Software as Infrastructure at NSF

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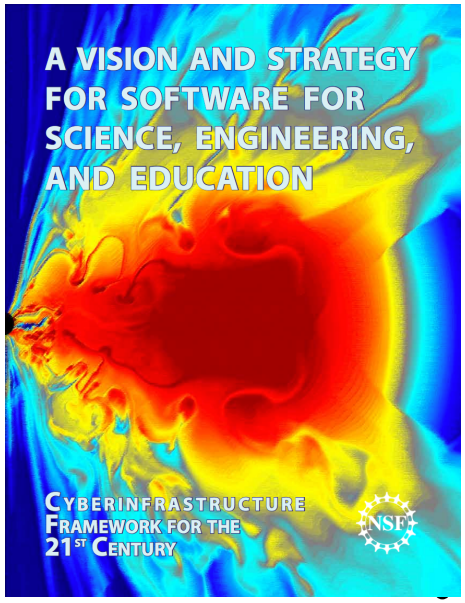
NSF Software Vision and Implementation



- Vision: "NSF will take a leadership role in **providing software as enabling infrastructure** for science and engineering research and education … **advancing** both the **use and development of new software** and **promoting the ubiquitous integration of scientific software across all disciplines** …"
  - A Vision and Strategy for Software for Science, Engineering, and Education – NSF 12-113

Implementation: Describes how NSF software activities fit together & which program(s) support which types of projects

- Implementation of NSF Software Vision – http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504817

- Led by Division of Advanced Cyberinfrastructure

Software Infrastructure Role & Lifecycle

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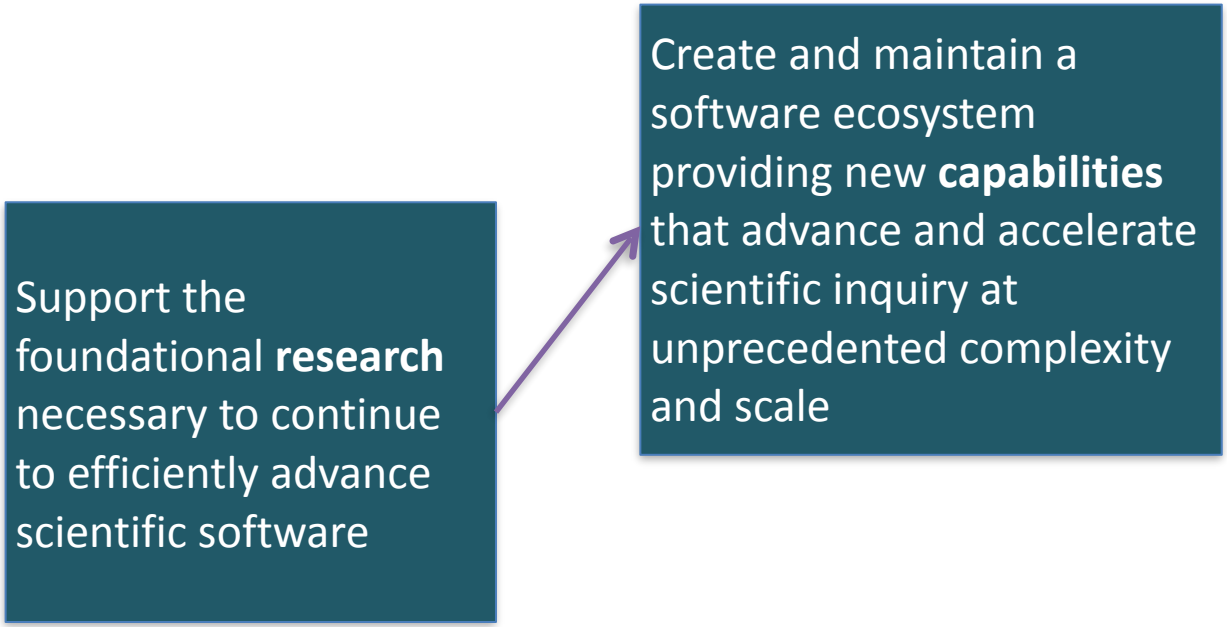

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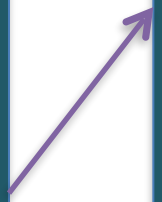

