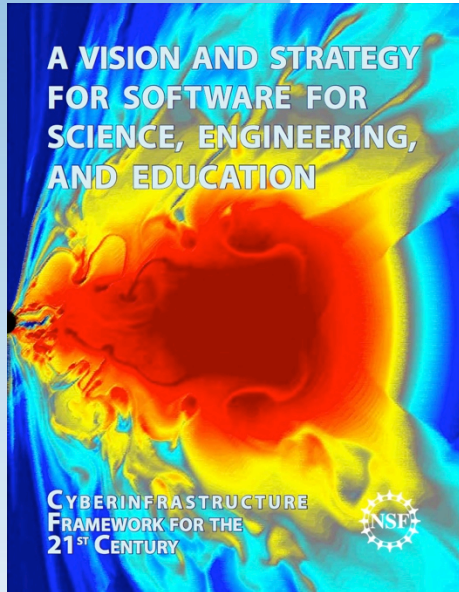# Software Cyberinfrastructure at NSF/OCI

for ACCI, 13 Dec 2012

Daniel S. Katz

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

- How does SI^2 fit with other NSF programs that support software cyberinfrastructure?
  - See: Implementation of NSF Software Vision - http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504817

Infrastructure Role & Lifecycle

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

Support the foundational *research* necessary to continue to efficiently advance CI

Enable transformative, interdisciplinary, collaborative, *science and engineering* research and education through the use of CI

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

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

Software Cluster Programs/Solicitations

- Exploiting Parallelism and Scalability (XPS)
  - New CISE & OCI program for foundational groundbreaking research leading to a new era of parallel (and distributed) computing
  - Issued in Oct., proposals due in Feb.

- Computational and Data-Enabled Science & Engineering (CDS&E)
  - Virtual program (ENG, MPS, OCI) for science-specific proofing of algorithms and codes
  - Identify and capitalize on opportunities for major scientific and engineering breakthroughs through new computational and data analysis approaches

- Software Infrastructure for Sustained Innovation (SI^2)
  - Transform innovations in research and education into sustained software resources that are an integral part of the cyberinfrastructure
  - Develop and maintain sustainable software infrastructure that can enhance productivity and accelerate innovation in science and engineering

SI² Projects
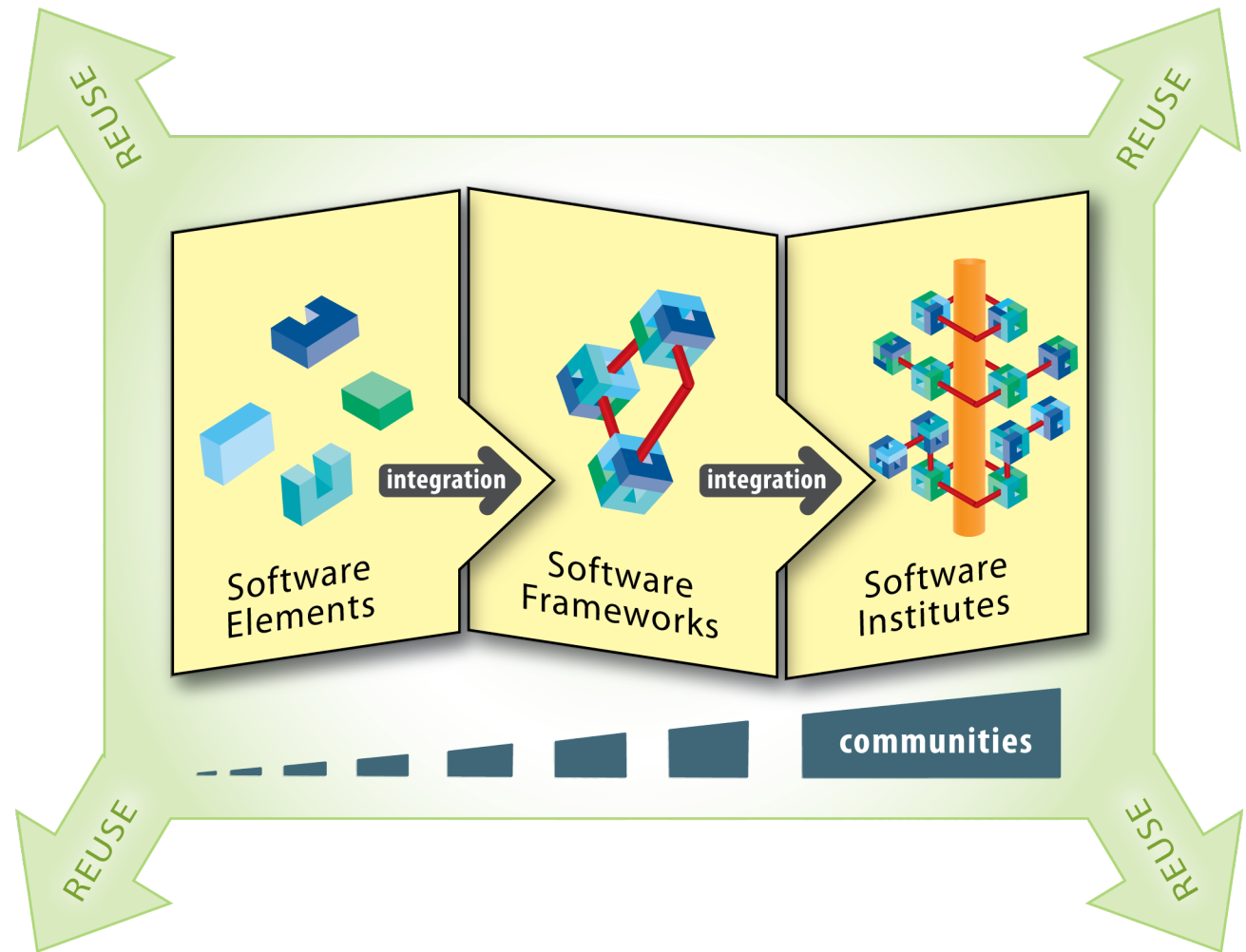
SI^2 Software Activities

- SSE & SSI
  - Past general solicitations, with most of NSF (BIO, CISE, EHR, ENG, MPS, SBE): NSF 10-551 (2011), NSF 11-539 (2012)
    - About 27 SSE and 20 SSI projects (19 SSE & 13 SSI in FY12)
  - Current focused solicitation, with MPS/CHE and EPSRC: US/UK collaborations in computational chemistry, NSF 12-576 (2012)
    - Will fund about 4-6 awards from 18 proposals
  - Planning additional annual general solicitations
- S2I2
  - Solicitation for conceptualization awards, NSF 11-589 (2012)
    - 13 projects (co-funded with BIO, CISE, ENG, MPS)
  - Solicitation out for 3-5 more S2I2s (NSF 13-511)
  - Full institute solicitation in late FY14
- US/China DCL (with CISE/CNS, loosely with NSFC)
  - NSF 12-096: will make decisions soon on small set of initial projects
  - Will fold into future SSE&SSI solicitation