
NSF
NSF's Pathways to Enable
Open-Source Ecosystems

Pathways to Enable Open-Source Ecosystems (POSE)

Welcome!

In this session:

- Opening remarks – Dr. Erwin Gianchandani
- Overview presentation
- Q&A – please submit questions via the Q&A function in Zoom

Solicitation: Pathways to Enable Open-Source Ecosystems

FAQs: POSE FAQs

DIRECTORATE FOR TECHNOLOGY, INNOVATION AND PARTNERSHIPS (TIP)

- Use-inspired, challenge-driven, convergent research
- Innovation and technology translation
- Leveraging the virtuous cycle of foundational and use-inspired research
- Long-term, large scale
- Public-private partnerships
- Education, workforce, diversity


NSF
NSF's Pathways to Enable
Open-Source Ecosystems

Pathways to Enable Open-Source Ecosystems (POSE)

Vision: Harness the power of distributed open-source development as an engine of innovation to address challenges of national and societal importance

Solicitation: Pathways to Enable Open-Source Ecosystems

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

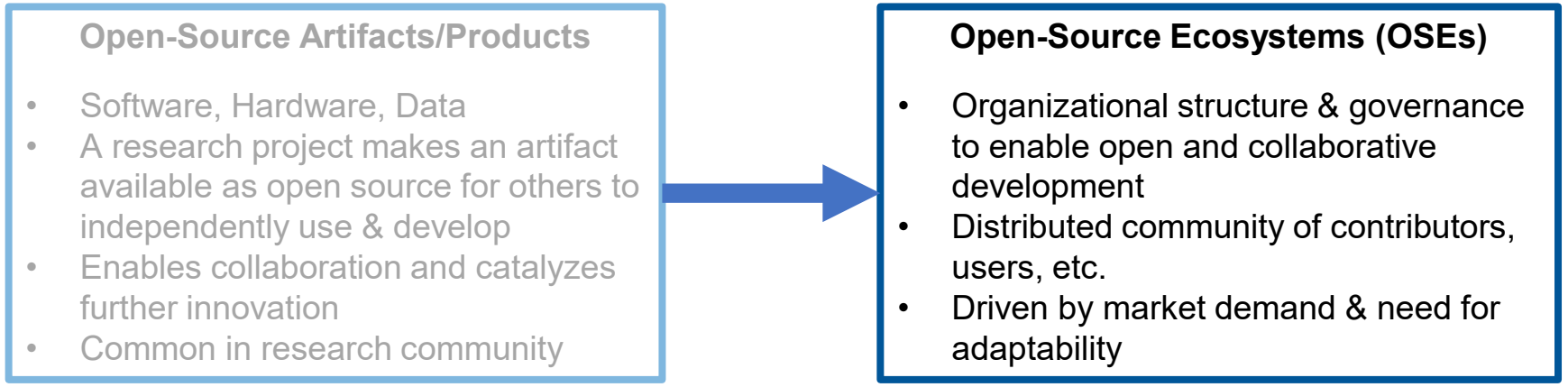
POSE Background

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