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Support the foundational **research** necessary to continue to efficiently advance scientific software

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

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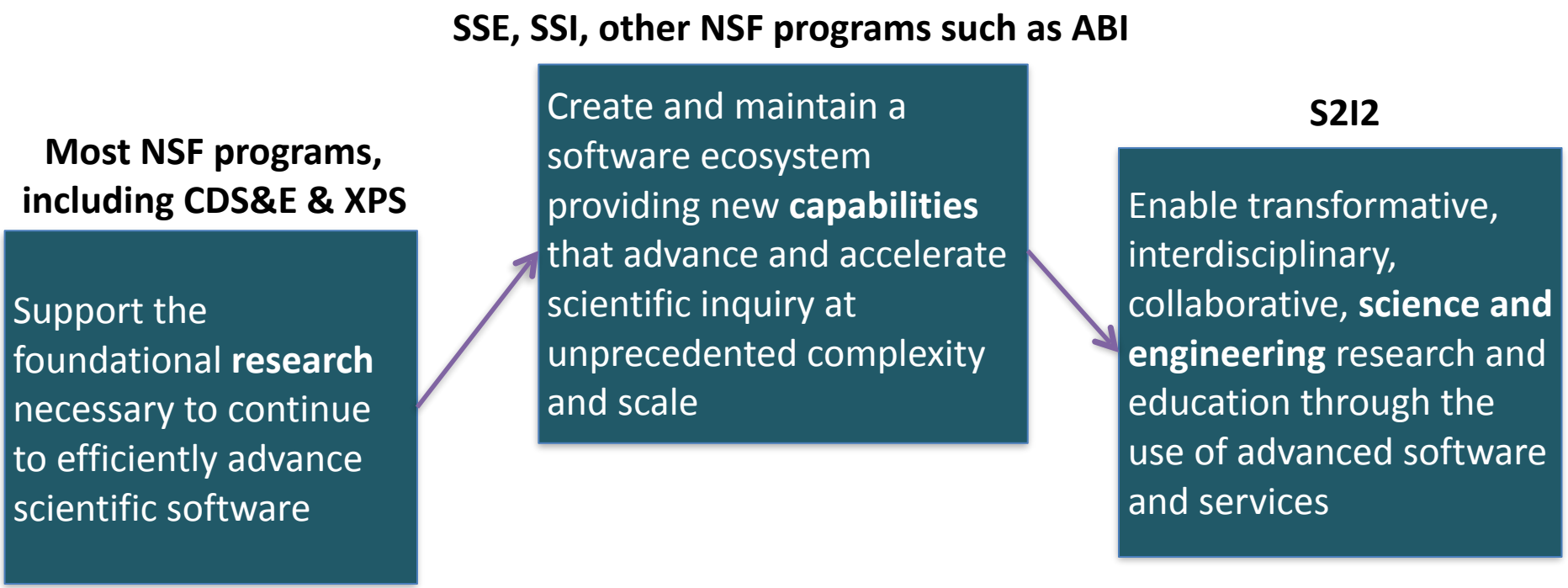

