guidance for this category can be found in Section V.A. Proposal Preparation Instructions.

Universities and colleges are eligible to submit proposals in this program area. Proposals in this area require titles that begin with "CC*DNI DIBBs:" followed by the title of the project.

(2) Data Driven Networking Infrastructure for the Campus and Researcher

Proposals submitted to this area should address network infrastructure improvements at the campus level to enable national and global high-performance end-to-end access to dynamic network services that in turn enable rapid, unimpeded movement of diverse and distributed scientific data sets and advanced computing. These networking improvements include, but are not limited to, the following types of activities:

- Network upgrades within a campus network to support a wide range of science data flows (including large files, distributed data, sensor networks, real-time data sources, and virtualized instruments for computer systems research);
- Re-architecting a campus network to support large science data flows, for example, by designing and building a Science DMZ (see <http://fasterdata.es.net/fasterdata/science-dmz/> for more information on the Science DMZ approach); and/or
- A network connection upgrade for the campus connection to a regional optical exchange or point-of-presence that connects to Internet2.

Proposals must address scientific and engineering project and application drivers that require network engineering or upgrades of their existing infrastructure. Proposals must also present project-specific end-to-end scenarios for data movement, distributed computing, and other end-to-end services driving the networking upgrade. Proposals are strongly encouraged to include in their description of data movement scenarios and use cases a quantitative element, for example providing current or historical data flow rates. Proposals should consider expected outcomes; they should explain the compelling need for proposed network improvements in light of current conditions and expected enabling benefits to identified science drivers and applications. Inclusion of itemized vendor quotes is required for all proposals in this program area.

Proposals must include a summary table of the science drivers and their network requirements – these requirements may be specified in terms of throughput ranges or as part of a composition or workflow profile for repeating cycles of scientific data movement.

Proposals are encouraged, but not required, to include a network diagram of the proposed network upgrades. Proposals are encouraged to document current utilization in the context of the proposed upgrades.

Proposals are expected to describe an approach to end-to-end network performance measurement based on the perfSonar framework with associated tool installation and use; proposals may describe an alternative approach to perfSonar with sufficient justification. Proposers are encouraged to reference the following community web site for more information on perfSonar: <http://fasterdata.es.net/performance-testing/perfsonar/>.

Proposals asking for significant funding of storage assets are encouraged to consider proposing instead into the DIBBS - Multi-Campus/Multi-Institution Model Implementations area.

An award in this program area is not the appropriate mechanism to provide support for individual faculty research projects. Requests for support of such projects should be directed to NSF's research grant programs.

Additional proposal preparation guidance for this category can be found in Section V.A. Proposal Preparation Instructions.

Current CC*IIIE awardees in program areas (2) - (6) are not encouraged to apply this year in the program area for which they currently have an award.

Universities and colleges are eligible to submit proposals in this program area. Proposals in this area are required to have titles that begin with "CC*DNI Networking Infrastructure:" followed by the title of the project.

(3) Network Design and Implementation for Small Institutions

This area supports smaller institutions with fundamental challenges to address in networking infrastructure and resources. Guidance for proposals is similar to the Data Driven Networking Infrastructure for the Campus and Researcher area but with fewer required components as described below.

Proposals submitted to this area should address network infrastructure improvements at the campus level to enable national and global high-performance end-to-end access to dynamic network services that in turn enable rapid, unimpeded movement of diverse and distributed scientific data sets and advanced distributed computing. These networking improvements include, but are not limited to, the following types of activities:

- Network upgrades within a campus network to support a wide range of science data flows (including large files, distributed data, sensor networks, real-time data sources, and virtualized instruments for computer systems research);
- Re-architecting a campus network to support large science data flows, for example by designing and building a Science DMZ (see <http://fasterdata.es.net/fasterdata/science-dmz/> for more information on the Science DMZ approach); and/or
- Network connection upgrade for the campus connection to a regional optical exchange or point-of-presence that connects to Internet2.

Proposals must address scientific and engineering project and application drivers that require network engineering or upgrades of their existing infrastructure. Proposals must also present project-specific end-to-end scenarios for data movement, distributed computing, and other end-to-end services driving the networking upgrade. Proposals are strongly encouraged to include in their description of data movement scenarios and use cases a quantitative element, for example providing current or historical data flow rates. Proposals should consider expected outcomes; they should explain the compelling need for proposed network improvements in light of current conditions and expected enabling benefits to identified science drivers and applications.

