ACCESS OpenCI Project Execution Plan

Submitted to the National Science Foundation,
Directorate for Computer and Information Science and Engineering,
Division of Advanced Cyberinfrastructure,
As a deliverable in preparation for
"ACO: An Open CI Ecosystem to Advance Scientific Discovery (OpenCI)"
Award #2138296

January, xx, 2023
Version 0.5 (Draft)

Table of Contents

Summary

1. Purpose, Goals, and Objectives

The Open CI Ecosystem to Advance Scientific Discovery (OpenCI) provides the structures and services to support and facilitate shared governance, community input, communication and outreach, and evaluation for the ACCESS Service Teams (Allocations; End User Support; Operations and Integration; and Monitoring and Measurement; along with any that might be awarded in the future). OpenCI provides the tools and services for shared governance and horizontal leadership of the ACCESS awardees to create an inclusive CI ecosystem where Service Team PIs work with common purpose through well-defined decision-making processes, transparency in communication, and a focus on enabling science.

OpenCI provides five essential functions: 1) establishes and facilitates governance through the creation and support of the ACCESS Executive Council, the formal governing body of the ACCESS program; 2) cultivates expert guidance through the creation and support of the ACCESS External Advisory Board; 3) engages the community through coordination and augmentation of communications, outreach, and community-building activities of the Service teams; 4) coordinates evaluation and metrics development across the ACCESS awards; and 5) serves as a resource to NSF in its management and oversight of the ACCESS program across the areas of reporting, evaluation, and reviews.

OpenCI's communication, outreach, and community-building efforts will broaden the participation of individuals and communities that have been underserved by the national CI ecosystem. Innovations in technology, research, and scholarship will be shared with the broader community that seeks to understand the role of CI in advancing society. The private sector will find new opportunities for collaboration, and through these opportunities, help improve the competitiveness of US companies in areas critical for the economy and the workforce.

OpenCI is led by the National Center for Supercomputing Applications (NCSA) at the University of Illinois Urbana-Champaign, in partnership with the San Diego Supercomputer Center (SDSC) at UC San Diego, and the Center for Education Integrating Science, Mathematics and Computing (CEISMC) at the Georgia Institute of Technology.

2. Project Deliverables

The following are the deliverables for the ACCESS OpenCI award. The schedule for these deliverables can be found in section 6.

- Establish an ACCESS web presence
- Develop and approve charter for the ACCESS Executive Council
- Develop and approve charter for the ACCESS External Advisory Board
- Confirm EAB membership and schedule the first meeting
- Establish collaborative plans for ACCESS Communication & Outreach
- Establish collaborative plans for ACCESS Community-Building efforts
- Establish an ACCESS program-wide risk-management process
- Establish an ACCESS program-wide change-management process
- Submit the OpenCI Project Execution Plan to NSF
- Establish the OpenCI Collaboration Portal and tools

- Establish an OpenCI Performance Management Plan
- Establish evaluation plan, coordinated timeline, and revised metrics
- Evaluation coordination, development, and dissemination of data as appropriate
- Periodic consultative support to Service Track awardees regarding ideas on evaluation and metrics
- Quarterly OpenCI Interim Project Reports submitted to NSF and regular (nominally weekly) meetings between the OpenCI Team and the CPO
- Periodic status reporting via teleconference, as determined by PI and NSF Program Officer
- Quarterly review of ACCESS ecosystem risks across all Service teams and OpenCI
- Facilitate regular meetings of ACCESS Executive Council
- Facilitate regular meetings of the ACCESS External Advisory Board
- Facilitate regular meetings of an ACCESS Communications team
- Produce quarterly ACCESS community and monthly staff newsletters
- Facilitating and coordination support of community engagement events
- Annual ACCESS Community Report
- Annual OpenCI Project Report and Program Plan submitted to NSF

