



NSF's Pathways to Enable
Open-Source Ecosystems

Pathways to Enable Open-Source Ecosystems (POSE)

Welcome!

In this session:

- POSE program overview
- Review solicitation Phase II
- Q&A – please submit questions via the Q&A function in Zoom

Solicitation: [Pathways to Enable Open-Source Ecosystems](#)

FAQs: [POSE FAQs](#)

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Pathways to Enable Open-Source Ecosystems (POSE)

National and societal needs can be served by catalyzing open-source projects into robust, distributed, secure, and sustainable ecosystems

Solicitation: [Pathways to Enable Open-Source Ecosystems \(22-572\)](#)

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What is Open Source?

- Open source refers to *something* people can modify and share because its *design* is publicly accessible
 - Software source code
 - Languages or formats
 - Hardware instruction sets
 - Hardware designs or specifications
 - Scientific methodologies, models, or processes
 - Manufacturing processes or process specifications
 - Material formulations
 - Data

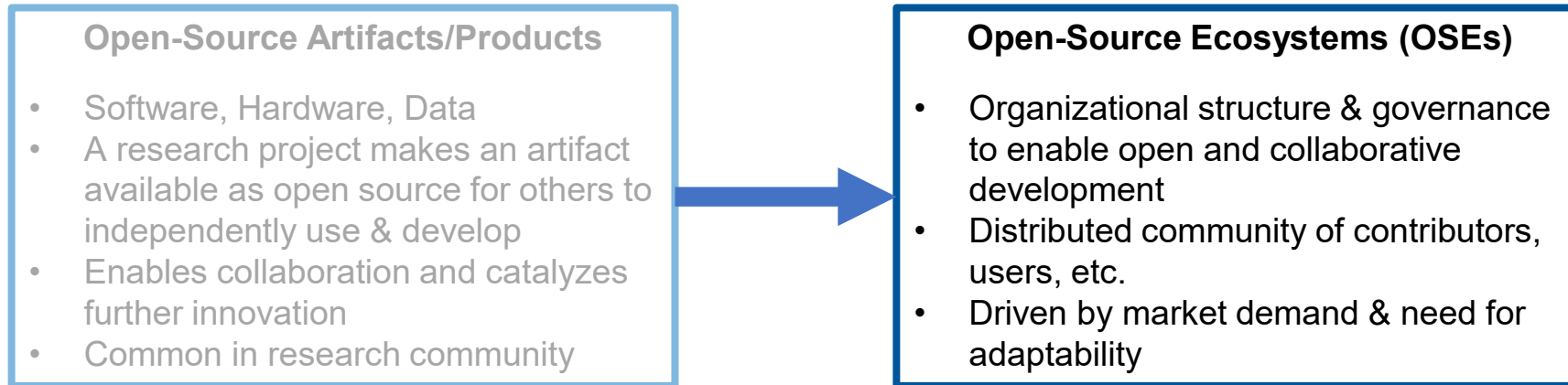
POSE Background

Open-Source Artifacts/Products

- Software, Hardware, Data
- Common in research community
- A research project makes an artifact available as open source for others to independently use & develop
- Enables collaboration and catalyzes further innovation

NSF has a long history of funding the development of open-source artifacts and products