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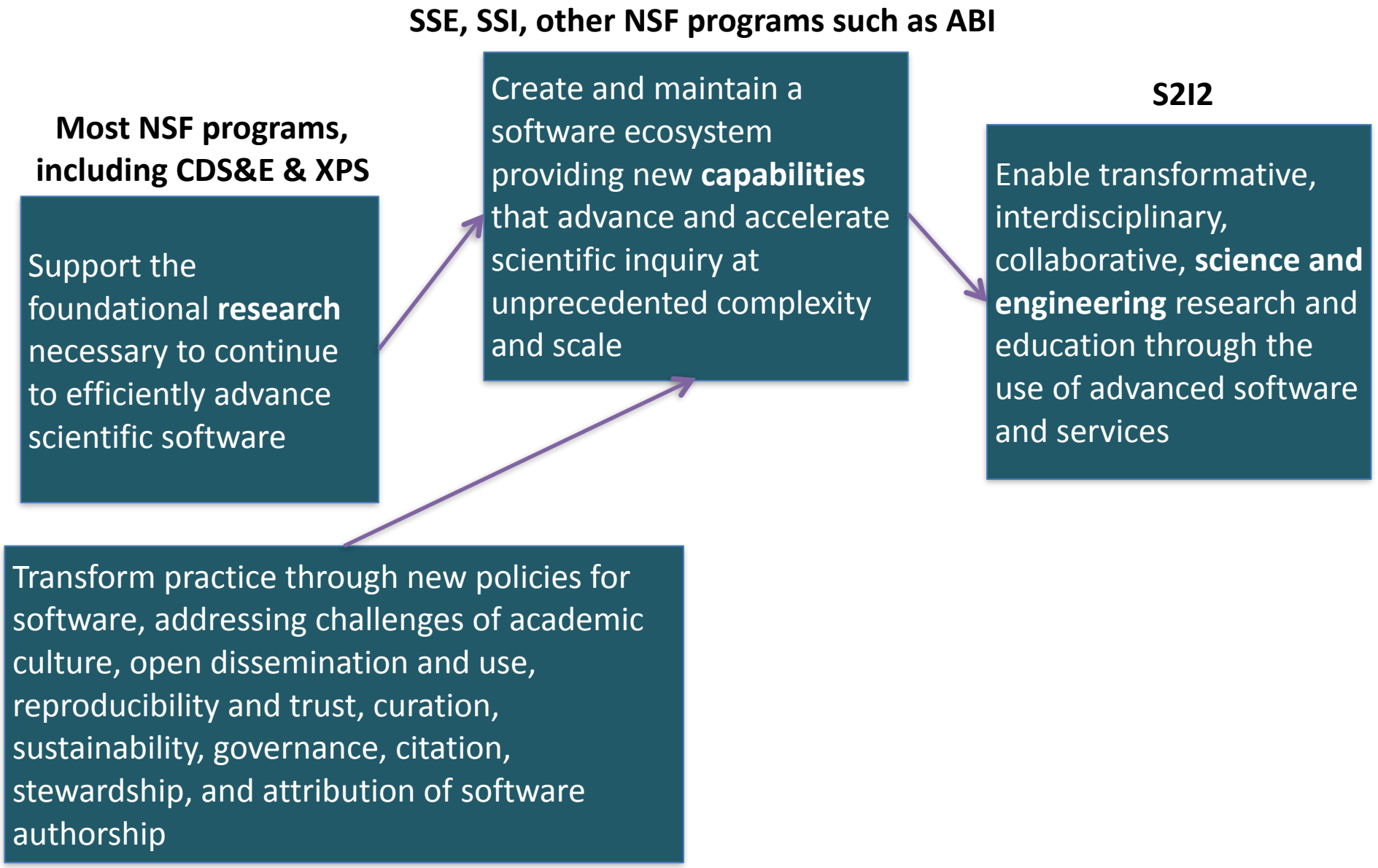