Governance

3. Organizational structure of the project team

The organizational structure of the ACCESS OpenCI project follows the functional areas of the project.
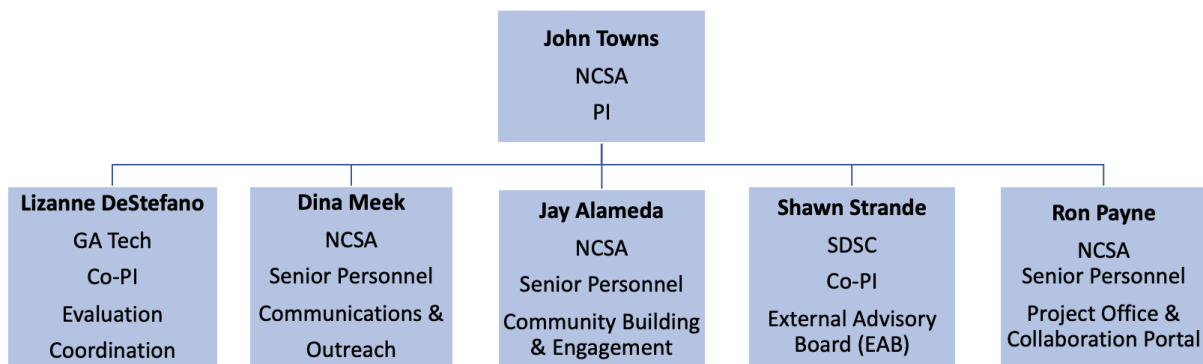
Figure 1 – OpenCI Organizational Structure

4. Governance

The OpenCI coordination office is designed to support and facilitate the NSF Blueprint for a national CI ecosystem[1] through governance models that allow for rapid innovation while providing a predictable and robust CI for the many researchers that depend upon it. This will be achieved through shared governance and horizontal leadership that supports both formal and informal methods, anticipates management structures that can change over time, and provides transparency and openness.

In this model, OpenCI will be a voting member of the ACCESS Executive Council (EC), and facilitate interactions with EC, providing the resources, support, decision- and change-management frameworks to achieve success.

---

[1] *Transforming Science Through Cyberinfrastructure: NSF's Blueprint for a National Cyberinfrastructure Ecosystem for Science and Engineering in the 21st Century*, https://www.nsf.gov/cise/oac/vision/blueprint-2019/

4.1. ACCESS Executive Council

The Executive Council (EC) is the primary management and governance body facilitated by OpenCI and will be the formal mechanism by which Service team awardees coordinate delivery of services and present a coherent CI ecosystem to the community. OpenCI will also facilitate communications between the EC and any working groups that span multiple awardees are formed around specific topics to provide a conduit for bi-directional communications so that, for example, recommendations or decisions taken by the working group can either be taken up by the EC for consideration or to ensure awareness of the EC, as appropriate. It will be critical for the EC to convene before the XSEDE project award expires to ensure a smooth transition from XSEDE to ACCESS. PI Towns will lead OpenCI's facilitation of the EC.

The OpenCI team will use the following guiding principles with respect to the EC:

- **Balance formal and informal processes:** While there are many formalities the EC might establish via its charter or other means, the OpenCI team recommends keeping processes and policy as lightweight as possible and only establishing formality/policy when necessary. This provides for flexibility and agility in governance and minimizes unnecessary bureaucracy.
- **Keep it simple:** Policies and practices should be as basic and straightforward as possible. Some issues are complex and require commensurate complex policy but minimizing this will allow for easier understanding and more efficient execution. Further, a smaller EC will make discussions and reaching consensus easier.
- **Work by consensus:** To the extent possible the EC will operate by working towards common goals and building consensus. Formal voting is an important tool but should only be used in cases in which it is warranted, e.g., project changes with impact on service stability or usability. This fosters shared understanding of both the issue and the solution, and enhances buy-in of all of the EC members.
- **Be visibly collaborative:** The staff of the Service teams will look to their respective PI and co-PIs and follow their lead. By encouraging collaboration, the coordination of services across the Service teams will be enhanced.
- **Effectively Resolve Conflict:** Conflict will naturally occur between Service Track teams in the drive to respond to community needs and successfully execute each individual service track award. Such conflicts will be approached by the impacted Service Teams, in a collaborative manner. If a resolution is not reached by the impacted service teams, the conflict will be brought to the EC for discussion. If the EC does not reach an acceptable resolution, the conflict will be brought to the NSF Cognizant Program Officer for direction and resolution. OpenCI will facilitate discussions, as needed, to efficiently resolve conflict.
- **Base decisions on timely and relevant information:** The EC is a decision-making body. Providing the tools and information to support these processes is imperative. OpenCI will provide tools and will recommend the EC adopt a data-driven approach to decision-making.
- **Maintain focus on programmatic innovations:** The EC will frame each of its discussions and

decisions in the context of one or more of the five programmatic outcomes defined by NSF (i.e., view CI holistically, improve usability, support translational research, couple discovery and CI innovation, and integrate those innovations through robust and secure means).

