



U.S. NATIONAL SCIENCE FOUNDATION  
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## Frequently Asked Questions (FAQs) for the NSF Pathways to Enable Open-Source Ecosystems (POSE) Program

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### PROGRAM BASICS

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1. What is the goal of the NSF Pathways to Enable Open-Source Ecosystems (POSE) program?
2. What is the difference between an open-source product and an open-source ecosystem?
3. What are the funding priorities for the POSE program?
4. How is POSE different from other Infrastructure programs at NSF?
5. Could you elaborate on what "ecosystem discovery" means?
6. The solicitation mentions, "POSE is not for existing, well-resourced OSEs." What does well-resourced mean? Our project has received previous funding for developing the product: Does that mean we are "well-resourced?"
7. How many active end-users does an open-source product need to be considered as a mature product?
8. How does NSF select which projects to support? Who manages the review and selection process?

### ELIGIBILITY

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9. My product is currently available as open-source but I intend to commercialize it. Can I submit a proposal to POSE?
10. Can I submit a proposal for the same open-source product to both Phase I and Phase II in the same funding cycle?
11. I have an open-source product that has been downloaded by multiple users but only my group contributes/develops content. Do I need to have external contributors/developers to submit for Phase I or Phase II funding?

12. I have an open-source data repository that my organization created and continues to maintain, but many people download data from and upload data to this repository. Can I submit a proposal for POSE funding to continue to maintain this repository?
13. I have an open-source product that is freely available for download on my website. Do I need an open-source license in place before submitting to Phase I or Phase II?
14. Are projects receiving other federal or non-federal funds for the development of the OS software eligible to receive POSE funding?
15. Will a for-profit organization be eligible as the lead organization by itself, or does it have to collaborate with a non-profit?
16. Can a for-profit organization make a proprietary product available as open-source and then submit a proposal for POSE funding to build a managing organization around it?
17. What are the legal requirements for a managing organization?
18. Can technical contributors to an open-source ecosystem funded by the POSE program be based outside the U.S.?
19. Can sub-awardees be non-U.S. organizations as long as the primary proposer is a U.S. organization that meets the solicitation's eligibility criteria?
20. My open-source artifact is not code or data, as such, but something else that does not fit either of these categories. Is my project eligible for POSE funding?
21. My team has not itself created an open-source product, but instead we have an idea for bundling several existing open-source artifacts together in a way that will add value to our user community. Can this kind of project receive POSE funding?
22. Most of the user community for my open-source product is international. Would POSE still be an appropriate source of funding for establishing an OSE for this product?
23. Who is the Principal Investigator (PI) on a POSE grant? What are the responsibilities of the PI?

## **PROGRAM DETAILS**

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24. What is the difference between POSE Phase I and Phase II proposals?
25. How do I decide whether to submit to Phase I or Phase II?
26. For a Phase I proposal, should the Community Building section focus on actual activities for engaging users, or should it describe a plan to identify those activities? Or a balance of both?
27. I have an open-source data repository that does not deal with sensitive data. Do I need to include the security plan that the solicitation requests? If so, what should I put in it?

28. Regarding security and collaborative infrastructure, do publicly-available version control platforms have sufficient state-of-the-art capabilities, or are more specialized, homegrown platforms preferred?
  29. How can POSE funding be spent? What development activities are allowable in a POSE project?
  30. How heavily weighted is sustainability in the Merit Review process? Specifically, does the proposal need to show how the managing organization will build and maintain a funding stream after POSE funding ends?
  31. How can I sign up as a reviewer for this program?
  32. How long will it take for my proposal to be reviewed?
  33. Do Letters of Collaboration need to follow the NSF Proposal & Award Policies & Procedures Guide (PAPPG) standard format for letters?
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## PROGRAM BASICS

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### 1. What is the goal of the NSF Pathways to Enable Open-Source Ecosystems (POSE) program?

The goal of the [NSF POSE program](#) is to fund new open-source ecosystem (OSE) managing organizations, each responsible for the creation and maintenance of infrastructure needed for efficient and secure operation of an OSE focused on a specific open-source product or class of products. The early and intentional formation of such managing organizations is expected to enhance the distributed development process, improve coordination of developer contributions, increase the size of the user community, and enable more focused route to impactful technologies.