Proposals in this area are not required to present a complete technical design and may choose to defer technical solutions and equipment purchases to the second year of activities. Therefore, vendor quotes are not required for this program area. Under this scenario, the year 1 annual report is required to provide these details with NSF approval, prior to expenditures in year 2. The NSF approval of the annual report is also subject to a successful review before the end of the first year of the technical design developed. Equipment is not expected to be fully specified in the budget; however equipment choices will be specified in the annual report and review.

Proposals in this area are required to partner with a leadership institution in their jurisdiction or region, and at a minimum are expected to actively participate in CC*DNI related community events and engineering exchanges, especially in the first year while developing the technical solution. The partnering institution's engagement activities may be supported in the proposal and included as a sub-award or non-lead proposal.

Note that proposals will be evaluated mainly on the strength of the science use cases presented - including research and education - and their quantification. Proposals will also be evaluated on the strength of institutional partnerships as they are expected to play a central role in developing and implementing the eventual network upgrades.

Proposals must include a summary table of the science drivers and their network requirements – these requirements may be specified in terms of throughput ranges or as part of a composition or workflow profile for repeating cycles of scientific data movement.

Proposals are required to include a conceptual or functional network diagram of the proposed network upgrades and are encouraged to include the context of end system and user connectivity. Proposals are encouraged to document current utilization in the context of the proposed upgrades.

Proposals must include a Project Plan addressing in its goals and milestones the end result of a working system in the target environment. Proposals are encouraged to address end-to-end networking performance in considering metrics of success.

All proposals in this area must document explicit partnerships or collaborations with the campus Information Technology (IT)/networking organization, as well as one or more domain scientists, research groups, and educators in need of the new network capabilities. Partnership documentation from personnel not included in the proposal as PI, Co-PI, or Senior Personnel should be in the form of a letter of collaboration located in the supplementary documents section of the proposal. Proposals are expected to describe an approach to end-to-end network performance measurement based on the perfSonar framework with associated tool installation and use; proposals may describe an alternative approach to perfSonar with sufficient justification. Proposers are encouraged to reference the following community web site for more information on perfSonar: <http://fasterdata.es.net/performance-testing/perfsonar/>.

An award in this program area is not the appropriate mechanism to provide support for individual faculty research projects. Requests for support of such projects should be directed to NSF's research grant programs.

Target environments must be campus infrastructure residing within the U.S.

Additional proposal preparation guidance for this category can be found in Section V.A. Proposal Preparation Instructions.

Current CC*IE awardees in program areas (2) - (6) are not encouraged to apply this year in the program area for which they currently have an award.

Universities and colleges are eligible to submit proposals in this area. Proposals in this area are required to have titles that begin with "CC*DNI Campus Design:" followed by the title of the project.

(4) Network Integration and Applied Innovation

This program area supports end-to-end network CI through integration of existing and new technologies and applied innovation. The goal is to take advantage of research results, prototypes, and emerging innovations to use them to enable specified researchers in a networking context. Proposals in this area may leverage new and existing investments in network infrastructure, services, and tools by combining or extending capabilities to work as part of the CI environment used by scientific applications and users.

Unlike proposals directed to the "Data Driven Networking Infrastructure for the Campus and Researcher" program area that focus primarily on equipment-based data networking improvements, proposals in this area support the development and integration of innovative networking capabilities; network-related software development and deployment activities resulting in an operational environment prototype are expected to be part of the proposed activities.

A broad range of activities is covered by this area, including but not limited to:

- Integration of networking protocols and technologies with application layer code and processes;
- Transition of successful research prototypes in Software Defined Networking (SDN), activities supported by NSF's Global Environment for Network Innovations (GENI) Project and Future Internet Architectures (FIA) program, and others, to distributed scientific environments and campus infrastructure;
- Innovative network solutions to problems driven by distributed computing and storage systems including cloud services;
- Federation-based security solutions for dynamic network services extending end-to-end; and/or

- Network engineering support through the creation and application of new and novel procedures and tools for solving end-to-end network performance issues, especially for dynamically constructed network services.

Proposals in this area must identify one or more supported science or engineering research projects or applications and describe how the proposed network integration activities will support those projects, particularly in the context of addressing data movement, throughput, and predictable performance end-to-end.

Additional proposal preparation guidance for this category can be found in Section V.A. Proposal Preparation Instructions.