Further details on the EC, including its charter, can be found on the ACCESS Program wiki: https://access-ci.atlassian.net/wiki/spaces/ACP/pages/688135/ACCESS+Execuve+Council+EC

4.2. External Advisory Board

While individual Service teams may seek outside advice and/or evaluation, the ACCESS Coordination Office has the primary role of coordinating program-wide external advice. OpenCI will facilitate the creation and operation of an External Advisory Board (EAB) to provide the ACCESS EC with strategic input and guidance regarding the services provided by the ACCESS Service teams. The composition and size of the EAB will be established in the EAB Charter. Co-PI Strande will lead OpenCI's facilitation of the EAB.

The primary role of the EAB will be as a trusted source of advice for the EC. Whereas the EC will focus on day-to-day service delivery of the ACCESS Service teams, through the EAB, the EC has a mechanism to periodically step back from this operational perspective and seek advice from experts spanning the CI ecosystem and the science and engineering research and education community.

The EAB will, with EC concurrence, be called upon to provide advice and recommendations in several key areas, including but not limited to:

- Providing feedback on ACCESS awardee annual program plans and priorities;
- Reviewing and providing feedback regarding proposed new services or changes to existing services with attention to how these services will achieve the goals of the ACCESS program and serve the ACCESS community;
- Providing feedback on draft annual reports and other written documents, data, or evaluation findings;
- Providing recommendations to the EC as it navigates the changing CI landscape, including viewpoints from universities, the public, and programs operated by NSF, DOE, NIH, and others;
- Providing insights into emerging programs and trends from their unique perspectives, and suggesting new services and changes to existing services that may inform longer-term plans of the ACCESS program and help guide innovation;
- Issues before the EAB may be beyond the scope of the EAB to address, both in terms of time commitment, as well as area of expertise. Thus the EAB may, from time to time, constitute working groups and/or seek external expertise to provide additional input to the EAB.

OpenCI identifies these guiding principles of a successful ACCESS EAB, which are formalized in the EAB Charter, which can be found on the ACCESS Program wiki:

https://access-ci.atlassian.net/wiki/spaces/ACP/pages/1409025/ACCESS+External+Advisory+Board+EAB

- **The EAB is a resource to the Executive Council.** The EAB will be a key resource to ACCESS Service team and OpenCI leadership, making it imperative that the EC provide the EAB with guidance in areas where advice is sought. Additionally, EAB members bring expertise to the program that can be anticipatory, helping the EC look ahead to areas where focus may be needed.
- **EAB members should be selected for their experience and knowledge in areas relevant to ACCESS.** The EAB should represent the community at large and provide advice relevant to the operations of a large program such as ACCESS. We expect members to have expertise in areas such as large-scale CI systems and services; science and engineering research; education and outreach; computational science; development of CI software, services, and other capabilities; project governance; and approaches to improving diversity, equity, and inclusion. Members who are researchers funded by the NSF Directorate for Computer and Information Science and Engineering (CISE) and areas outside those traditionally funded by its Office of Advanced Cyberinfrastructure (OAC) will be encouraged.
- **The number of EAB members should be modest.** The board should be large enough to encompass the scope of ACCESS, but not so large that the individual members would be inhibited from providing candid advice. We expect the board to include approximately 10 members.
- **EAB members should reflect the diversity of the community ACCESS seeks to serve.** It is imperative that ACCESS be welcoming and inclusive with respect to the broad community it serves; therefore, we will seek members whose work improves the diversity of the community.
- **EAB meetings should be focused and strive for quality over quantity.** OpenCI is mindful of the commitment that board service requires. We anticipate holding quarterly EAB meetings, three of which will be remote and one in-person. Remote meetings will be two hours, whereas in-person meetings will be one full business day.
- **Preparation is essential to getting the most out of the EAB.** Ensuring high-quality advice will be predicated on giving board members the information they need to understand the topics brought before them. The OpenCI team will take special care to provide succinct and relevant information to members prior to board meetings, and to have all documents, minutes, and other program materials available on the OpenCI Collaboration Portal.