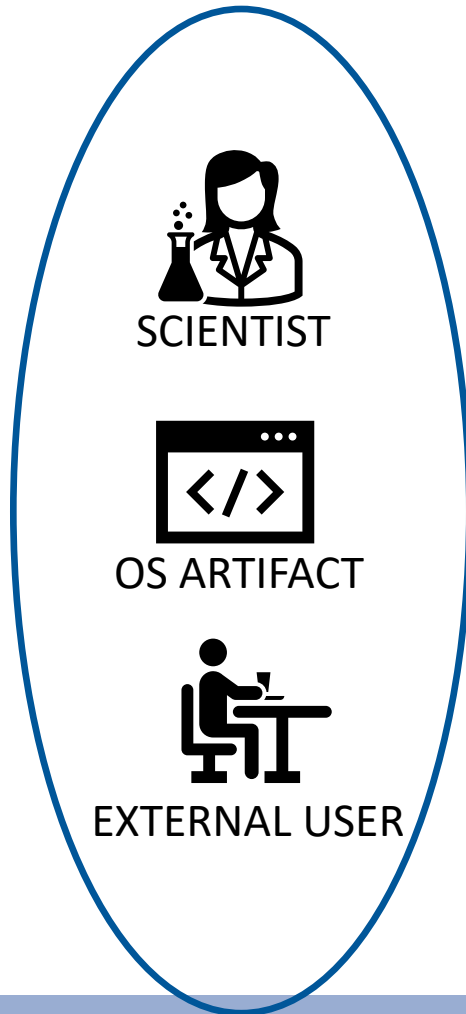
POSE Background



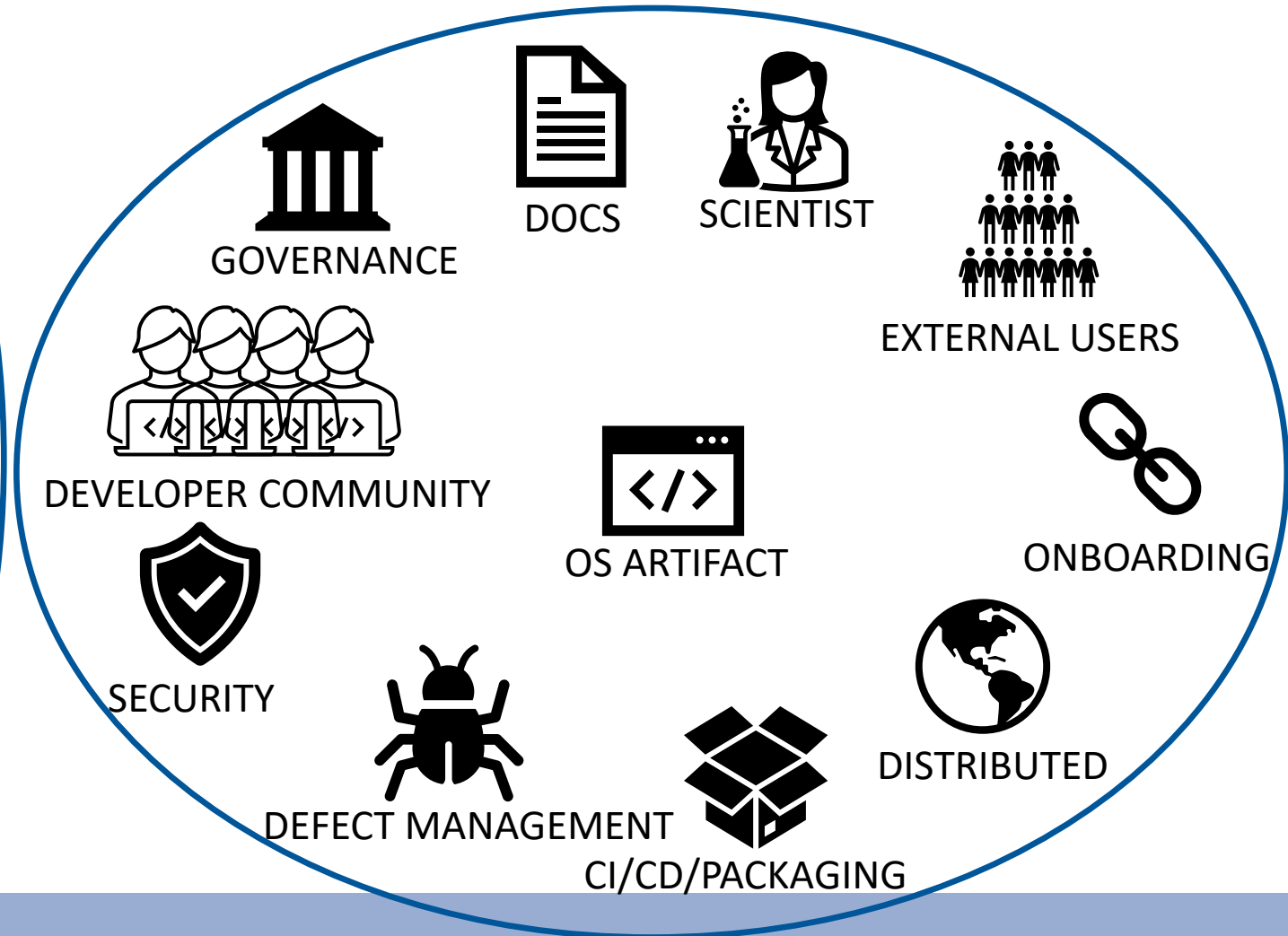
Some open-source artifacts and products evolve into open-source ecosystems