Current CC*IE awardees in program areas (2) - (6) are not encouraged to apply this year in the program area for which they currently have an award.

Universities and colleges are eligible to submit proposals in this area. Proposals in this area require titles that begin with "CC*DNI Integration:" followed by the title of the project.

(5) Campus CI Engineer

This program area recognizes the enabling role of technical expertise, leadership, and engagement at the campus level in the successful research and educational pursuits across the NSF community. NSF views the Campus CI Engineer as an emerging professional role responding to current needs and opportunities in advancing scientific discovery. This special function is not merely a research support role, but rather an integrative one that centers on partnering with research projects within the campus and across campuses on shared goals. Proposals in this area should describe the institutional need for a campus cyberinfrastructure engineer and should describe planned engagement activities in multiple science and engineering projects on campus, including plans to leverage existing campus cyberinfrastructure. Proposals may describe focused areas of expertise, such as networking, distributed data management, or scientific computing. Proposals must request one full-time equivalent (FTE) for up to two years. Proposals are expected to address institutionalization of this type of activity/position in the longer term through discussion of a sustainability plan.

Additional proposal preparation guidance for this category can be found in Section V.A. Proposal Preparation Instructions.

Current CC*IE awardees in program areas (2) - (6) are not encouraged to apply this year in the program area for which they currently have an award.

Universities and colleges are eligible to submit proposals in this area. Proposals in this area require titles that begin with "CC*DNI Engineer:" followed by the title of the project.

(6) Regional Coordination and Partnership in Advanced Networking

This program area seeks to build regional centers for community building, coordination and partnership through leadership activities at institutions whose expertise and resources in advanced network engineering can be leveraged and applied to partnering with other local and regional institutions. Proposals in this area should describe: the approach to providing a focused set of resources for regional support of advanced research and education networking; the institutional capacity and expertise in campus networking; the planned outreach and engagement activities in their jurisdiction or region - especially to smaller colleges and universities - and interactions with other regions and national entities such as Internet2; and other institutional partners. These partners may, for example, be current and future proposers at smaller institutions and in EPSCoR jurisdictions. Proposed activities should emphasize sustainability and science engagement and are encouraged to include both researchers and engineers, especially those engaged in exemplar research and education activities. Activities may include workshops and meetings, as well as direct support on network design and implementation; and network performance measurement and analysis. Planned activities should consider the dissemination of advanced networking techniques, building bridges to distributed science communities, and potential tailoring of advanced networking solutions to problems faced by science projects and communities. Proposals should address deliverables and define their measures of success, including the potential for documenting significant improvements in end-to-end and campus-to-campus network performance improvements.

Proposals in this area are required to have their campus CI plan represent a regional CI plan, as opposed to a single campus. These regional plans have an opportunity to convey a future vision of inter-campus cyberinfrastructure in support of distributed scientific research and education.

Additional proposal preparation guidance for this category can be found in Section V.A. Proposal Preparation Instructions.

Current CC*IE awardees in program areas (2) - (6) are not encouraged to apply this year in the program area for which they currently have an award.

Non-profit organizations are eligible to submit proposals in this area. Universities and colleges are eligible to submit proposals in this area. In particular, proposals are encouraged from regional network organizations and consortiums representing and serving the networking needs of academic institutions within a designated region of the U.S. Proposals in this area require titles that begin with "CC*DNI Region:" followed by the title of the project.

(7) Instrument Networking

This program area recognizes scientific instruments as a first-class element in research infrastructure with the resulting need to establish high performance reliable networking connectivity and integration. Proposals in this area should describe the pivotal role of the scientific instrument or instruments in need of improved network connectivity and integration. Each instrument description should include a quantitative profile of data requirements driving the networking improvements. Proposals may request funds for new and upgraded network connectivity, or the development of tools, techniques, and frameworks for network integration of instruments based on one or more specific examples. Proposals describing new approaches to network integration of instruments are challenged to describe how those approaches can be applied to other sets of instruments in the NSF community.

Additional proposal preparation guidance for this category can be found in Section V.A. Proposal Preparation Instructions.

Universities and colleges are eligible to submit proposals in this area. Proposals in this area require titles that begin with "CC*DNI Instrument:" followed by the title of the project.