Further details on the EAB, including its charter, can be found on the ACCESS Program wiki:
https://access-ci.atlassian.net/wiki/spaces/ACP/pages/1409025/ACCESS+External+Advisory+Board+EAB

4.3. Other internal & external advisory bodies

The OpenCI leadership has established a relationship with and commitment from a set of leaders of six large program coordination offices with similar functions to the OpenCI ACCESS ACO. All of

these leaders recognize that an ongoing dialogue would benefit OpenCI, their own projects, and the broader community. Thus, an informal coordination office advisory group, composed of members of the various coordination offices, will be formed as a vehicle to advise one another, and share best practices and effective strategies to benefit these programs. OpenCI currently has commitments from the following organization for their leaders to participate in this group, though we anticipate this may evolve over time:

- Open Science Grid (OSG) [NSF]
- EarthCube [NSF]
- Platforms for Advanced Wireless Research (PAWR) [NSF]
- CyVerse [NSF]
- Navigating the New Arcc (NNA) [NSF]
- HubMAP [NIH]

In addition, the CONECT (Service team 3) team has led the formation of the Cybersecurity Governance Council. The OpenCI team will participate in this Council as an ex-officio, non-voting member. The primary roles the OpenCI team will play are:

- Facilitate program-wide communications of cybersecurity policy and practice as appropriate
- Facilitate communications with the community regarding cybersecurity issues and, as warranted, cybersecurity incidents
- Facilitate bringing issues for the Cybersecurity Governance Council to address as received by the OpenCI team via various channels (EC, EAB, questions from the community, etc.).

5. High-Level Work Breakdown Structure (WBS)

OpenCI is organized in five functional areas. These functional areas also represent the work breakdown structure of the project. These functional areas are further explained in the following sections.

5.1. Communications & Outreach

OpenCI will act as a primary interface to the broader community, providing a focal point for the flow of public-facing information between the ACCESS program and the science and engineering research and education community. It will further support communications internal to the ACCESS program via posted content and an internal newsletter to allow staff in all Service teams to inform one another of progress and share information on developments in a timely manner. OpenCI will make recommendations as to the cadence of the internal (program-wide) newsletter as the program evolves.

With services of NSF-funded CI under the ACCESS program provided via multiple awards, it will fall particularly on OpenCI to project a coherent ecosystem of resources and services to the community. An important element of this work will be to engage both established and emerging cyberinfrastructure communities focused on science and engineering, with a strong focus on

engaging traditionally underrepresented segments of the community. Senior Personnel Meek will lead these efforts as OpenCI Communication & Outreach Coordinator.

Further details on Communications & Outreach can be found on the ACCESS Program wiki: https://access-ci.atlassian.net/wiki/spaces/ACP/pages/40960001/Communication+Outreach+Coordination.

5.2. Community Building & Engagement

Each ACCESS Service team awardee will engage with their stakeholders in a way most relevant to their specific services; however, cross-team coordination will be essential for coherent, efficient, and effective community building and engagement with the ecosystem. Jay Alameda at NCSA leads the OpenCI Community Building & Engagement team and provides coordination and information sharing across the range of efforts that will emerge from the ACCESS Service teams—providing assistance where relevant—so that individual Service team efforts leverage contributions from one another, remain coherent, and avoid "blind spots" in their approaches. To accomplish this, OpenCI has formed a virtual community building and engagement team comprising a small group within the OpenCI award and a representative from each of the ACCESS Service team awards. The virtual community building and engagement team solicits input and feedback on plans from relevant advisory bodies created in association with the ACCESS program. This includes the ACCESS EC and we anticipate will also include an open forum for ACCESS service and resource providers as well as a researcher advisory board among other possibilities.

Further details on Community Building and Engagement can be found on the ACCESS Program wiki: https://access-ci.atlassian.net/wiki/spaces/ACP/pages/49971211/Community+Building+Engagement.

5.3. Evaluation

OpenCI includes both internal (program-wide) and external (of OpenCI) evaluation capabilities. Internally, OpenCI's Evaluation Coordinator, co-PI Lizanne DeStefano, will work with Service team awardees/evaluators to coordinate, strengthen, and maximize the shared use and dissemination of evaluation findings across all Service teams. Externally, consultant Lisa Kaczmarczyk will conduct an annual, independent evaluation of OpenCI to guide its development and maximize impact.

Further details on Evaluation can be found on the ACCESS Program wiki: https://access-ci.atlassian.net/wiki/spaces/ACP/pages/49971201/Evaluaon+Coordinaon.