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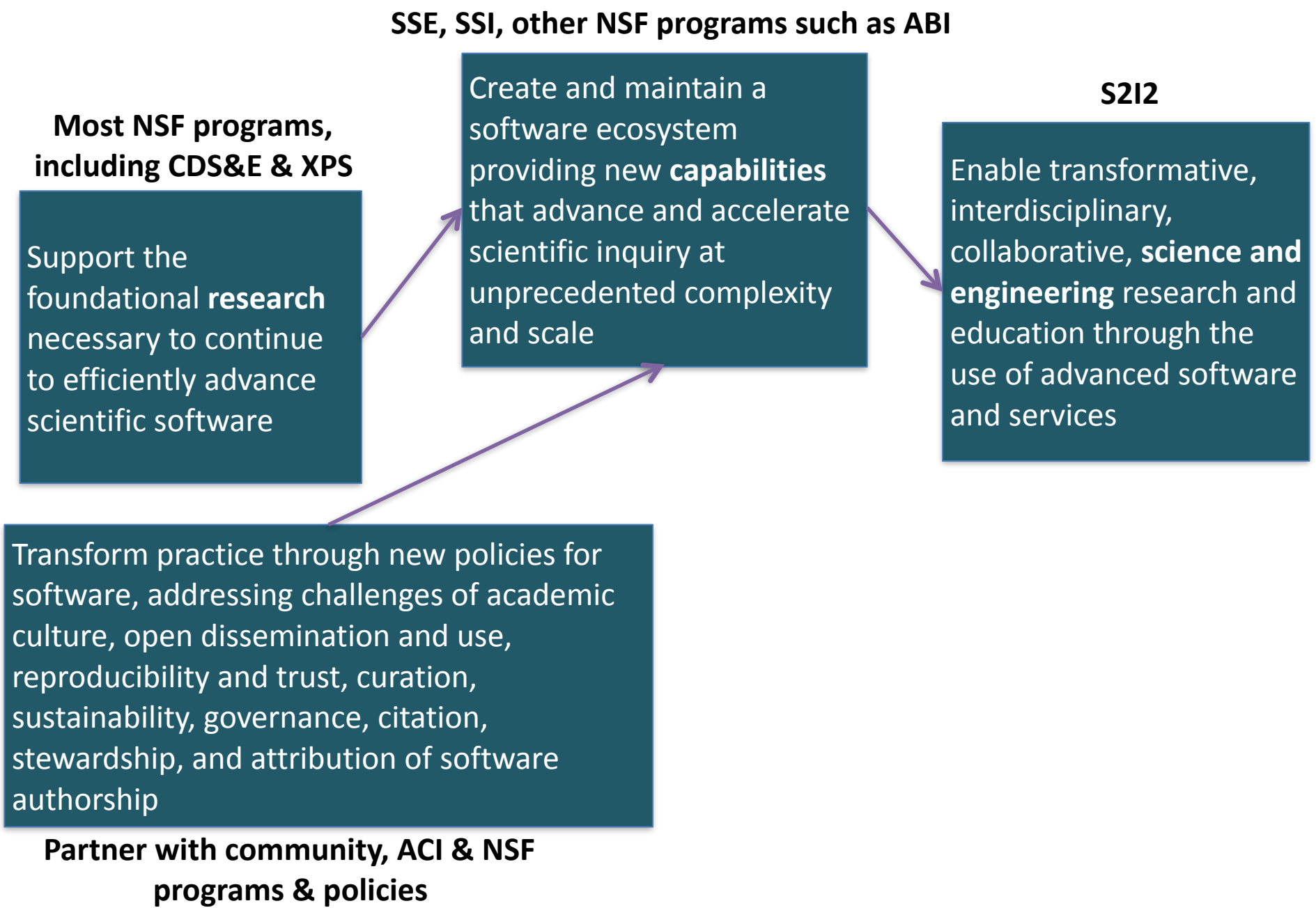