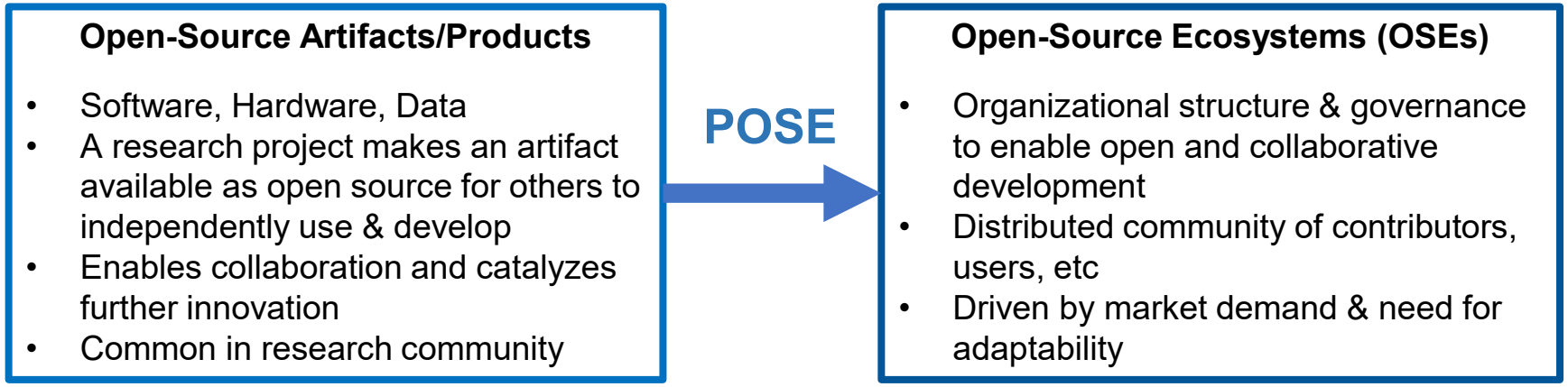
Open-source Product vs OSE

- Open-source Product
  - Original source code available online
  - External users
  - All development/updates done by original authors
  - Minimal support for users: limited documentation, bugs reported and features requested by email
- Open-Source Ecosystem (OSE)
  - Original source code available online (e.g., GitHub)
  - External users
  - External contributors, with onboarding mechanisms
  - Comprehensive user support
  - Continuous integration, delivery and deployment infrastructure with security, privacy and quality control mechanisms in place

OSE Success Stories with NSF Roots

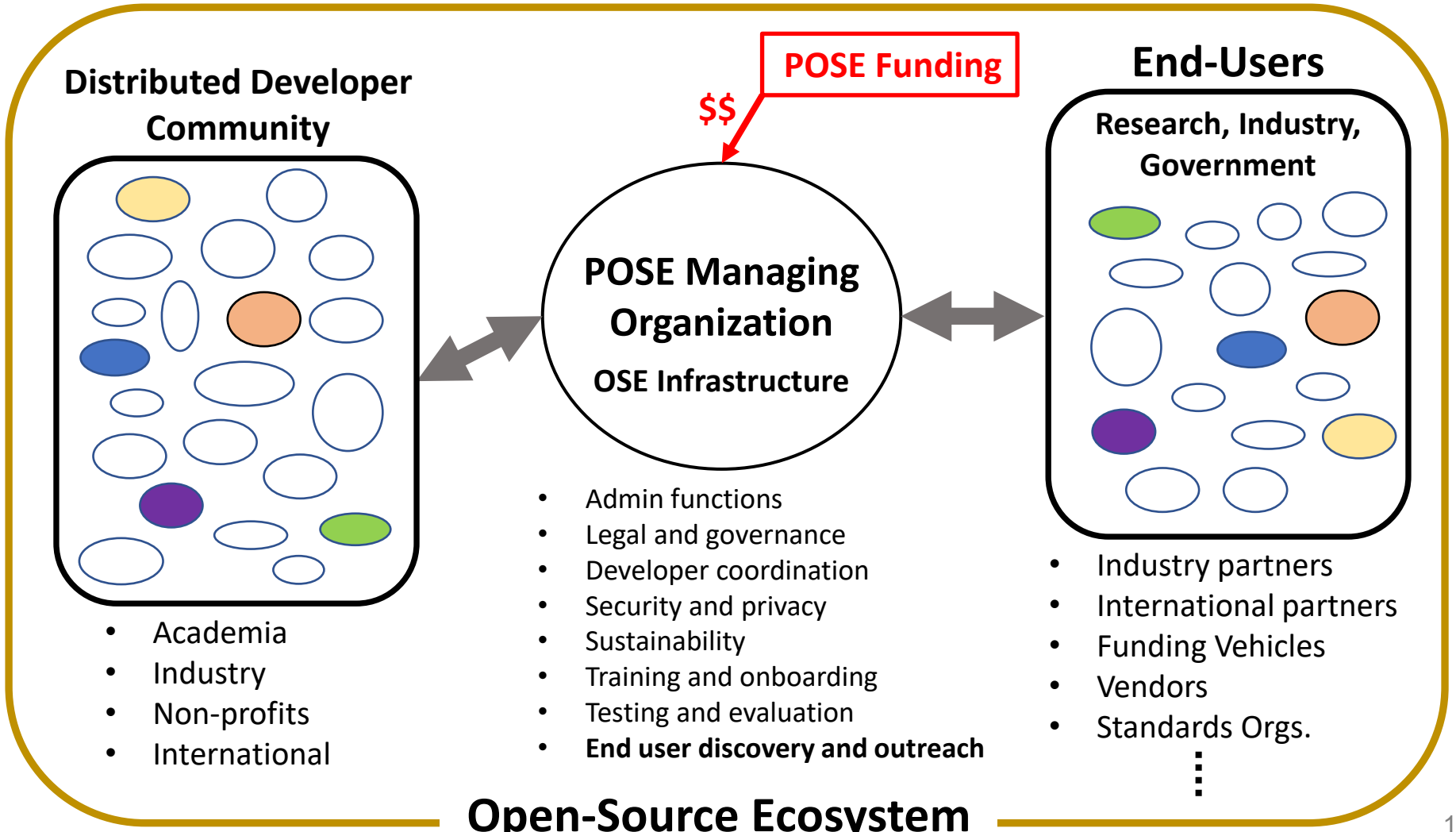
- Software: Apache Spark
  - Unified analytics engine for large-scale data processing
  - Research project (2009) -> Apache Foundation (2013)
  - One of most widely used technologies in big data and AI
- Hardware: RISC-V
  - Open standard instruction set architecture (ISA) for hardware
  - Research project (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 the early and intentional transition from an open-source product to an OSE