5.4. Project Office

The OpenCI Project Office, led by Senior Personnel Ron Payne at NCSA, will ensure that an efficient and effective project governing structure is in place throughout the award period to support all significant project activities and ensure efficient and effective performance of all project responsibilities. The Project Office is responsible for providing collaborative resources

and program-level processes for basic operations. Each of these points are summarized below.

Further details on the Project Office can be found on the ACCESS Program wiki: https://access-ci.atlassian.net/wiki/spaces/ACP/pages/19726343/OpenCI+Project+Office :

6. Project schedule

The milestones for the OpenCI deliverables are shown in figure 3 below. Any outputs for these deliverables will be stored or referenced in the ACCESS Collaboration wiki. OpenCI will collaborate with other ACCESS Service teams to coordinate cross-service team deliverables and reconcile schedule considerations. Where appropriate, cross-functional working groups and/or committees will be used to ensure program-wide coordination. Escalation paths for issues will follow those set by the program through the ACCESS EC.

Task/Deliverable	May-Jul. 2022	Aug.- Oct. 2022	Nov. 2022- Jan. 2023	Feb.-Apr. 2023	May 2023- Apr. 2027
Establish an ACCESS web presence					
Develop and approve charter for the ACCESS Executive Council					
Develop and approve charter for the ACCESS External Advisory Board					
Confirm EAB membership and schedule the first meeting to occur prior to or during Oct. 2022					
Establish collaborative plans for ACCESS Communication & Outreach		Subject to revision			
Establish collaborative plans for ACCESS Community-Building efforts		Subject to revision			
Establish an ACCESS program-wide risk-management process					
Establish an ACCESS program-wide change-control process					
Submit the OpenCI Project Execution Plan to NSF		Subject to revision			
Establish the OpenCI Collaboration Portal and tools					
Establish an OpenCI Performance Management Plan		Subject to revision			

Establish evaluation plan, coordinated timeline, and revised metrics		Subject to revision			
Evaluation coordination, development, and dissemination					
Quarterly OpenCI Interim Project Reports submitted to NSF					

Task/Deliverable	May-Jul. 2022	Aug.- Oct. 2022	Nov. 2022- Jan. 2023	Feb.-Apr. 2023	May 2023- Apr. 2027
Quarterly review of ACCESS ecosystem risks across all Service teams and OpenCI					
Regular meetings of ACCESS Executive Council					
Regular meetings of the ACCESS External Advisory Board					
Quarterly ACCESS newsletter and community newsletter					
Annual ACCESS Community Report					
Annual OpenCI Project Report and Program Plan submitted to NSF					

Figure 3 - OpenCI Deliverable Milestones

7. Risk Management Plan

The risk-management process, which must be ongoing and dynamic, ensures that:

• risk identification and analysis have the appropriate rigor;
• risk issues are made visible early;
• thorough, credible mitigation plans are prepared/implemented;
• budgets are maintained;
• appropriate personnel are notified when a risk is triggered.

Project risk management consists of a six-step process: (1) identify potential vulnerabilities/risks; (2) determine the likelihood of occurrence; (3) assess the impact on the project scope, cost, and schedule baselines; (4) determine activities, alternatives, or contingencies that would reduce/migrate/accommodate the risk; (5) execute a plan to accomplish these risk-reducing activities; and (6) report and track risk.

The project will use the Atlassian Jira tool with its integration into the ACCESS Collaboration Portal as the risk-management software application, which will help the project team record, track, and report on identified project risks.

The risk register will be updated regularly to reflect the modification to existing risks, addition of new risks, and retirement of risks as the project moves forward.

Identified risks can have positive as well as negative impacts on the project's technical scope, schedule, and cost. The project team will track opportunities in order to take full advantage of information for making decisions that might affect the project. The project will promptly inform NSF of any significant risk issues or opportunities that may arise during the project lifetime, and the risk register will be maintained for round communication of potential project risks and migration strategies. These alerts will be contained in the conventional status reporting activities of the project, where stakeholders are informed about any issues that may impact the project.

8. Evaluation of Effectiveness

The ACCESS Collaboration Portal will be used to facilitate the exchange of information between team members to help the project management team make informed decisions based on accurate and timely information.

8.1. OpenCI will use a metrics-based approach to assess the performance of the project and guide continuous improvement and excellence. This will largely be represented via Key Performance Indicators (KPIs) and metrics aligned with the objectives and values of the OpenCI team and developed in consultation with the EC and EAB.