The POSE program is not intended to fund:

- compensation for the developers of the open-source research products, including tools and artifacts;
- existing, well-resourced open-source communities, organizations, and/or ecosystems; or
- the development of products that are unavailable for open use.

Proposers working on a product where the intention is to commercialize may wish to consider NSF Small Business Innovation Research (SBIR) or Small Business Technology Transfer (STTR) program (see: <https://seedfund.nsf.gov/>).

## 2. What is the difference between an open-source product and an open-source ecosystem?

An open-source product is an artifact (e.g., software source code; hardware instruction sets, designs, and specifications; models, languages, formats, scientific methodologies and processes; manufacturing process and process specifications; data; etc.) that is made available freely to anyone and for any purpose using an open-source license. An open-source product is generally shared via the Internet (and often, but not always, through a public repository or version control system.) Users of the product may copy or adapt the product for their own purposes, but further development (if any) is usually done solely by the original authors.

In contrast, an open-source ecosystem (OSE) is a self-sustaining organization that enables ongoing development of open-source products designed to be publicly accessible, modifiable, and distributable by anyone under an open-source licensing model. Ideally, such organizations have formalized and documented governance procedures, a multi-stakeholder governing body, protocols for on-boarding new members, and other features. The socio-technical processes and mechanisms for continuous development, integration, and deployment of the product are typically sustained by a decentralized and open network of contributors who provide their time and expertise to develop and maintain the open-source products.

## 3. What are the funding priorities for the POSE program?

The program seeks two types of proposals. Phase I allows teams to propose specific activities to *scope and plan* the establishment of an OSE, and Phase II allows teams to *establish* a sustainable OSE. For both proposal types, the proposal must document a robust open-source product that shows promise in the ability to both meet an emergent societal or national need(s) and build a community to help develop it.

POSE Phase I proposals must describe the current context and, to the extent known at the time of the proposal, the long-term vision and potential impact of the proposed OSE. The proposal should include specific scoping activities that will inform plans for ecosystem discovery. Scoping in this context means discovering the potential for growth and sustenance of the user, developer, and other related communities. Phase I projects should also include activities to develop formal organizational and governance structure(s); continuous development, integration, and deployment of the open-source product(s); and community building for users and intellectual content developers.

POSE Phase II proposals describe the transition of an existing, promising open-source product into a sustainable and robust OSE. Phase II proposals are expected to have conducted the relevant scoping activities (not necessarily via a POSE Phase I award)

needed to develop a detailed project plan. Phase II proposals must include a community outreach plan that outlines activities to engage the intended intellectual content developer community. The proposal must also provide evidence about the composition of user communities and/or organizations that will serve as adopters of the technology.

Examples of suitable open-source products that can serve as the focal point of an OSE include, but are not limited to software, hardware, models, specifications, programming languages, research tools, products, and services, or data platforms. These products can arise from any area of Science, Technology, Engineering, and Mathematics (STEM) research and development.

#### 4. **How is POSE different from other Infrastructure programs at NSF?**

##### a. **How is POSE different from the NSF's Cyberinfrastructure for Sustained Scientific Innovation?**

[NSF's Cyberinfrastructure for Sustained Scientific Innovation \(CSSI\)](#) program supports innovation in software, data, tools, and services that enhance scientific cyberinfrastructure and enable scientific discovery. CSSI supports open-source development, software robustness efforts, and specialized communities. CSSI does not require that a product is or becomes licensed as open source.

In contrast, the POSE program supports the scoping, planning, and development of a managing organization for a specific, mature, open-source licensed product. POSE supports development of organizational structures, governance processes, and infrastructure needed for a sustainable OSE with broad societal impacts. The POSE program welcomes proposals from previous CSSI awardees, assuming the OS product in question has the potential for broad societal impact.