POSE managing organization



What POSE Is

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

- Broader impact: will the OSEs address significant challenges of societal, national or economic importance?
- Mature: 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 the right approach?
- NSF Objective: to apply public funds where they will be most impactful

What POSE Is Not

- 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
- Not intended to support open-source ventures for which profit is the primary motive

How is POSE different from OS projects currently funded by NSF?

- For example:
  - Cyberinfrastructure for Sustained Scientific Innovation (CSSI, NSF 21-617)
  - CISE Community Research Infrastructure (CCRI, NSF 22-509)
  - Infrastructure Capacity for Biological Research (Capacity, NSF 21-501)

- None of these programs supports development of an OSE infrastructure – POSE does support this

External Third-Party Contributors

Example: Open-source data

- Proposal to build data repository
  - Centralized infrastructure and tools development
  - External users download/upload data

  ✗ probably not a good fit for POSE

- Proposal to build integrated data platform
  - De-centralized infrastructure and tool development
  - Contributors may contribute tools or upload data along with supporting models, scenarios and other intellectual content

  ✓ **possibly a good fit for POSE**

- External content contributors to POSE funded projects are expected to contribute intellectual content

Two types of POSE awards

- Phase I – OSE Scoping Awards
- Phase II – OSE Development Awards
- Applicants can apply for one or other of these awards, but not to both for the same project
- A Phase I award is not a prerequisite for Phase II

POSE Phase I Project

- OSE Scoping project – proposal should address:
  - Ecosystem discovery – a plan to understand the end-user ecosystem
  - Organization and governance – plan for establishing a sustainable organization
  - Community building – strategy to engage content contributors who will help develop and maintain the open-source product
- 7-page project description (does not include Letters of Collaboration or the Data Management Plan)
- Up to $300K
- Up to 12-month duration

POSE Phase II Project

- 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

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
- POSE should not be used to fund developers to create or improve an open-source artifact, tool or product

Mandatory training

- 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
- Training is provided for Phase I and Phase II awardees

Security Plan

- Data Management Plan **must** include mechanisms to ensure:
  - 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)

Eligibility and fit for POSE

- 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 subawardees
- Projects that are not based on distributed, ongoing development of a mature open-source artifact, tool or product will not be a good fit with the POSE program
- See the solicitation for details

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

How do I apply?