III. AWARD INFORMATION

Approximately \$23 million-\$28 million will be made available in FY 2015 to support 25-47 awards.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

Limit on Number of Proposals per PI or Co-PI: 1

An individual may serve in the Principal Investigator role on no more than one proposal. **This eligibility constraint will be strictly enforced in order to treat everyone fairly and consistently.** In the event that an individual exceeds this limit, proposals received within the limit will be accepted based on the earliest date and time of proposal submission (i.e., the first proposal received will be accepted and the remainder will be returned without review). **No exceptions will be made.**

There is no limit on number of proposals on which an individual may be listed as co-PI.

Additional Eligibility Info:

Universities and Colleges may submit proposals to any of the seven requested areas.

Non-profit, non-academic organizations may submit to area (6) Regional Coordination and Partnership in Advanced Networking.

Proposals must identify a lead institution. Collaborative proposals submitted as simultaneous submission of proposals from different organizations, with each organization requesting a separate award are not allowed. Collaborative proposals submitted as a single proposal, in which a single award is being requested (with subawards administered by the lead organization) are allowed.

Current CC*IE awardees in areas (2) – (6) are not encouraged to apply this year in the category for which they currently have an award. For example, a PI of an active award in the CI Engineer program area is not encouraged to apply to that same area.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

See Chapter II.C.2 of the [GPG](#) for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions.

For Data Infrastructure Building Blocks (DIBBs) - Multi-Campus/Multi-Institution Model Implementations Proposals:

Proposals in this area require titles that begin with "CC*DNI DIBBs:" followed by the title of project.

Proposals in this category are required to include:

- A Project Plan, identifying in its goals and milestones the anticipated results of the model implementation in the targeted multi-institution/regional context. The Project Plan should address requirements for optimized processing and sustainable throughput of ultra-large, heterogeneous data collections across the demonstrated network and associated full system(s) processing data path as criteria contributing to define project success.
- A management plan addressing roles, responsibilities, and support. The plan should explain how science data flows will be supported;
- A campus cyberinfrastructure plan, representing the lead PI's institution and addressing a multi-institution scope of planning.
- Tangible metrics to evaluate the success of the integrated system, and the value of the resulting capability beyond the target environment.

Proposals in this program area are encouraged to address in their Data Management Plan how the project will manage its data and software and share its research results (including software), including the types of data and other materials to be produced in the course of the project; standards to be used for data and metadata format and content (as deemed appropriate); policies for access and sharing, including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements; policies and provisions for re-use, re-distribution, and the production of derivatives; plans for archiving data, samples, and other research products, and for preservation of access to them including software sharing.

All proposals in this area must document explicit partnerships or collaborations with the campus IT/networking organization, as well as one or more domain scientists, research groups, and educators in need of the new data-centric, network-aware capabilities. Partnership documentation from personnel not included in the proposal as PI, Co-PI, or Senior Personnel should be in the form of a letter of commitment located in the Supplementary Documents section of the proposal.

Collaborative proposals submitted as simultaneous submission of proposals from different organizations, with each organization requesting a separate award are not allowed. Collaborative proposals submitted as a single proposal, in which a single award is being requested (with subawards administered by the lead organization) are allowed.

Refer to Section II, Program Description, for additional information about requirements for CC*DNI proposals. In particular, a Campus CI Plan must be included, with a limit of up to 5 pages, as a supplemental document.

For Data Driven Networking Infrastructure for the Campus and Researcher Proposals:

Proposals in this area require titles that begin with "CC*DNI Networking Infrastructure:" followed by the title of project.

Proposals must include a Project Plan addressing in its goals and milestones the end result of a working system in the target environment. Proposals are encouraged to address end-to-end networking performance in considering metrics of success.

All proposals in this area must document explicit partnerships or collaborations with the campus Information Technology (IT)/networking organization, as well as one or more domain scientists, research groups, and educators in need of the new network capabilities. Partnership documentation from personnel not included in the proposal as PI, Co-PI, or Senior Personnel should be in the form of a letter of collaboration located in the Supplementary Documents section of the proposal.

Any budget request for professional services, such as IT staff support, must be documented in coordination with the institution's campus IT or CIO organization. Note that requests for significant human resources should be considered in the Campus CI Engineer section of this solicitation.

Proposals asking for funds supporting new fiber builds must describe fiber use plans that include long term planning for supporting innovation through reserved capacity.

Proposals are required to include a network management plan addressing responsibilities, support, and roles. The plan should spell out how science data flows will be supported.