##### b. **How is POSE different from Community Infrastructure for Research in Computer and Information Science and Engineering?**

The [Community Infrastructure for Research in Computer and Information Science and Engineering \(CIRC\)](#) program funds the creation and enhancement of world-class research infrastructure in three participating CISE divisions: Computing and Communication Foundations (CCF), Computer and Network Systems (CNS), and Information and Intelligent Systems (IIS). Projects can include efforts to develop shared equipment, testbeds, software, and data repositories needed to push the limits of computing, communications, and information systems.

The POSE program is not limited to projects fitting under the CISE umbrella. POSE funds the scoping, planning, and development of OSE managing organizations, but does not fund development of the open-source product. The

POSE program welcomes proposals from previous CIRC awardees, assuming the OS product in question has the potential for broad societal impact.

**c. How is POSE different from Infrastructure Capacity for Biological Research?**

The [Infrastructure Capacity for Biological Research \(Capacity\)](#) program supports implementation of, scaling of, or major improvements to research tools, products, and services that advance contemporary biology and that are broadly applicable to a wide range of researchers.

POSE is not limited to projects fitting under the umbrella of biology. The POSE program welcomes proposals from previous Capacity awardees, assuming the OS product in question has the potential for broad societal impact.

**5. Could you elaborate on what "ecosystem discovery" means?**

For POSE Phase I projects, the size and composition of the user and contributor communities may not be well known. For example, if numerous users have downloaded an open-source artifact, but why and how they use it is unknown, it is difficult to ascertain whether the artifact has the potential to be used by many others. Ideally, Phase I award recipients may use some of their funding to discover details about their user and developer communities, so that they can plan appropriately for the scope and capabilities of a managing organization.

POSE Phase II proposals must present evidence documenting the known and expected composition of user and developer communities to justify the proposal's claims for broader impacts. This user and developer discovery does not preclude additional discovery activities in a Phase II award. For example, an open-source artifact that is already impactful in one area may also have the promise of a new application domain.

**6. The solicitation mentions, "POSE is not for existing, well-resourced OSEs." What does well-resourced mean? Our project has received previous funding for developing the product: Does that mean we are "well-resourced?"**

There is a continuum of ecosystem development ranging from nothing-at-all to large, long-standing advocacy organizations. The POSE program aims to catalyze the creation and enhancement of ecosystems and managing organizations that have not yet reached a self-sustaining state. If an open-source product already has a managing organization that is self-sustaining, it is unlikely that it would be prioritized for support from the POSE program. On the other hand, if there is no existing managing organization or the existing ecosystem has never received funding for community management, governance development, market research, etc., then it would be sensible to submit a proposal for POSE funding.

**7. How many active end-users does an open-source product need to be considered as a mature product?**

There's no specific cutoff point for the appropriate number of end users. Proposers should contextualize the current user base and its future potential in relation to the broader societal impacts of the project. Proposers with open-source products that have few users today but demonstrable potential for future impact are encouraged to submit. An obsolete open-source product with many users might not be competitive if it is near the end of its life-cycle. POSE Phase I award recipients can use funding to help discover and document the potential for impact. Phase II proposals must provide compelling evidence for expected impact.

**8. How does NSF select which projects to support? Who manages the review and selection process?**

Both POSE Phase I and Phase II proposals are carefully reviewed according to the [NSF Merit Review Process](#). The [timeline for the proposal review and award process](#) is 6 to 8 months.

During the NSF POSE Merit Review Process, at least three experts with relevant technical and/or market expertise assess how the proposal meets the review criteria. The Merit Review Criteria and Additional Solicitation Specific Review Criteria are listed in the solicitation. Reviewers are selected by NSF Program Directors who, in turn, lead and oversee the review process. Each Program Director uses the proposal itself, the reviewers'/panelists' statements, the panel summary (if available), their knowledge of the field and marketplace, and other programmatic factors to make a recommendation for funding or declination.

## ELIGIBILITY

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**9. My product is currently available as open-source but I intend to commercialize it. Can I submit a proposal to POSE?**

If you are seeking funding to develop and commercialize a product or service based on open-source and/or proprietary technology, consider submitting to the NSF Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) program, which funds small businesses to develop new leading-edge technologies that offer the potential for commercial and societal impact. For more information, please visit <https://seedfund.nsf.gov/>.