- Detailed instructions in the solicitation - NSF 22-572
- Submission deadlines (submit via research.gov only):
  - Phase I – May 12, 2022
  - 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
- Office hours to answer your questions will be held in April
- Send email or one-page executive summary to pose@nsf.gov

One-Page Executive Summary

- If you email a one-page (or less) executive summary, please ensure it addresses the following questions:

1. Do you currently have external users outside of your group?
2. Do you currently have external contributors who provide content and/or help develop the open-source product?
3. Do you currently have an organizational or governance structure that enables collaborative development?
4. What activities will POSE funding support?
5. What is the expected Broader Impact of the proposed OSE?

Q&A

POSE Working Group

- **Nina Amla (CISE/CCF)**
- **Peter Atherton (TIP/TI)**
- **Lakshmi Balachandran (TIP/OAD)**
- **Christopher Balakrishnan (BIO/DEB)**
- **Robert Beverly (CISE/OAC)**
- **Sarit B. Bhaduri (ENG/EEC)**
- **Richard Dawes (MPS/CHE)**
- **Jean X. Gao (BIO/DBI)**
- **Michael E. Jackson (GEO/OPP)**
- **Mimi McClure (CISE/CNS)**
- **Deepankar Medhi (CISE/CNS)**
- **Rebecca Shearman (TIP/ITE)**
- **Chia Shen (EHR/DRL)**
- **Sylvia J. Spengler (CISE/IIS)**
- **Patricia Van Zandt (SBE/BCS)**
- **Teresa Westfall (TIP/OAD)**

POSE email: pose@nsf.gov
FAQs: POSE FAQs
Solicitation: Pathways to Enable Open-Source Ecosystems

Slide 1

POSE logo

Slide 2

Thank you all for joining the webinar.

In this webinar we'll be introducing a new NSF program entitled "Pathways to Enable Open-source Ecosystems", or POSE.

The webinar will be divided into three parts. First, Dr. Erwin Gianchandani will deliver opening remarks. Dr. Gianchandani heads up the newly created NSF Directorate for Technology, Innovation and Partnerships.

Following this I'll give an overview of the POSE program and highlight some important points to keep in mind if you're planning to submit a proposal. And finally, we'll have an open Q&A, during which I will be joined by other members of the POSE working group. If you have questions, please submit them using the Q&A function in Zoom. You can submit questions at any time.

The presentation slides will be available after the webinar at the solicitation web page and will include the script that I'll be reading.

So I would now like to invite Dr. Gianchandani to deliver his opening remarks.

Slide 3

Thank you. Good afternoon everyone or good morning, depending on where you might be located.

My name is Erwin Gianchandani. I serve as the NSF Assistant Director for Technology Innovation and Partnerships or TIP.

It's my pleasure to welcome you to this webinar today. We are really thrilled all of us on this call. You'll get a chance to meet the members of the team that have been working on the POSE program for quite some time now.

We're thrilled to be able to talk about Pathways to Enable Open-Source Ecosystems or Pose-- something that has indeed been long in the works over the course of several months, almost a year or so, at this point.

Before I give you a little bit of a snapshot about POSE and high order bit about our goals with this program, I think I'd be remiss if I didn't address one other bit of news from NSF over the course of the last week or so. As many of you may know, and as Peter sort of hinted at we at NSF are pleased to launch a new Directorate for Technology, Innovation and Partnerships week ago today. This is NSF first new directorate in 32 years. It's truly a once in a generation activity and hopefully for the community, a once in a generation opportunity as well.

What's new--what's different with this particular directorate? The way I'd summarize it is that we have a threefold set of foci for the purposes of the mission and vision for this directorate.

First, is to be able to cultivate innovation ecosystems throughout the U.S. that allow us to be able to advance use inspired research with a particular focus on the breakthrough technologies and societal and economic challenges that we face, and how those technologies can help to address those societal and economic challenges.

Second, it's about trying to enhance the translation of emerging technologies to the market and to society more generally, and I'll say a little bit more about that in the context of POSE in just a moment.