A letter of support from a campus leader is encouraged and should address sustainability and commitment from the institution.

Target environments must be campus infrastructure residing within the U.S.

Refer to Section II, Program Description, for additional information about requirements for CC*DNI proposals. In particular, a Campus CI Plan must be included, with a limit of up to 5 pages, as a supplemental document.

For Network Design and Implementation for Small Institutions Proposals:

Proposals in this area require titles that begin with "CC*DNI Campus Design:" followed by the title of project.

Proposals must include a Project Plan addressing in its goals and milestones the end result of a working system in the target environment. Proposals are encouraged to address end-to-end networking performance in considering metrics of success.

All proposals in this area must document explicit partnerships or collaborations with the campus Information Technology (IT)/networking organization, as well as one or more domain scientists, research groups, and educators in need of the new network capabilities. Partnership documentation from personnel not included in the proposal as PI, Co-PI, or Senior Personnel should be in the form of a letter of collaboration located in the supplementary documents section of the proposal.

Any budget request for professional services, such as IT staff support, must be documented in coordination with the institution's campus IT or CIO organization. Note that requests for significant human resources should be considered in the Campus CI Engineer section of this solicitation.

Proposals asking for funds supporting new fiber builds must describe fiber use plans that include long term planning for supporting innovation through reserved capacity.

An award in this program area is not the appropriate mechanism to provide support for individual faculty research projects. Requests for support of such projects should be directed to NSF's research grant programs.

Proposals in this program area are encouraged to address in their Data Management Plan how their data collection will be used to understand the impact of the project, for example through privacy-preserving network data collection.

Proposals are required to include a network management plan addressing responsibilities, support, and roles. The plan should spell out how science data flows will be supported.

A letter of support from a campus leader is encouraged and should address sustainability and commitment from the institution.

Target environments must be campus infrastructure residing within the U.S.

Refer to Section II, Program Description, for additional information about requirements for CC*IIE proposals. In particular, a Campus CI Plan must be included, with a limit of up to 5 pages, as a supplemental document.

For Network Integration and Applied Innovation Proposals:

Proposals in this area require titles that begin with "CC*DNI Integration:" followed by the title of project.

Proposals in this area must identify one or more supported science or engineering research projects or applications and describe how the proposed network integration activities will support those projects, particularly in the context of addressing data movement, throughput, and predictable performance end-to-end. Where appropriate, proposals are encouraged to document explicit partnerships or collaborations with the campus IT/networking organization. Proposals in this area must include clear project goals and milestones. Any software development under proposed activities should identify the open source license used.

Proposals in this area must include a Project Plan with clear project goals and milestones resulting in a working system in a target environment. Proposals must define base metrics relevant to the proposal goals and address measurement and evaluation of the resulting system. Any software development under proposed activities must be made available under an open source license. Proposals in this area are encouraged to request some travel support, up to \$5000, total for the entire project, to fund community dissemination activities.

Refer to Section II, Program Description, for additional information about requirements for CC*DNI proposals. In particular, a Campus CI Plan must be included, with a limit of up to 5 pages, as a supplemental document.

For Campus CI Engineer Proposals:

Proposals in this area require titles that begin with "CC*DNI Engineer:" followed by the title of project.

NSF plans to support national level coordination, and perhaps training, activities in building a stronger community of campus level CI engineering expertise. Funded activities should include up to \$3000 per year, for travel support enabling the campus engineer to participate in and help establish a national community of campus level CI engineering. Engineers supported in this program area will be prime participants in community building events in the years ahead.

Proposals in this area are required to provide as a supplementary document a Job Description associated with the planned position of the CI Engineer.

Refer to Section II, Program Description, for additional information about requirements for CC*DNI proposals. In particular, a Campus CI Plan must be included, with a limit of up to 5 pages, as a supplemental document.

For Regional Coordination and Partnership in Advanced Networking Proposals:

Proposals in this area require titles that begin with "CC*DNI Region:" followed by the title of project.

Refer to Section II, Program Description, for additional information about requirements for CC*DNI proposals. In particular, a Campus CI Plan must be included, with a limit of up to 5 pages, as a supplemental document. Due to the regional nature of proposed activities in this area, proposals may choose to address campus level cyberinfrastructure challenges and plans in this supplemental document on either a specific campus in the region, or conceptually across campuses in the region.

For Instrument Networking Proposals:

Proposals in this area require titles that begin with "CC*DNI Instrument:" followed by the title of project.

