

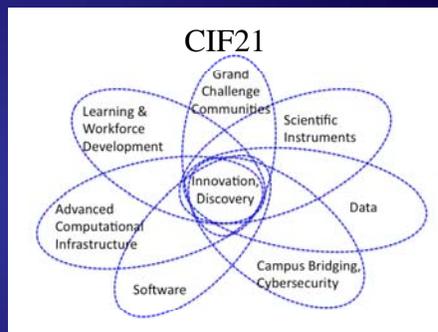
# Campus Cyberinfrastructure – Network Infrastructure and Engineering (CC-NIE)

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NSF Office of CyberInfrastructure  
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## Office of Cyberinfrastructure

- ❖ HPC/ACI
- ❖ Software
- ❖ Data
- ❖ Campus Bridging/Networking
- ❖ Learning and Workforce Development
- ❖ VOs and building Research Communities





## (Post NSFnet) Brief History of NSF Investments in Network Infrastructure

- ❖ vBNS and High Performance Connections Program (HPNC) – 1995-2003
  - National backbone and connections
- ❖ International Networking (IRNC) – 1997 – present
  - Connecting US to the world
- ❖ Experimental Infrastructure Networking (EIN) - 2003
- ❖ “Academic Research Infrastructure Program – Recovery and Reinvestment” - 2009
  - Subset: Optical exchange, regional networking upgrades
- ❖ EPScOR – Research Infrastructure Improvement (RII) – 2011
  - Inter-campus, intra-campus connectivity
- ❖ STCI program (2011 – “100G Connectivity for Data-Intensive Computing at JHU”, Lead PI: Alex Szalay)

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## ACCI Task Force on Campus Bridging

- ❖ *Strategic Recommendation to the NSF #3: The National Science Foundation should create a new program funding high-speed (currently 10 Gbps) connections from campuses to the nearest landing point for a national network backbone. The design of these connections must include support for dynamic network provisioning services and must be engineered to support rapid movement of large scientific data sets.* - pg. 6, National Science Foundation Advisory Committee for Cyberinfrastructure Task Force on Campus Bridging, Final Report, March 2011
- ❖ [www.nsf.gov/od/oci/taskforces/TaskForceReport\\_CampusBridging.pdf](http://www.nsf.gov/od/oci/taskforces/TaskForceReport_CampusBridging.pdf)
- ❖ Also see Campus Bridging Technologies Workshop: Data and Networking Issues Workshop Report. G.T. Almes, D. Jent and C.A. Stewart, eds., 2011, <http://hdl.handle.net/2022/13200>

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## Campus Cyberinfrastructure – Network Infrastructure and Engineering (CC-NIE)

- ❖ NSF 12-541 – solicitation released March 1, 2012
- ❖ [http://www.nsf.gov/publications/pub\\_samm.jsp?WT\\_2\\_pms\\_id=504798&ods\\_key=nsf12541](http://www.nsf.gov/publications/pub_samm.jsp?WT_2_pms_id=504798&ods_key=nsf12541)
- ❖ 1st area: Data Driven Networking Infrastructure for the Campus and Researcher
- ❖ 2<sup>nd</sup> area: Network Integration and Applied Innovation
- ❖ This is a networking solicitation
- ❖ Proposals due May 30, 2012

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## CC-NIE

- ❖ **Estimated Number of Awards:** 10 to 20
- ❖ **Anticipated Funding Amount:**
  - \$12,000,000 to \$15,000,000 will be available for this competition in FY 2012.
  - Data Driven Networking Infrastructure for the Campus and Researcher awards will be supported at up to \$500,000 total for up to 2 years.
  - Network Integration and Applied Innovation awards will be supported at up to \$1,000,000 total for up to 2 years.
- ❖ Proposals may only be submitted by 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.