And third, it's about trying to be able to leverage partnerships that bring researchers and practitioners together, to be able to really pursue those efforts that I just described.

What we announced last week with the establishment of this directorate in many ways is a first step. We look forward to Congressional action on the Bipartisan Innovation Act to really help us realize the vision for TIP in the longer term.

Now, for the purposes of this particular webinar, you've heard a little bit about this new directorate and this emphasis around technology translation. I really want to drill a little bit deeper into that emphasis. NSF has been a leader over the years in taking research results from the lab to the market.

Through programs that we've pioneered for the rest of the Federal Government, and those programs include activities like Partnerships for Innovation, the NSF I-Corps™ program which provides entrepreneurial education to the Community and really helps with customer and market fitness, and our Small Business Innovation Research--Small Business Technology Transfer, SBIR/STTR, programs as well, which allow for deep technology ventures to really be piloted and hardened and ultimately, result in new products, new startups new small businesses.

Having said that, we also see a tremendous opportunity to think about new avenues additional pathways to help realize the translational impact of the research that me and others fund.

It's not just about translating research results to startups and small businesses and markets, though, we certainly are very excited about the work that we support there, but it's also about thinking about other forms.

You could imagine, for instance, research results that can serve to inform new policymaking by other agencies in the Federal Government. Research results from the education space, for instance, that could potentially be scaled at the K-12 levels or at the level of institutions of higher education and so forth.

In the context of this particular webinar, our interest is around how can we take research results products that come out of research labs and think about translating them into open-source ecosystems. And how do we provide the research community broadly read with the training, the capacity, the resourcing to really be able to facilitate that translation from an open-source product to an open-source ecosystem.

When we think about open-source ecosystems, and you'll hear Peter and others describe it shortly, we really view this as an important counterpoint, not a replacement, but an important counterpoint to the more common for-profit lab to market approach that we just talked about.

Open-source ecosystems allow us to be able to bring together large multi-disciplinary, multi-sector stakeholders to encourage innovation, including rapid prototyping. Key aspect here for us is to really be able to demonstrate the potential of a technology or product. And we've seen how these sorts of ecosystems have really allowed us to be able to give rise to positive impacts, not just on society, but also positive on our economies more generally as well. You'll hear about some examples of those in just a little bit.

Now, when we think about open-source ecosystems, oftentimes the default is to contemplate open-source software and, indeed, we hope to be able to imagine OSC that emerged from software-based approaches, but we also want to think about the fuller spectrum. Whether it be hardware, whether it be new tools, new artifacts, new approaches that could potentially be harnessed into open-source ecosystems going forward, and ones that span all of the disciplines, all of the

science and engineering areas that the National Science Foundation has a history of supporting as well. Whether it be computing or bio or geosciences or math and physical sciences and beyond, I'd encourage you to think broadly and widely as you contemplate potential open-source ecosystems of the future.

Finally, I think it's important for us to also pay attention to not just cultivating these ecosystems and thinking about the translation of these products to ecosystems, but also thinking about the security, the reliability, the trustworthiness of these ecosystems, as we looked at the future as well. That's something that you will find our program officers stressing when we describe the program the goals of the program, and the specific investments that we'd like to make, through this program as well.

Really, the importance of security and reliability of privacy of ethics, with respect to open-source data, open-source software, open-source hardware, open-source ecosystems that we hope to cultivate into the future.

With that, I hope this gives you at least at a high-level sense of what we're trying to do here--thinking about a new translational pathway that allows us to be able to take the research that we're supporting and cultivating these ecosystems that can allow for further innovation, further productivity, and ultimately allow for another approach to technology translation.

Before I close, I would be remiss if I didn't thank our colleagues on this call, who have made this effort a possibility--a reality in fact. You're hearing from Peter Atherton, Program Officer in the TIP Directorate, who has been helping to co-lead this effort with Nina Amla from the Computing directorate as well as with AAAS Fellow, Lakshmi Balachandra. I also want to acknowledge the rest of the team. Peter will mention all of the team members in just a moment, who've been instrumental from all of the directorates across the Foundation in orchestrating this effort.