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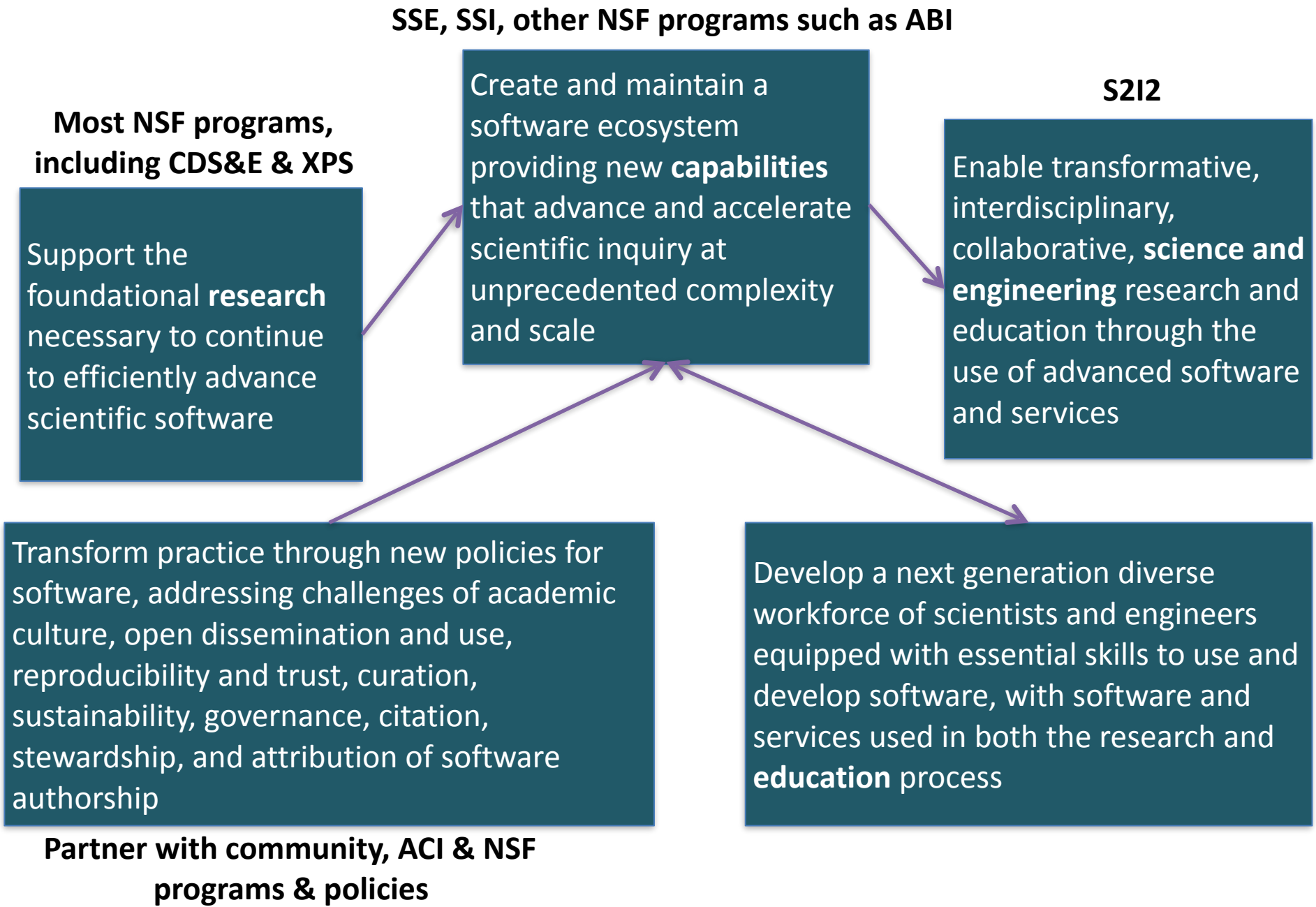

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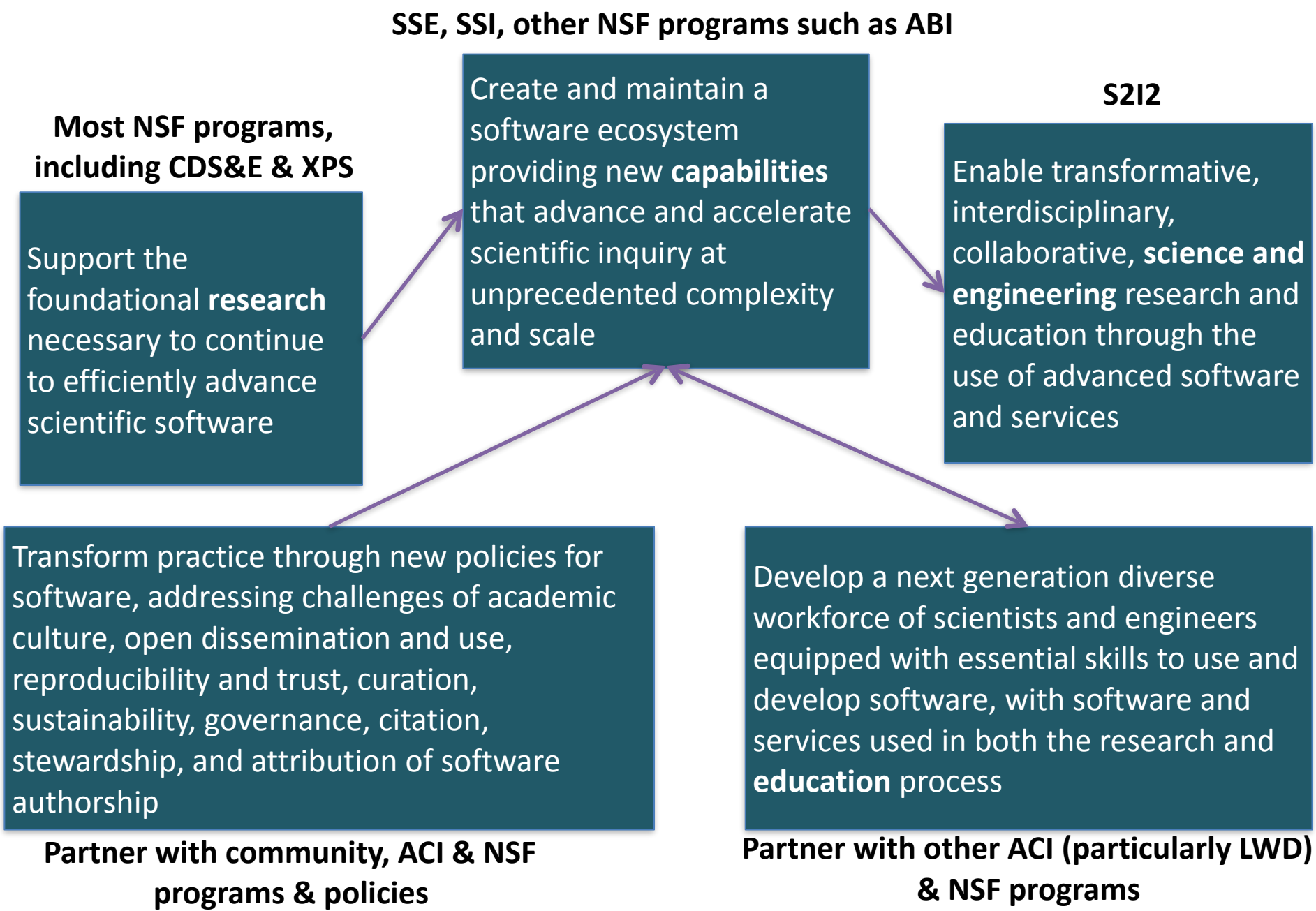