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## CC-NIE Area#1 - Data Driven Networking Infrastructure for the Campus and Researcher

- ❖ network infrastructure improvements at the campus level
- ❖ network improvements include:
  - network upgrades within a campus network to support a wide range of science data flows
  - 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/science-dmz/> for more information on the "science DMZ" approach)
  - campus network upgrades addressing sustainable infrastructure through improvements in energy efficient networking.
  - campus network upgrades addressing the growing needs in mobile networking.
  - Network connection upgrade for the campus connection to a regional optical exchange or point-of-presence that connects to Internet2 or National Lambda Rail.

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## Other Notes on Area#1

- ❖ Must address scientific and engineering project and application drivers
- ❖ Must present project-specific end-to-end scenarios for data movement, distributed computing, and other end-to-end services driving the networking upgrade.
- ❖ Data movement scenarios are encouraged to describe end-to-end data transfers that include access to and use of wide area dynamic circuit networking services
- ❖ Proposals must include a Campus Cyberinfrastructure plan within which the proposed network infrastructure improvements are conceived, designed, and implemented in the context of a coherent campus-wide strategy and approach to CI.
- ❖ This Campus CI plan must be included as a supplementary document and is limited to no more than 5 pages. The plan should also address campus IPv6 deployment and use of the InCommon Federation global federated system.

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## Other Notes on Area#1

- ❖ 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 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 commitment located in the supplementary documents section of the proposal.
- ❖ Should 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.
- ❖ Title should start with: "CC-NIE Network Infrastructure:"
- ❖ Funding request not to exceed \$500k for up to 2 years

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## CC-NIE Area#2 – Network Integration and Applied Innovation

- ❖ end-to-end network CI through integration of existing and new technologies and applied innovation
- ❖ Applying network research results, prototypes, and emerging innovations to enable (identified) research and education
- ❖ 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

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## Area#2 Examples of Relevant Activities

- ❖ Integration of networking protocols/technologies with application layer
- ❖ Tool development supporting native IPv6 environments
- ❖ Transitioning successful research prototypes in SDN, and activities supported by GENI and FIA programs, to distributed scientific environments and campus infrastructure
- ❖ Development/deployment of mobile communication protocols/capabilities to support remote sensor and instrument access, real-time and adaptive steering, and energy efficiency.

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## Area#2 Examples of Relevant Activities

- ❖ Apply new energy efficient algorithms/techniques to production net environments
- ❖ Network engineering support through expert teams, common tools and processes for solving end-to-end network performance issues
- ❖ Applying network test, monitoring, measurement, or security tools and capabilities, including PerfSonar, Bro, and Web10G, to scientific domains, project end systems, and distributed environments.
- ❖ Experimental deployment of new networking protocols and technologies

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## Other Notes on Area#2

- ❖ 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.
- ❖ Must include clear project goals and milestones.
- ❖ Any software development must be made available under an open source license.
- ❖ Title should start with “CC-NIE Integration:”
- ❖ Funding request not to exceed \$1M total for up to 2 years

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## Additional Review Criteria for CC-NIE proposals

- ❖ expected impact on the deployed environment described in the proposal.
- ❖ extent to which the value of the work is described in the context of a needed capability required by science and engineering, and potential impact across a broader segment of the NSF community.
- ❖ A project plan that addresses in its goals and milestones the end result of a working system in the target environment.
- ❖ Where applicable, how resource access control, federated identity management, and other cybersecurity related issues and community best practices are addressed.
- ❖ Also for CC-NIE Network Infrastructure projects: Cyberinfrastructure Plan - How well does the cyberinfrastructure plan support and integrate with the institutions' science and technology plan? To what extent is the cyberinfrastructure plan 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? Are IPv6 deployment and InCommon federation addressed?
- ❖ Also for CC-NIE Integration projects: Tangible metrics described 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.

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## Wrap up

- ❖ Proposals are due May 30
- ❖ Read the CC-NIE solicitation carefully
- ❖ Contact me with any questions – email is best! [kthomps@nsf.gov](mailto:kthomps@nsf.gov)