POSE program funding is intended to establish, enhance, and grow ecosystems in which the core products are presently and will remain licensed as open source.

**10. Can I submit a proposal for the same open-source product to both Phase I and**

## **Phase II in the same funding cycle?**

No, the requirements for POSE Phase I and Phase II are very different. If you received Phase I funding in a previous funding cycle, it is entirely appropriate to submit a proposal for Phase II funding for the same product. In this case, the Phase II proposal should clearly describe how Phase I funding supported the scoping and planning of the OSE.

Proposers who have not submitted for (or received) a Phase I award are eligible to submit a proposal for Phase II funding. Please consult the solicitation for more information.

### **11. I have an open-source product that has been downloaded by multiple users but only my group contributes/develops content. Do I need to have external contributors/developers to submit for Phase I or Phase II funding?**

You do not need external contributors/developers to submit a proposal for Phase I funding; rather, it is recommended to have some external users (along with letters describing the nature of their participation) for Phase I proposals.

For Phase II proposals it is recommended that you have external users as well as some external contributors/developers (along with letters describing the nature of their participation). POSE Phase II awards can support efforts to make the OSE sustainable with respect to stability and succession in the developer community.

### **12. I have an open-source data repository that my organization created and continues to maintain, but many people download data from and upload data to this repository. Can I submit a proposal for POSE funding to continue to maintain this repository?**

POSE proposals are intended to catalyze a managing organization to enable ongoing collaborative development of an open-source product. The content that is added by external contributors needs to add intellectual value to the open-source product being developed. If external contributors are only adding raw data (for example, without specific use cases, models, tools, or other supporting material), then such a project may not be a good fit for POSE. Such efforts could consider one of NSF's cyberinfrastructure programs instead.

### **13. I have an open-source product that is freely available for download on my website. Do I need an open-source license in place before submitting to Phase I or Phase II?**

While a *specific* open-source license need not be identified prior to a Phase I proposal submission, it is expected that such a license will be in place prior to submitting for



Phase II funding and that the Phase II proposal will contain a rationale for the type of license selected. Both Phase I and Phase II proposals should make evident the team's long-term commitment to maintaining the product under an open-source license.

**14. Are projects receiving other federal or non-federal funds for the development of the OS software eligible to receive POSE funding?**

Projects receiving other sources of funding for development of the core OS product are eligible to receive POSE funding. POSE funding focuses on scoping/planning (Phase I) and creation/building (Phase II) of an open-source ecosystem (including the managing organization). POSE funding may not be used to compensate development of the core OS product(s).

Proposals should describe, in the Project Description, existing and anticipated sources of funding for the open-source product and provide a justification of why POSE funding would not be duplicative.

**15. Will a for-profit organization be eligible as the lead organization by itself, or does it have to collaborate with a non-profit?**

Yes, proposals may be submitted by for-profit U.S. organizations, including small businesses with strong capabilities in scientific or engineering research or education, with or without collaboration with non-profits.

**16. Can a for-profit organization make a proprietary product available as open-source and then submit a proposal for POSE funding to build a managing organization around it?**

Possibly, but make sure to review the solicitation's recommendations and requirements for the open-source product. An artifact that is the subject of a POSE proposal should *already* be publicly available as open source, ideally with an appropriate open-source license governing its distribution. Additionally, the open-source version of the product should currently be in use by some users and/or some developers external to the proposing entity.

The solicitation is not intended to fund existing well-resourced, open-source communities or ecosystems, so a proposal about a formerly proprietary product must justify why the for-profit entity would not be able to sustain the product without NSF funding.

**17. What are the legal requirements for a managing organization?**

Review Section IV (Eligibility Information) of the solicitation carefully for information about the ownership structure of the proposing organization. While it is true that many

mature open-source managing organizations are constituted as 501(c) non-profits, formally establishing a non-profit is not a requirement to receive POSE Phase I or Phase II funding. With that said, Phase II proposals should clearly describe the proposer's vision and plans for forming and sustaining the managing organization and what form that organization will take.

**18. Can technical contributors to an open-source ecosystem funded by the POSE program be based outside the U.S.?**

While NSF welcomes international collaborations, non-U.S. based entities and personnel cannot receive NSF funds.