With that, I will pause and hand the microphone back to Peter. Thank you all again very much for your interest in your engagement, and really looking forward to seeing what comes of this effort, this pilot effort that we're starting this year.

Slide 4

Thank you, Erwin.

I'd like to begin this presentation by stating the aim of the program in its broadest terms. The overarching vision of the POSE program is to harness the power of distributed open-source development as an engine of innovation to address challenges of national and societal importance.

So let's now unpack this statement to better understand what it means in practice.

Slide 5

I'll start by defining what we mean by open-source.

Open-source refers to intellectual property of some sort that is publicly available and that people can modify and share. It can be in any of a number of forms, including, for example, 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; or data.

Slide 6

We're all familiar with the use of open-source artifacts and products. These are common in the research community, for example, where a research project may result in a product that is made available as open-source for others to use and develop independently, enabling further collaboration and catalyzing further innovation.

As you probably know, NSF has a long history of funding research projects that result in the development of open-source artifacts and products.

Slide 7

In some cases, an open-source product becomes widely adopted and forms the basis for a self-sustaining open-source ecosystem (or OSE) that includes a distributed community of developers and a broad base of users across academia, industry, and government.

As the end-user community grows, and reliance on the open-source product becomes more critical, the founding team may create a managing organization to facilitate ongoing development and enable scalable distribution of the open-source product. This may be done through a foundation, for example. Development contributions are coordinated by this organization and, in turn, are driven by the needs of users across a range of applications.

Slide 8

It's important to appreciate the distinction between an open-source product and an OSE.

In the case of an open-source product that's available in the form of software, the source code will typically be available online; there will be external users – in other words, users outside the development team; all development and updates

will be carried out by the original authors; and a minimal level of support will be available to users.

On the other hand, an OSE built around a similar product will typically include external development contributors; mechanisms to onboard new contributors; comprehensive user support; and infrastructure to enable continuous integration, delivery, and deployment of the product with security, privacy, and quality control mechanisms in place.

I want to emphasize that I've used software simply as an example. The same general principles apply to open-source products in other forms.

Slide 9

There are many OSEs that have had broad and measurable impact in different ways. I'll briefly describe just three examples that have their roots in NSF-funded programs.

Spark is a unified analytics engine for big data processing that started as an open-source research project in 2009. As it transitioned into an OSE it moved to the Apache foundation in 2013 and is now one of the most active projects in Apache, with over 1000 contributors from 250 different organizations. Apache Spark is one of most widely used technologies in big data and AI, with broad adoption in industry.

RISC-V is open-standard instruction-set-architecture for building hardware. This also started as a research project in 2010, and then became a non-profit corporation, the RISC-V foundation, in 2015. In 2020, RISC-V International was created as a Swiss non-profit with a new, more inclusive membership structure. RISC-V has enabled academics and small device manufacturers to design and experiment with building hardware without having to pay royalties.

Galaxy is a scientific workflow & data integration platform for computational biology. It started as research infrastructure for biological data analysis in 2005, and became an integrated data platform under Academic Free License, with an active community of tens of thousands of users across the world. Galaxy makes analyses accessible to all researchers, ensures analyses are completely reproducible, and makes it simple to communicate analyses so that they can be reused and extended.

Slide 10

Historically, OSE managing organizations have been created in response to a growing user community, which has forced the creation of infrastructure and governance mechanisms.

In contrast, the purpose of the POSE program is to close this gap by enabling the early and intentional transition from an open-source product to an OSE, ahead of expected demand. The aims are to ensure, firstly, that user needs are understood early and targeted by the developer community and, secondly, that critical OSE infrastructure is in place early to enable scalability while also ensuring reliability, security, and privacy. Our belief is that early and intentional establishment of the OSE managing organization will ensure the most efficient route to generating impact.

Slide 11

This next slide shows the structure of a typical OSE as envisioned under the POSE program.