Framework for Software Infrastructure Projects and Funding Status for SI^2

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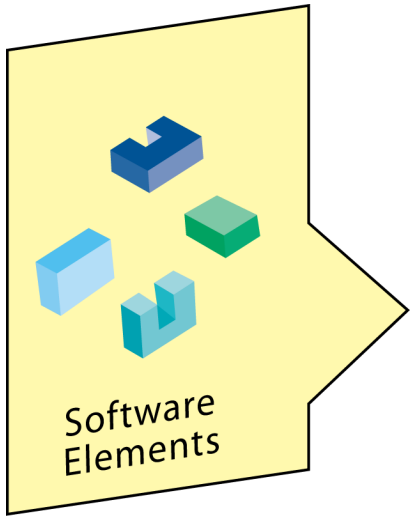
6 rounds of funding,
80 SSEs



See http://bit.ly/sw-ci for current projects

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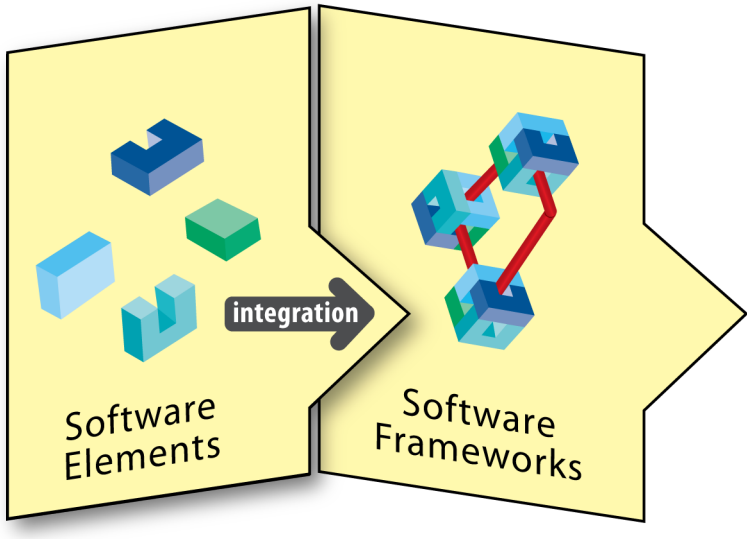