**19. Can sub-awardees be non-U.S. organizations as long as the primary proposer is a U.S. organization that meets the solicitation's eligibility criteria?**

Non-U.S. based entities and personnel cannot receive NSF funds, either directly or indirectly. The only exception allowable under the POSE solicitation is for international branch campuses of a U.S. institution of higher education. If the proposal includes funding to be provided to an international branch campus of a U.S. institution (including through use of sub-awards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus and justify why the project activities cannot be performed at the U.S. campus.

**20. My open-source artifact is not code or data, as such, but something else that does not fit either of these categories. Is my project eligible for POSE funding?**

The POSE program defines an open-source artifact broadly to include software source code, hardware instruction sets, designs, and specifications, models, languages, formats, scientific methodologies and processes, manufacturing process and process specifications, and data. This is intended to be only a partial list of the most common types of open-source artifacts. Other types of intellectual property could fit the intent of the solicitation as well. The ease of distribution for other intellectual property types may be salient to the broader impacts of the project, however, and as such should be discussed in the proposal.

**21. My team has not itself created an open-source product, but instead we have an idea for bundling several existing open-source artifacts together in a way that will add value to our user community. Can this kind of project receive POSE funding?**

In theory, yes, but the proposal would have to adequately address the added complexity that may arise from coordination of development activities across a varied set of open-source products. To address NSF's *Broader Impacts* Merit Review Criterion, the proposal would also need to justify why bundling the open-source products together is

expected to have positive societal impacts beyond the existing benefits of the individual open-source products. The proposal would also need to describe how the OSE managing organization would manage projects already under the auspices of other project owners.

**22. Most of the user community for my open-source product is international. Would POSE still be an appropriate source of funding for establishing an OSE for this product?**

If the proposal adequately addresses the Broader Impacts criterion in the NSF Proposal & Award Policies & Procedures Guide ([PAPPG](#)) as well as any program-specific criteria, having an international user base for an open-source artifact is not a barrier to seeking POSE funding.

**23. Who is the Principal Investigator (PI) on a POSE grant? What are the responsibilities of the PI?**

The NSF Proposal & Award Policies & Procedures Guide ([PAPPG](#)) contains a functional definition of principal investigator and other senior roles on an NSF award. The POSE solicitation includes some additional eligibility requirements describing who may serve as a principal investigator. Review Section IV (Eligibility Information) of the solicitation for more information.

## **PROGRAM DETAILS**

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**24. What is the difference between POSE Phase I and Phase II proposals?**

POSE Phase I projects are scoping projects and are intended for teams that have a mature open-source product that is publicly accessible, preferably with some external third-party users and/or content contributors. It is expected that Phase I proposers may not have previous experience in building an OSE and are unsure of the needs and composition of their end-user communities. Key goals of Phase I products included developing an improved understanding of the potential user community for the project and/or planning the development of an OSE.

POSE Phase II projects are aimed at establishing and/or developing an OSE. Teams submitting proposals for Phase II funding should have a mature open-source product that is publicly accessible and open-source licensed, with external third-party users and external third-party content contributors, as well as the basic mechanisms in place to enable continuous development, integration, and deployment. Some of the requested funding may be directed towards creating processes and structures that enable the product to evolve with the state-of-the art. The proposers need to demonstrate at least a rudimentary understanding of the needs and composition of their end-user communities.

Both Phase I and Phase II projects should have as their goal the development of a sustainable OSE that addresses a current or emergent societal, national or economic need.

**25. How do I decide whether to submit to Phase I or Phase II?**

Consider a Phase I submission if your open-source product is already freely available with some existing external users outside of your group, but you don't have any external contributors who help develop content. POSE Phase I projects are scoping projects for developing an improved understanding of the potential user community for the project and/or planning the development of an OSE.

Consider a Phase II submission if your open-source product is publicly distributed, already licensed as open-source, has a base of existing external users outside of your group, and has a community of external contributors who help develop the product. Phase II projects are aimed at establishing and/or developing a sustainable OSE.