In this ecosystem a community of developers, shown on the left, makes ongoing contributions to a mature open-source product. These contributions are

coordinated by a managing organization, shown in the center, that is charged with ensuring the open-source product is focused on addressing a specific societally important need.

The managing organization is responsible for a range of additional activities in service of this goal, including: coordination and quality control of developer contributions; security and privacy; training and onboarding of contributors; ensuring long-term sustainability of the ecosystem; and, depending on the context, other functions such as testing and evaluation.

An especially critical function of the managing organization is to discover and establish relationships with end user communities across the research enterprise, industry, and government, shown on the right in this figure, and to ensure that development efforts are directed to addressing the needs of these end users in alignment with the broader impact objectives of the OSE.

The managing organization is also responsible for implementing appropriate governance practices and maintaining relationships with downstream parties such as industry partners, potential funding sources, standards organizations, and so on, as needed.

It's important to appreciate that the POSE program will provide funding for the managing organization, as indicated in red in the figure. It will not provide funding for ongoing development of the open-source product.

Slide 12

It might be helpful to briefly summarize what POSE is and what POSE is not. Firstly, what it is.

First and foremost, a POSE OSE must be focused on addressing a significant challenge of societal, national, or economic importance.

As mentioned, the POSE program is intended to fund managing organizations to catalyze the creation of OSEs based on an existing mature open-source product. In this context the term “mature” refers to a robust open-source product with active users outside the team that was responsible for its development.

To justify funding through the POSE program, there must also be a verifiable need for the technology and a rationale that an open-source ecosystem is the best approach for development and deployment.

It’s also important to keep in mind that NSF’s objective is to apply public money where it will be most impactful, which we believe will best be achieved by supporting the development of new or early-stage OSEs that might otherwise emerge too slowly or perhaps not emerge at all.

Slide 13

Next, let me outline what POSE is not.

The POSE program is not intended to fund the development of open-source artifacts, tools, or products.

For reasons outlined on the previous slide, POSE is also not intended to fund existing well-resourced open-source communities and ecosystems.

Lastly, the POSE program is not intended to fund open-source ventures for which profit is the primary motive.

Slide 14

You may be wondering how the POSE program differs from current and previous open-source projects funded by NSF, so we've included three examples here that hopefully will help answer this question. I'll briefly summarize each of these examples.

The first is the Cyberinfrastructure for Sustained Scientific Innovation program, which supports open-source development, software robustness efforts, and specialized communities.

The second is the CISE Community Research Infrastructure program, which supports further development of open-source projects in computer science disciplines to enable academic science and engineering research and education.

The final example is the Infrastructure Capacity for Biological Research program, which supports the development, scaling or major improvements of cyberinfrastructures used by a broad biological research community.

Each of these programs, in one way or another, is aimed at supporting development of open-source tools and products, or research infrastructure. None is aimed at addressing the downstream infrastructure and processes necessary for an open-source product to have maximum societal impact. On the other hand, as we've just been discussing, POSE is specifically aimed at putting in place the OSE infrastructure and mechanisms needed to accelerate progress towards broader impacts.

Slide 15

Another important consideration for POSE OSEs is that we expect content contributors to contribute intellectual content. This is perhaps best explained by considering the case of open-source data.

Consider firstly the example of data repositories, with centralized infrastructure and tool development, and external users who simply upload or download data. Such repositories are probably not a good fit for the POSE program.

On the other hand, integrated data platforms with de-centralized infrastructure and tool development, and external contributors who contribute tools or upload data along with supporting models, scenarios and other intellectual content are likely to be a good fit for the POSE program.

Slide 16

I'd like to now provide an overview of the mechanics of the program.

The solicitation describes two types of POSE projects: Phase I OSE Scoping Awards and Phase II OSE Development Awards.

Applicants can apply for either of these awards, but not for both for the same project. Also, it is not necessary to receive a Phase I award before applying to Phase II – you can apply directly to Phase II.

Slide 17

A Phase I proposal, for an OSE scoping project, should include the following components: a plan to discover and understand the end-user ecosystem; a plan for establishing a sustainable organization and that describes the proposed organization and governance model; and a strategy for community building – in other words, how you will engage contributors to help develop and maintain the open-source product.