Open-source Product vs Ecosystem

OS Product



OS Ecosystem



OSE Success Stories with NSF Roots

➤ Software: Apache Spark

- Unified analytics engine for large-scale data processing
- Research project (2009) -> Apache Foundation (2013)
- One of most widely used technologies in big data and AI

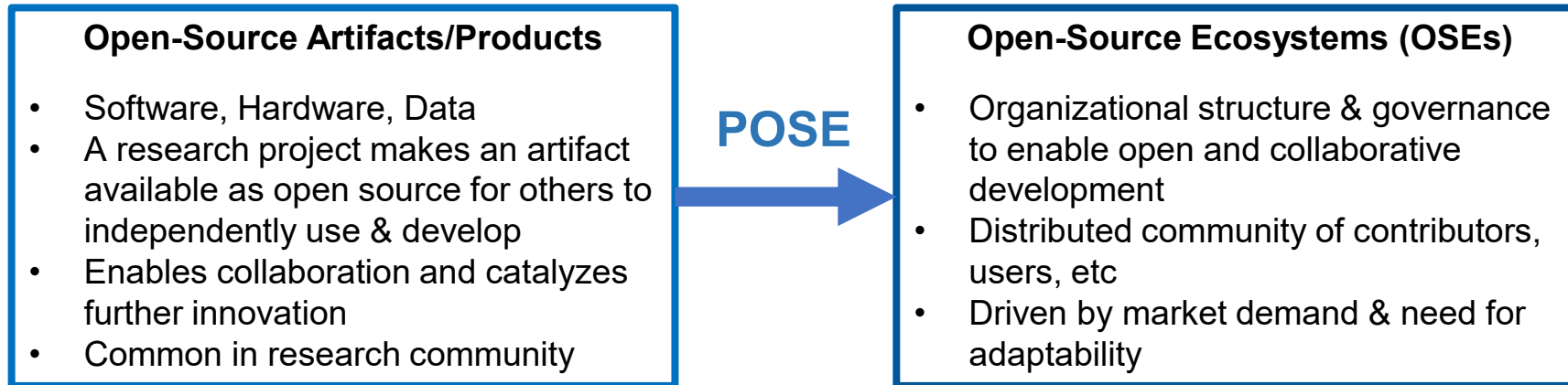
➤ Hardware: RISC-V

- Open standard instruction set architecture (ISA) for hardware
- Research project (2010) -> RISC-V Foundation (2015) -> RISC-V International (2020)
- Enables academics and small device manufacturers to design and experiment with building hardware without royalties