Key Performance Indicators are well-known as a method that provides quantifiable measures of performance over time for specific objectives and focuses a team on important project outcomes. OpenCI will use KPIs to measure progress for each primary function. KPIs will be identified, tracked, and reported to all OpenCI stakeholders, and used by the OpenCI team members to provide insights that will help the team make informed decisions.

The description of exemplar metrics and KPIs can be found below:

OpenCI Function	KPIs
• Establish and Facilitate Governance	• EC satisfaction survey/focus group (External Evaluation) • Quantity of EC meetings conducted (Internal Evaluation) • Record of EC decisions and votes posted in a timely manner (Internal Evaluation)

• Culvate Expert Guidance	• EAB satisfaction survey/focus group (External Evaluation) • Quantity of EAB meetings conducted (Internal Evaluation) • Record of EAB meetings and recommendations posted in a timely manner (Internal Evaluation)

	• Responses to EAB recommendations completed in a timely manner (Internal Evaluation)
• Engage the Community	• ACCESS researcher satisfaction survey/focus groups (External Evaluation) • Quantity of community-building and engagement events held (Internal Evaluation) • Percentage of new allocation researchers from non-traditional disciplines and from underserved communities (Shared metric with Allocations) • ACCESS website usage, e.g. pageviews, researcher satisfaction (Internal Evaluation) • ACCESS Social media impressions over time (Internal Evaluation) • Communication, e.g. media hits, email opens/click-throughs (Internal Evaluation)
• Support Governance	• ACCESS Service team and SP satisfaction (aggregate range–External Evaluation) • ACCESS ecosystem effectiveness (aggregate effectiveness range–shared metric across all ACCESS teams) •Percent of ACCESS ecosystem risks reviewed quarterly

8.2. External Evaluation of OpenCI:

Dr. Lisa C. Kaczmarczyk will serve as the independent external evaluator for the OpenCI project. Kaczmarczyk was selected given her experience in similar programs, including EarthCube's Coordination Office. Project evaluation will follow common guidelines for the evaluation of NSF projects.[22]

The external evaluation of OpenCI will be guided by this overarching question:
How well is OpenCI meeting its stated goals and objectives in the intended time frame and producing its desired outputs and outcomes?

Within the first 90 days of program operation, Dr. Kaczmarczyk will work with the OpenCI PI and co-PIs to develop a detailed output- and outcomes-based OpenCI Logic Model. This model will further detail the outcomes and activities described in this proposal as well as new activities and metrics suggested by the EC and EAB. The OpenCI Logic Model will serve as a graphic representation of OpenCI's activities, outcomes and impact so that all stakeholders can better understand its role and function. It will also serve as an objective guide against which to assess project progress. Additionally, the development of the OpenCI Logic Model, along with project metrics and KPIs, will inform the development of external evaluation instruments and metrics.

Evaluation data gathering, analysis, and reporting will be both formative and summative, and continuous to ensure that achievement of project goals and impact is monitored and to guide program improvement. In addition to monitoring key metrics, Dr. Kaczmarczyk will solicit input from the Service team PIs and staff regarding OpenCI performance. She will maintain regular communication and collaboration with leadership to support continuous improvement.

Each year, Dr. Kaczmarczyk will provide project leadership with a written report summarizing findings for that year and reporting on overall progress toward goals and objectives. At project end, Dr. Kaczmarczyk will produce a comprehensive report summarizing lessons learned throughout the lifetime of the project.

8.3. Evaluation Coordination Across ACCESS:

We expect that each Service team awardee will develop their own evaluation plans independent and unaware of other awardees' plans. During the Discovery Phase (first 90 days from project start), DeStefano will work with Service team PIs and evaluators to summarize and aggregate Service team-specific plans into a program-wide evaluation matrix. Completion of the matrix will lead into the Coordination Phase (90 days through project end), which will identify commonalities, complementarity, redundancies, and gaps in program-wide evaluation efforts. This will reveal opportunities for data sharing, reducing completion and response burden for stakeholders, and lead to the development of common metrics that can be used across Service teams to reflect compound effectiveness and impact. Evaluation coordination will continue during the life of the program and, if effective, will result in a model that could be used to promote efficient, systemic evaluation of complex initiatives of this kind. OpenCI will develop and utilize tools and practices to support the sharing and use of evaluation findings, such as data-sharing agreements, joint IRB protocols, an instrument bank, a common evaluation timeline, and an evaluation data repository. OpenCI will monitor these tools and practices and undertake any corrective action needed in association with their use. During the Development Phase (180 days to project end), OpenCI will facilitate professional development on evaluation for the Service team PIs and evaluators to support the development of innovative evaluation strategies across the program. The topics and format will be determined by the PIs and evaluators based on their interests

and needs. Finally, in the Dissemination Phase (360 days to project end), OpenCI will encourage the dissemination of evaluation methods and findings through publications and presentations to both CI and evaluation professional communities.