**26. For a Phase I proposal, should the Community Building section focus on actual activities for engaging users, or should it describe a plan to identify those activities? Or a balance of both?**

Phase I proposals are primarily for scoping and planning. Scoping includes the discovery of the size and composition of the user and developer communities; planning includes developing and testing methods of engagement with existing and prospective users and developers. As Phase I award recipients may wish to apply later for Phase II funding, a Phase I proposal should use the Community Building section to plan the essential groundwork for effective community engagement in the near future. In contrast, the Community Building section of a Phase II proposal should describe a substantive, detailed plan for growing the relevant communities in the ecosystem.

**27. I have an open-source data repository that does not deal with sensitive data. Do I need to include the security plan that the solicitation requests? If so, what should I put in it?**

Even publicly available and seemingly non-sensitive information can involve security risks. In the context of open source, security risks may also be related to supply chain vulnerabilities. Effective development, integration, and deployment of an open-source product depend in part on the managing organization's ability to track and control the provenance of all elements of the intellectual property of the OSE. The solicitation indicates that the managing organization's development model should include, "processes for ensuring quality, security, privacy or ethical concerns of new content." Proposers are also encouraged to consult the Open Source Security Foundation's [best practices](#).

Projects collecting or re-using data involving living human participants (including but not limited to actual and or potential OSE participants) may also need [Institutional Review Board \(IRB\) certification](#).

**28. Regarding security and collaborative infrastructure, do publicly-available version control platforms have sufficient state-of-the-art capabilities, or are more specialized, homegrown platforms preferred?**

The POSE solicitation does not specify a preference. Proposers should articulate why and how the selected platform for distribution and version control is appropriate for the open-source product in question.

**29. How can POSE funding be spent? What development activities are allowable in a POSE project?**

The solicitation indicates that the OSE managing organization, "coordinates an external distributed developer community; interfaces with and supports a community of users; provides training and on-boarding to new developers and users; enables efficient continuous development, integration and deployment of the open-source product; maintains an efficient supply chain; ensures security, privacy and reliability of all aspects of the OSE operations; and maintains appropriate organizational governance practices." POSE funding may be used to provide salary to any staff who will assist in the planning, scoping, development, or governance of the OSE, including the principal investigator (PI) and co-PIs, students, infrastructure developers, and marketing, administrative, and/or legal professionals. The narrative budget justification should clarify costs and effort associated with each role as required by the NSF Proposal & Award Policies & Procedures Guide ([PAPPG](#)), regardless of whether the work is subcontracted.

The budget for POSE proposals may include salary for developers, but only for specific purposes unrelated to the development of the core product. The solicitation states, "POSE program does not itself support further development of open-source products. A key attribute of OSEs is a distributed development model in which external intellectual content contributors use a continuous development, integration, and deployment model to develop and/or maintain the core open-source product."

**30. How heavily weighted is sustainability in the Merit Review process? Specifically, does the proposal need to show how the managing organization will build and maintain a funding stream after POSE funding ends?**

POSE funding is intended to catalyze the creation and growth of a sustainable managing organization. In particular, the solicitation indicates that the goal of Phase II awards is to, "*establish* a sustainable OSE based on a robust open-source product that shows promise in the ability to both meet an emergent societal or national need and

build a community to help develop it."

**31. How can I sign up as a reviewer for this program?**

To be considered as a potential reviewer, please send an email with your resume to [pose@nsf.gov](mailto:pose@nsf.gov). Please note: You will not be able to serve as a reviewer for proposals received for a particular submission deadline if you are part of a team that has submitted a proposal for the same deadline.

**32. How long will it take for my proposal to be reviewed?**

NSF attempts to have most submissions processed within six to eight months of receipt.

**33. Do Letters of Collaboration need to follow the NSF Proposal & Award Policies & Procedures Guide (PAPPG) standard format for letters?**

Each letter writer should clearly describe how they have contributed and will continue to contribute to the development of an OSE. These letters do not have to conform to the standard format specified in the PAPPG. Each letter of collaboration (not to exceed two pages) must include the name of the letter writer, current affiliations (institution or place of employment), and relationship to the members of the proposing team.