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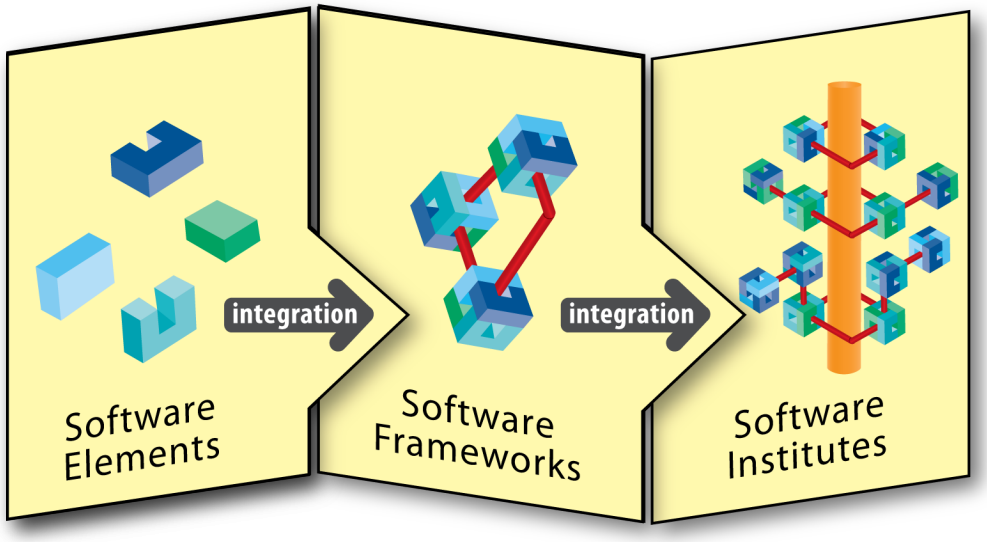

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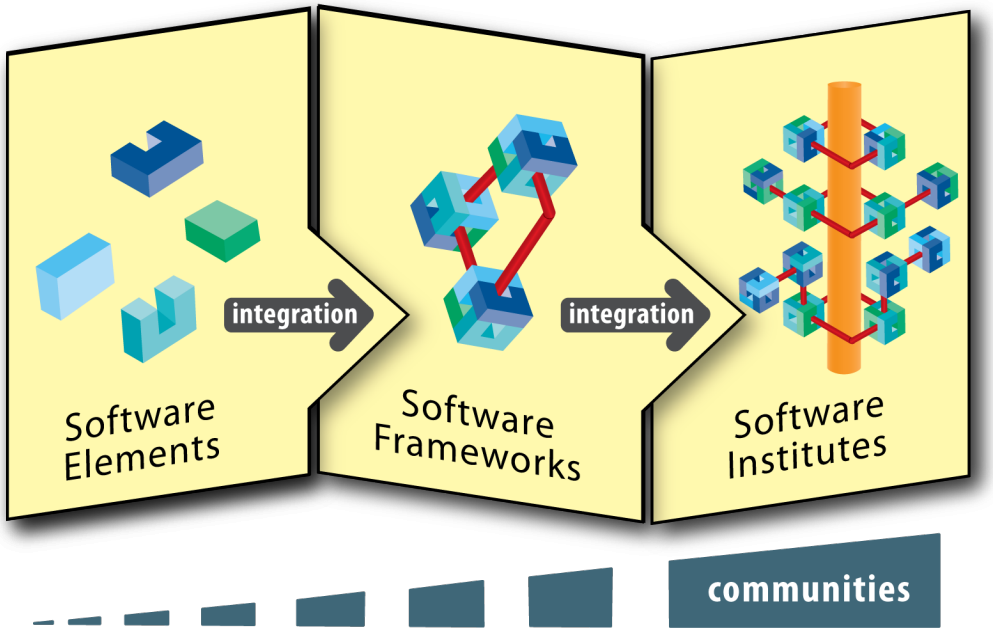