To accomplish these goals, DeStefano will routinely engage ACCESS Service team evaluation representatives in identification of evaluation needs and concerns and develop action plans in response to these issues. It is expected that the EAB will also have feedback that will influence the metrics and evaluation plans of Service team awardees. OpenCI staff will record and track those recommendations, integrating them into Coordination and Development follow-up activities. DeStefano will further facilitate monthly meetings with the group of evaluators/evaluation points of contact from each Service team to create a professional learning community in which evaluators can coordinate, collaborate, and strengthen their practice and dissemination. The utility and impact of this evaluation coordination and support will be assessed as part of the external evaluation, discussed below.

Fiscal

9. Project Budget

The following table shows the OpenCI cumulative budget by WBS element level and includes staff costs, travel, participant support, and other direct costs (ODCs).

WBS: Function	NCSA	SDSC	GA Tech	Total
1.0: Project Office	$1,326,224			**$1,326,224**
3.0: External Advisory Board		$239,405		**$239,405**
4.0: Communications & Outreach	$885,040	$813,098		**$1,698,137**
5.0: Community Building & Engagement	$547,242			**$547,242**
7.0: Evaluation		$197,500	$302,063	**$499,563**
Total	**$2,758,506**	**$1,250,003**	**$302,063**	**$4,310,572**

10. Budgeting Methodology and Assumptions

NCSA will manage the project funds in accordance with Illinois rules and procedures under the day-to-day direction of the NCSA Business Office director. The University of Illinois business procedures are found in its OBFS Policies and Procedures Manual (https://www.obfs.uillinois.edu/purchases/procedures-rules/).

A budget plan will be established and updated annually. Expenditures will be planned and actual expenses reconciled monthly with the University's enterprise accounting system.

Budgets and actual costs will be collected in financial accounts, which correspond with the WBS structure of the project in the Illinois financial system. Elements of costs will also be maintained so that totals for effort, equipment purchases, and other cost categories can be tracked across all WBS elements. The cost incurred at each partner institution will be billed to Illinois and reviewed by the PI and the Illinois finance officer. The PI, with assistance from the NCSA Business Office and the Program Manager, will be responsible for reporting project financial information to NSF through the quarterly annual reports. Budgets, actual expenditures, and forecasted expenditures will be reported by WBS and will include funding and spend for staff, equipment, services, and participant support.

11. Technical and Financial Reporting

The project will provide interim project and annual reports as designated by the NSF Cognizant Program Officer with content, format, and submission guidelines established by the NSF Cognizant Program Officer. The project will submit all required reports via Research.gov using the appropriate reporting category; for any type of report not specifically mentioned in Research.gov, the project will use the Interim Project Report function to submit reports.

12. Project Management Systems

OpenCI will make use of applicable project-management best practices, as defined by the Project Management Institute and will use the ACCESS Collaboration Portal to support and store processes, procedures, workflows, project reporting, and communications within the project.

Financial and Business Controls

NCSA will manage the project funds in accordance with Illinois rules and procedures under the day-to-day direction of the NCSA Finance division director. The University of Illinois business procedures are found in its OBFS Policies and Procedures Manual (https://www.obfs.uillinois.edu/purchases/procedures-rules/).

A budget plan will be established and updated annually. Expenditures will be planned and actual expenses reconciled monthly with the University's enterprise accounting system. The cost incurred at each partner institution will be billed to Illinois and reviewed by the Principal Investigator and the Illinois finance officer. The Principal Investigator, with assistance from the NCSA Finance Division and Program Manager, will be responsible for reporting project financial information to NSF as required.

Technical

13. Software Development, Roadmapping, Quality Control, & Corrective Processes

The OpenCI project has no plans or deliverables that include software development. All software tools used by OpenCI will be standard off-the-shelf versions of products and services available to the public. With this expectation, there is no need for an OpenCI-defined quality control or Corrective process. Regarding roadmapping, OpenCI will participate and adhere to the ACCESS Services Roadmap process as defined by the ACCESS Program.