➤ Data Platform: Galaxy

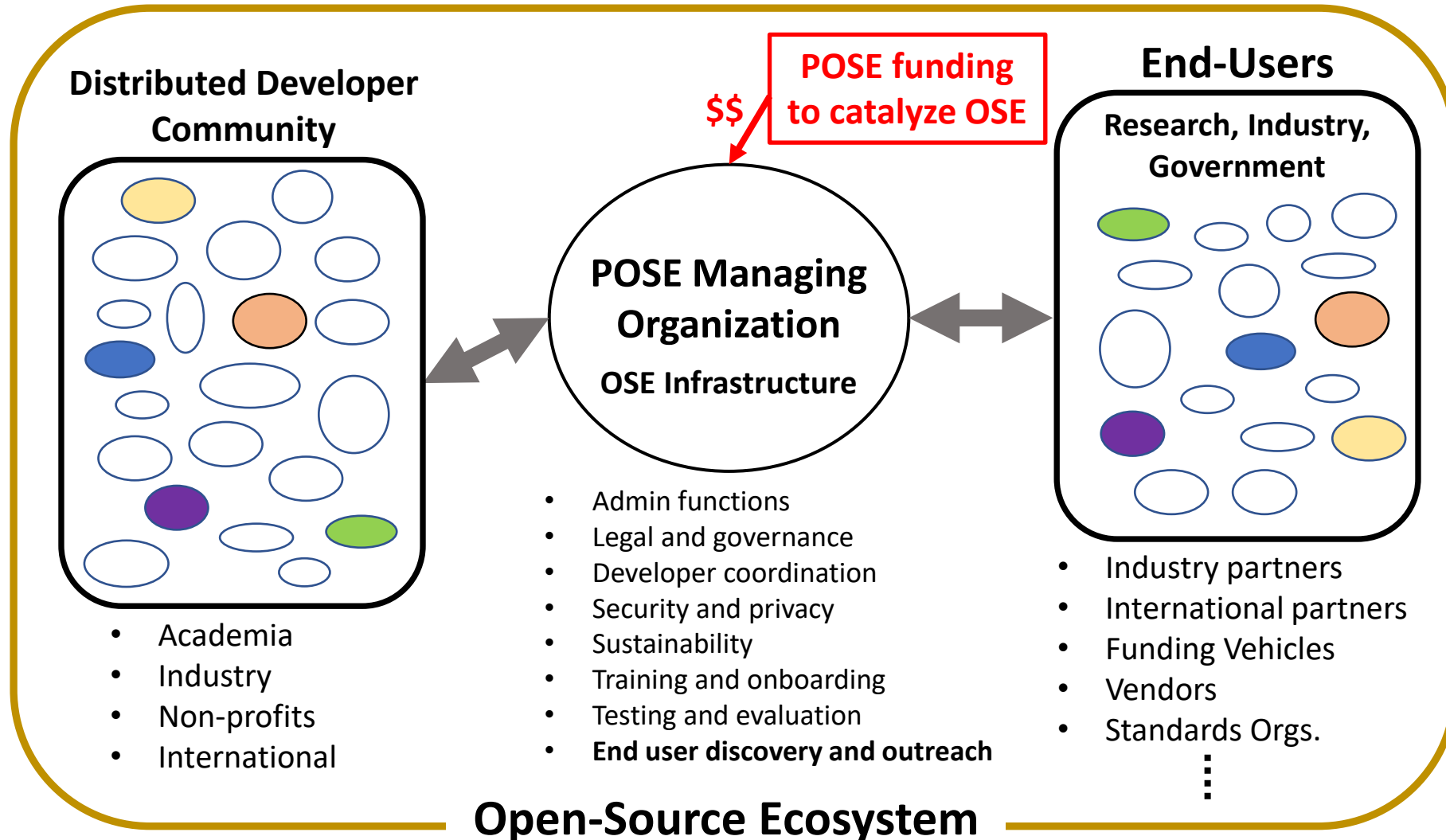
- Workflow & data integration platform for computational biology
- Research infrastructure (2005) -> Integrated data platform (community driven under Academic Free License)
- Enables accessible, reproducible, and collaborative research in bioinformatics worldwide

POSE Background



POSE is intended to enable intentional transition from an open-source product to an impactful and safe OSE

POSE managing organization



POSE Outcomes

- Grow the community who develop and contribute to OSE efforts
- Enable pathways for the development of collaborative OSEs that lead to new technology products or services that have broad societal impacts