A Phase I project description can be up to 7 pages in length. I should note that the page count for the project description for both Phase I and Phase II proposals does not include Letters of Collaboration or the Data Management Plan.

Maximum Phase I funding is $300,000 and the project duration is up to 12 months.

Slide 18

A Phase II proposal, for an OSE development project, should include the following components: a plan for ecosystem establishment and growth; a well-developed organizational, coordination, and governance model; a long-term strategy for community building; and clear sustainability goals along with an actionable evaluation plan that includes success metrics.

A Phase II project description can be up to 15 pages in length.

Maximum Phase II funding is $1.5M and the project duration is up to 2 years.

Slide 19

POSE funding may be used to fund developers to develop OSE infrastructure that could include, for example: development of testing and verification, security and privacy, or quality control processes.

As mentioned earlier, however, POSE funding should not be used to fund developers to create or improve an open-source artifact, tool, or product.

Slide 20

A POSE budget may include up to $10,000 to cover the costs of attending mandatory training for POSE award recipients. This training will be available to both Phase I and Phase II awardees. It will cover a range of topics relevant to building an OSE, including: presentations by leading experts with experience in OSE development; “hands-on” experiential training in ecosystem discovery; community building; management of an OSE; security and privacy; and sustainability.

We expect the first training to be available for Phase I awardees in the Fall of this year.

Slide 21

NSF considers security to be a critical priority for POSE OSEs, so if you submit a POSE proposal the Data Management Plan must include a security plan that addresses mechanisms to ensure the following:
Code and/or data quality
Security, including: access control mechanisms for users and content contributors; secure software development methodologies; policies for patching known security vulnerabilities; and chain of custody
Ethical use of sensitive data: including privacy and protection of human subjects

Proposals that do not include a security plan will be returned without review.

I should mention here that we recognize there are many challenging research issues associated with open-source security. We don’t expect proposers to have a solution to every security challenge, but we do expect the data management plan to acknowledge the importance of security and include a security plan based on state-of-the-art practices.

Slide 22

I'll now provide a brief overview regarding eligibility and fit for the program, but please read the solicitation for further details.

POSE proposals may be submitted by any of the following:

- 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, with all other organizations participating as subawardees. Collaborative proposals arranged as separate submissions from multiple organizations will not be accepted.

And, as mentioned earlier, projects that are not based on distributed, ongoing development of a mature open-source product will not be suitable for the POSE program.

Slide 23

International contributors to the development of an open-source product are expected and encouraged in the POSE program.

International collaborators – in other words, international organizations that collaborate with a POSE managing organization – are also encouraged but cannot be funded via a POSE award.

Slide 24

Detailed instructions for applying to the POSE program can be found in the solicitation, at the link shown on this slide.

The submission deadline for Phase I proposals is May 12 and for Phase II proposals is October 21.

All proposals that are compliant will be reviewed by external experts, and the review criteria can be found in the solicitation. NSF strives to provide the outcomes of the review process within 6 months of the submission deadline.

Slide 25

If you have further questions, there are various ways these can be addressed.

Firstly, please read the solicitation carefully since it will likely answer many of your questions.

FAQ's regarding the POSE program can be found at the link shown on this slide.

We will also be hosting office hours in April to answer questions. Details will be posted on the solicitation web site.

You are also welcome to email questions to pose@nsf.gov

And, if you are unsure whether your project is a fit for the program, you are welcome to email a brief executive summary of no more than 1 page to pose@nsf.gov and the POSE working group will provide feedback.

Slide 26

If you do email a one-page executive summary, please ensure that it addresses the following questions:

1. Do you currently have external users outside of your group?
2. Do you currently have external contributors who provide content and/or help develop the open-source product?
3. Do you currently have an organizational or governance structure that enables collaborative development?
4. What activities will POSE funding support?
5. What is the expected Broader Impact of the proposed OSE?

Answers to these questions will help the working group provide guidance.

Slide 27

So that concludes the presentation.