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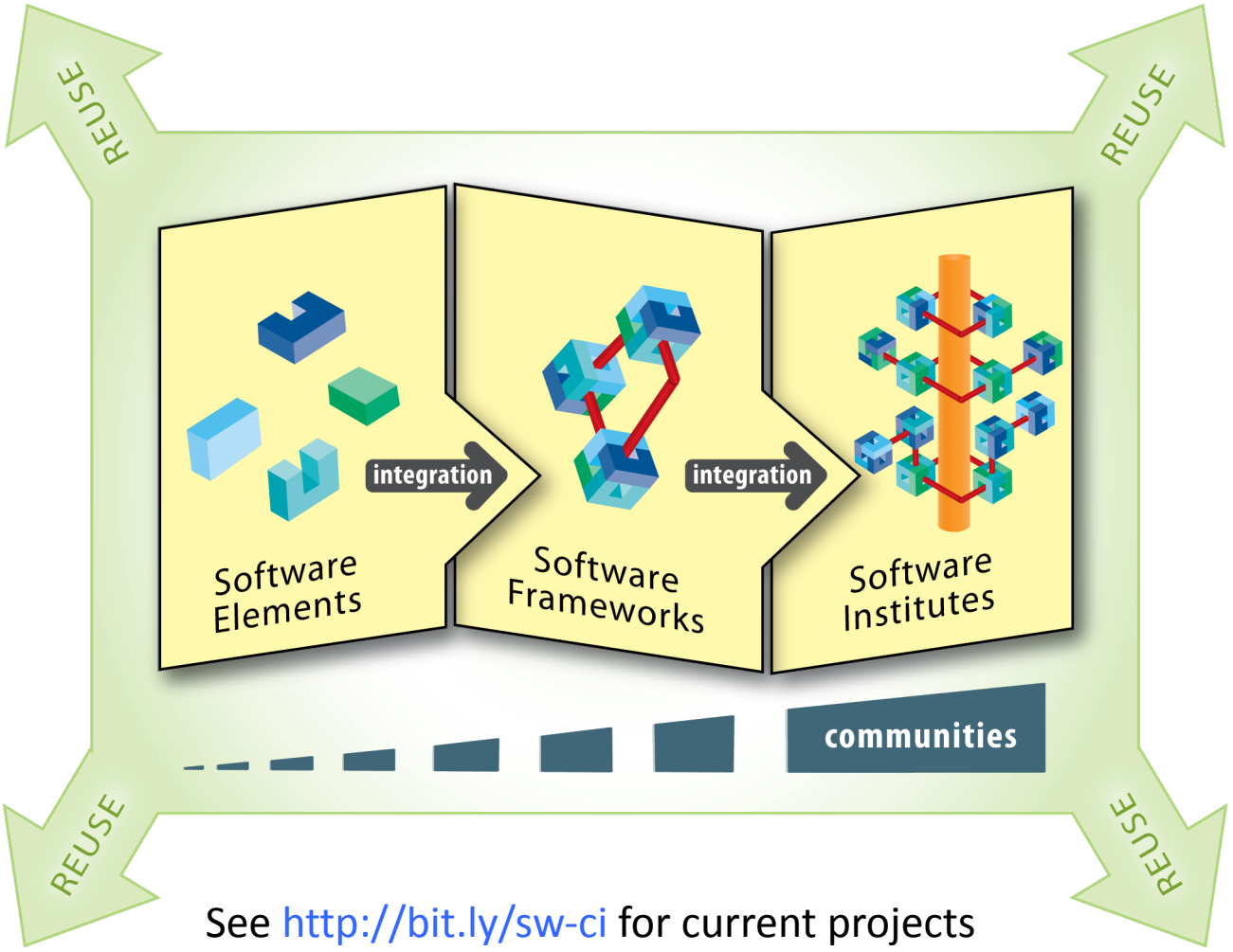

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Challenges

- **Funding models**. NSF supports projects for up to 5 years; lifetime of software projects can span 20+ years.
- **International funding.** Software collaborations span countries, but most funding agencies don't.
- **Career paths for software-focused researchers**. University structure &academic culture rewards publications, not software.
- **Incentives, including credit**. How should software be cited? How are all software contributions recognized?
- **Software Engineering**. What software engineering practices work (best) in science?
- **Training/Education**. How to train students, and professional scientists/engineers in best software engineering practices?
- **Interdisciplinary work**. Much software requires knowledge from more than one field – this doesn't fit our siloed system.
- **Portability**. How to deal with changing hardware, middleware, and languages?
- **Dissemination.** How do we document available software with usage examples, strengths, weaknesses, and user experiences?