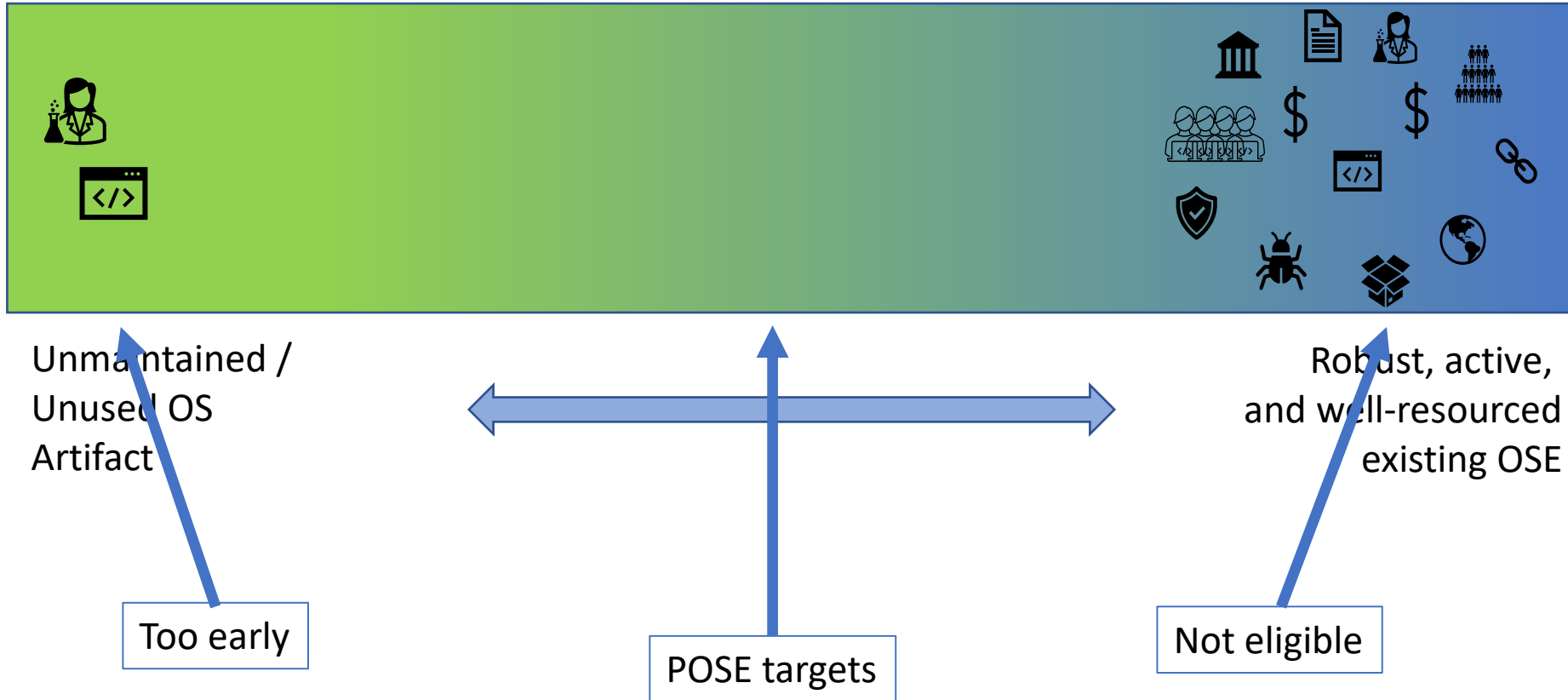
Harness open-source model as an engine
of innovation



Is POSE a good fit?



OSE Maturity



OSE Maturity



Unmaintained /
Unused OS
Artifact



Robust, active,
and well-resourced
existing OSE

- Not intended to fund the development of open-source artifacts, tools or products
- Not intended to fund existing well-resourced open-source communities and ecosystems

Key: How impactful will NSF funding be to developing the OSE?

What POSE Is

The POSE program is intended to fund managing organizations to catalyze the creation of OSEs based on an existing open-source product

- Broader impact: will the OSEs address significant challenges of societal, national or economic importance?
- Demonstrable external value: does the open-source product have active users outside of the participating institutions?
- Ecosystem: is there a need for this technology?
- Strategy: is an OSE with distributed users, developers, and additional process the correct approach?
- NSF Objective: to apply public funds where they will be most impactful



What POSE will not Support

- No funding for:
 - Development of open-source artifacts, tools or products
 - Existing well-resourced open-source communities and ecosystems (that already meet our definition of an OSE)
 - Ventures where profit is the primary motive
 - Work unrelated to the OSE development
 - Full-time students

POSE funding for development

- Developers can be supported by POSE to develop OSE infrastructure
 - This may include, for example, development of testing and verification, security and privacy, or QC processes
- Again, POSE will not fund developers to create or improve an open-source artifact, tool or product

Phase II



Two types of POSE awards

~~➤ Phase I – OSE Scoping Awards~~

- (Deadline was May, 2022)

➤ Phase II – OSE Development Awards

- Deadline: October 21, 2022

Phase I award is *not* a prerequisite for
Phase II

Phase I vs Phase II

- POSE recognizes the need to catalyze projects at different stages of maturity to reach a robust and sustainable OSE

