



Software as Cyberinfrastructure at NSF

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Cyberinfrastructure

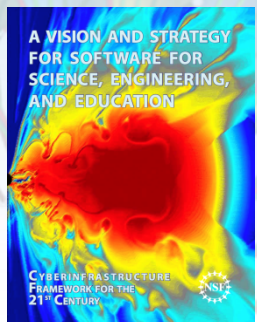
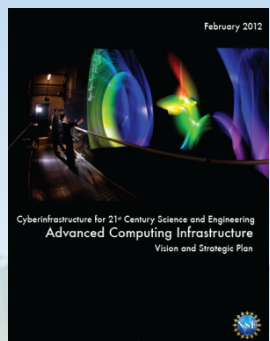
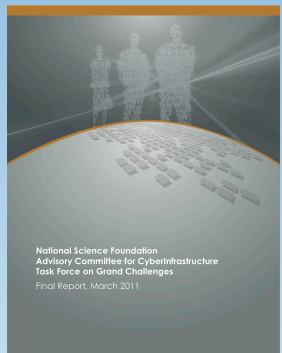
- *“Cyberinfrastructure consists of computing systems, data storage systems, advanced instruments and data repositories, visualization environments, and people, all linked together by software and high performance networks to improve research productivity and enable breakthroughs not otherwise possible.”*

-- Craig Stewart
Indiana University

- Infrastructure elements:
 - parts of an infrastructure,
 - developed by individuals and groups,
 - international,
 - developed for a purpose,
 - used by a community



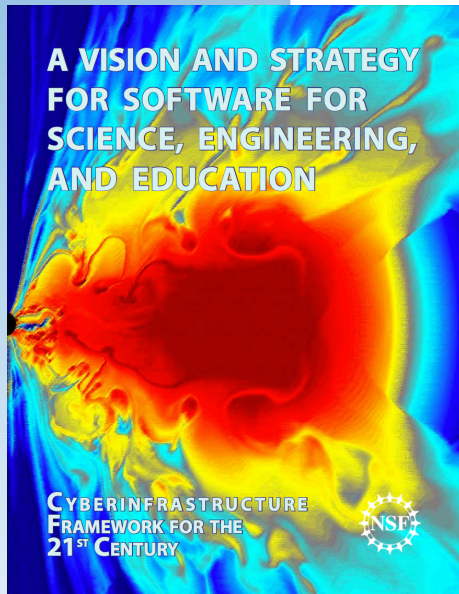
Cyberinfrastructure Framework for 21st Century Science and Engineering (CIF21)



- Cross-NSF portfolio of activities to provide integrated cyber resources that will enable new multidisciplinary research opportunities in all science and engineering fields by leveraging ongoing investments and using common approaches and components (<http://www.nsf.gov/cif21>)
- ACCI task force reports (<http://www.nsf.gov/od/oci/taskforces/index.jsp>)
 - Campus Bridging, Cyberlearning & Workforce Development, Data & Visualization, Grand Challenges, HPC, Software for Science & Engineering
 - Included recommendation for NSF-wide CDS&E program
- Vision and Strategy Reports
 - ACI - http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf12051
 - Software - http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf12113
 - Data - <http://www.nsf.gov/od/oci/cif21/DataVision2012.pdf>
- Implementation
 - Implementation of Software Vision
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504817



Software Vision



NSF will take a leadership role in **providing software as enabling infrastructure** for science and engineering research and education, and in **promoting software** as a principal component of its comprehensive CIF21 vision

...

Reducing the complexity of software will be a unifying theme across the CIF21 vision, **advancing** both the **use and development of new software** and **promoting the ubiquitous integration of scientific software across all disciplines**, in education, and in industry

- A Vision and Strategy for Software for Science, Engineering, and Education – NSF 12-113



Software Infrastructure Role & Lifecycle

Support the foundational **research** necessary to continue to efficiently advance scientific software

Create and maintain a software ecosystem providing new **capabilities** that advance and accelerate scientific inquiry at unprecedented complexity and scale

Enable transformative, interdisciplinary, collaborative, **science and engineering** research and education through the use of advanced software and services

Transform practice through new **policies** for software addressing challenges of academic culture, open dissemination and use, reproducibility and trust, curation, sustainability, governance, citation, stewardship, and attribution of software authorship

Develop a next generation diverse workforce of scientists and engineers equipped with essential skills to use and develop software, with software and services used in both the research and **education** process