Refer to Section II, Program Description, for additional information about requirements for CC*DNI proposals. In particular, a Campus CI Plan must be included, with a limit of up to 5 pages, as a supplemental document.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited.

Budget Preparation Instructions: Budgets should include travel funds for the project principal investigators and other team members as appropriate from all collaborating institutions to attend one annual Principal Investigators' meeting.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

March 24, 2015

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information

about using Grants.gov is available on the Grants.gov Applicant Resources webpage: <http://www.grants.gov/web/grants/applicants.html>. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via FastLane are strongly encouraged to use FastLane to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as [Exhibit III-1](#).

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in [Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018](#). These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document

the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.i. contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.i., prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
 - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
 - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

All CC*DNI projects will be reviewed with careful attention to the following:

- *The extent to which the work provides a needed capability required by science, engineering and education.*
- *The expected impact on the deployed environment described in the proposal, and potential impact across a broader segment of the NSF community.*
- *Where applicable, how resource access control, federated identity management, and other cybersecurity related issues and community best practices are addressed.*
- **A Cyberinfrastructure Plan** - *To what extent is the planned cyberinfrastructure likely to enhance capacity for discovery, innovation, and education in science and engineering? How well does the plan as presented position the proposing institution(s) for future cyberinfrastructure development? How well does the cyberinfrastructure plan support and integrate with the institutions' science and technology plan? Are IPv6 deployment and InCommon Federation addressed? Are the activities described in the proposal consistent with the institution's cyberinfrastructure plan?*

Additionally, for proposals in area (1) Data Infrastructure Building Blocks (DIBBs) - Multi-Campus/Multi-Institution Model Implementations:

- **A Project Plan** *addressing in its goals and milestones the end result of a working system in the target environment, and describing outcomes/deliverables that will result each year of the award period. Are innovative solutions to community-wide, data-related issues and policies discussed, and plans for sustainability beyond the scope of the award described?*
- **A Management Plan** *describing plans and procedures for the development and assessment of the proposed activity. Are there clearly defined responsibilities for leadership and the role of the PI institution and other organizations? Are plans described for maintaining an appropriate degree of openness and for encouraging the involvement of additional interested parties? Are means described for self-evaluation of progress toward the network goals and are they presented as an important part of the management plan? Are formal mechanisms included to ensure fair and equitable allocation of group resources?*
- **A detailed Data Management Plan** *describing plans for retaining and sharing data. See http://www.nsf.gov/cise/cise_dmp.jsp for guidance.*
- **Tangible metrics** *to evaluate the success of the integrated system, and the value of the resulting capability beyond the target environment.*

Additionally, for proposals in area (2) Data Driven Networking Infrastructure for the Campus and Researcher:

- **A Project Plan** *addressing in its goals and milestones the end result of a working system in the target environment.*

Additionally, for proposals in area (4) Network Integration and Applied Innovation:

- **A Project Plan** *addressing in its goals and milestones the end result of a working system in the target environment.*
- **Tangible metrics** *to measure the success of the integrated systems and any associated software developed, and the steps*

necessary to take the systems from prototype status to production use.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will be completed and submitted by each reviewer. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See Section VI.B. for additional information on the review process).

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the *NSF Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). Within 90 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Kevin Thompson, ACI Program Director, telephone: (703) 292-4220, email: CCDNIQueries@nsf.gov
- Joseph B. Lyles, CNS Program Director, telephone: (703) 292-7152, email: CCDNIQueries@nsf.gov
- Bob Chadduck, ACI Program Director, telephone: (703) 292-2247, email: CCDNIQueries@nsf.gov
- Amy Walton, ACI Program Director, telephone: (703) 292-4538, email: CCDNIQueries@nsf.gov
- Anita Nikolich, ACI Program Director, telephone: (703) 292-4551, email: CCDNIQueries@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF [Grants Conferences](#). Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website at https://public.govdelivery.com/accounts/USNSF/subscriber/new?topic_id=USNSF_179.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at <http://www.grants.gov>.

Related Programs:

NSF Advisory Committee for Cyberinfrastructure Task Force on Campus Bridging, *Final Report*, March 2011.
Available from: http://www.nsf.gov/od/oci/taskforces/TaskForceReport_CampusBridging.pdf

Reference material on the "Science DMZ" concept is available at: <http://fasterdata.es.net/fasterdata/science-dmz/>

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

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