Phase I: OSE Scoping and Planning

- Explore challenges and opportunities toward building and growing OSE
- Explore ways to catalyze OSE
- Feasibility decision for OSE

Phase I vs Phase II

- POSE recognizes the need to catalyze projects at different stages of maturity to reach a robust and sustainable OSE

Phase I: OSE Scoping and Planning

- Explore challenges and opportunities toward building and growing OSE
- Explore ways to catalyze OSE
- Feasibility decision for OSE

Phase II: OSE Development

- Identified challenges and clear plan for OSE growth and sustainability
- Build robust OSE (w/ distributed development, security, governance, etc)

POSE Phase II

- OSE Development Project – proposal should address:
 - Ecosystem establishment and growth
 - Organization and governance – describe a well-developed organizational, coordination, and governance model
 - Community building – describe a long-term strategy for community building
 - Sustainability – clear sustainability goals and an actionable evaluation plan with success metrics
- 15-page project description (does not include Letters of Collaboration or the Data Management Plan)
- Up to \$1.5M
- Up to 2-year duration



Evaluation Criteria



Intellectual Merit

- Evaluate novelty of existing open-source product within current technological landscape in the field of study.
- Does the proposal provide convincing evidence that a substantial user base exists, or could be built?
- Are there clear plans for
 - discovering the ecosystem within which the OSE will operate?
 - establishment of a sustainable organizational structure?
 - building a community of contributors?
- Does the team have the required expertise, experience and resources?
- Is the budget appropriate for the proposed activities?



Broader Impact

- Is the OSE addressing an issue of significant societal or national importance not currently being addressed?
- Is the OSE the best approach for generating impact?
- Is there a long-term vision for the OSE, including potential partnerships and sustainability?



POSE Phase II (OSE Development) Solicitation-Specific Criteria

- Societal importance
- Long-term vision
- Substantial user-base
- OSE motivation

- Plan for ecosystem growth
- Plan for organizational structure
- Plan for community contributors

- Team expertise
- NSF support needed to form OSE
- Third-party letters of collaboration

- Licensing approach
- Build and test infrastructure; quality and security control
- Sustainability plan and metrics

Submission Requirements



Eligibility

- Proposals may only be submitted by:
 - US Institutions of Higher Education
 - Non-profit, non-academic US organizations
 - For-profit US organizations
 - US State and local governments

- POSE proposals can be multi-organizational, but a single organization must serve as the lead and all other organizations as sub-awardees

International contributors and collaborators

- International contributors to the ongoing development of an open-source product are expected and encouraged
- International collaborators – i.e., organizations that collaborate with a POSE managing organization – are encouraged but cannot be funded via a POSE award

Security Plan

- Data Management Plan **must** include mechanisms to ensure security and privacy as applicable in the context of the proposed OSE:
 - Code/data quality (robustness, portability)
 - Security (access control mechanisms for users and content contributors, secure software development methodologies, policies for patching known security vulnerabilities, chain of custody)
 - Ethical use of sensitive data (privacy, protection of human subjects)

Mandatory training

- Training is provided for Phase II awardees
- Budget may include up to \$10K to cover the costs of attending mandatory training for POSE award recipients
- Training will include:
 - Presentations by leaders in OSE development
 - Ecosystem discovery – including “hands-on” experiential training
 - Community building
 - Management of an OSE
 - Security and privacy considerations
 - Sustainability

Letters of Collaboration

- Must include 3 to 5 letters from third-parties
 - Not a template / form letter
 - Maximum two page length each
 - Current users or contributors
 - Describe current contributions and future role in OSE
 - Value proposition of project and OSE

How do I apply?

- Detailed instructions in the solicitation - [NSF 22-572](#)
- Submission deadlines (submit via research.gov only):
 - Phase II – October 21, 2022
- Proposals will be reviewed by external experts – review criteria are included in the solicitation
- NSF aims to provide outcomes of the review process within 6 months of the submission deadline

What if I have further questions?

- Please read the solicitation ([NSF 22-572](#)) carefully
- FAQs can be found at [POSE FAQs](#)
- Send email to pose@nsf.gov



Q&A

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FAQs: [POSE FAQs](#)

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