14. Collaborative Resources and Program-Level Processes for Basic Operations

14.1. ACCESS Program-Level Collaboration Resources

OpenCI will provide ACCESS awardee stakeholders with an integrated portal andtoolset (implemented as a wiki with integrated tools and capabilities) to facilitate the cross-team business processes, technical-information sharing, formal and informal decision making, and collaboration that will be essential for the operational efficiency of day-to-day project activities and overall program success. As depicted in Figure 2, the portal will support the core functions of OpenCI with role-based access (when appropriate) for the various stakeholder groups (e.g., EC, EAB, NSF, Service teams, and OpenCI). To the extent possible, the wiki will be viewable by anyone in the world to support transparency. Features will include change management, document and data repositories, links to resources provided by the Service teams, a project-wide event and planning calendar, links to cross-team and program-wide communications channels, and an Action Center that will allow the team to view upcoming activities and set alerts for critical dates and action items.

Figure 2 - OpenCI Coordination Office Collaboration Portal

Per discussions with the individual ACCESS team awardees, the Atlassian Confluence tool has been chosen to serve as the ACCESS Collaboration Portal in the form of a wiki. Google Workspace will be used and integrated with the wiki to provide a digital repository via Google Shared Drive, a shared

calendar, and a shared email list management system via Google Groups. To facilitate controlled process flows and program task tracking, the Atlassian Jira product will also be used and integrated into the wiki. Slack is the Program's chosen messaging tool and will be used by the ACO and all individual ACCESS awards. Finally, digital artifacts of the program can be stored in IDEALS (Illinois Digital Environment for Access to Learning and Scholarship) which will provide persistent identifiers and long term preservation of these artifacts as described in the Data Management Plan. Use of this digital repository is open to all of the ACCESS awardees.

14.2. OpenCI Functional Support

The OpenCI Project Office will provide functional support in multiple ways for OpenCI and the ACCESS Program in general. The Project Office will procure, configure, and manage the ACCESS program-level collaboration resources described above. In addition, OpenCI leadership and team meetings will be coordinated and supported by the Project Office OpenCI wiki space, including meeting planning and preparation, meeting facilitation and meeting summaries with actions and decisions. All OpenCI meeting outputs will be stored on the ACCESS Collaboration wiki.

14.3. ACCESS Program Level Common Processes

Upon approval by the EC, the OpenCI Project Office will implement and support project-level processes, including Risk Management and Change Control. Unless otherwise noted, these processes will be implemented using the Jira tool and accessible through the ACCESS Collaboration wiki.

14. Transition Planning

The OpenCI project will use the Detailed Transition Plan, defined by the XSEDE project, as well as work closely with XSEDE's Program Office to understand and transition any information relevant to the OpenCI.

Specifically, the OpenCI Communications and Outreach team will work with each ACCESS award team to convey important transition information to XSEDE users and resource providers, via XSEDE's Advance to ACCESS webpage, the ACCESS webpage, and newsletters. In addition, the OpenCI Communications team will work with each ACCESS award team to convey important evaluation findings to the ACCESS community, the EAB, resource providers, and other relevant stakeholders. This transition-focused communications will occur throughout the first four months of the ACCESS program.

The development of the EAB charter, facilitated by the ACO and described above, establishes the framework for the establishment of the EAB. These processes will take place following the formation of the EC. Once the EAB is formed, the ACO will immediately begin the process of planning the first EAB meeting.

The early activities of the Community Building and Engagement team will include community-building and engagement activities that promote transition to ACCESS, drawing information-sharing processes for cross-team activities, documented understanding of outcomes desired by each team's community-building and engagement efforts, and a

coordination plan that will support these efforts. As transition activities subside, the team will cultivate a broad awareness of NSF-funded science and engineering research and education efforts and NSF-funded CI efforts, with input from the virtual team itself, the CI and S&E communities, and the EAB, which will inform the development of an ACCESS community-building and engagement plan.

15. Pilot development and implementation plan

While the ACO does not need hardware, software, or network infrastructure for this purpose, we will work with the Service teams to identify processes and timelines for measuring the success of proposed novel activities and moving toward implementation, if warranted. Synergies and cross-team relevance will be identified and the ACO will facilitate cross-team coordination if needed.

16. Cybersecurity plan

The ACO does not operate digital services for the community. As noted above, the tools it will use are commodity software and largely commodity software-as-a-service services. As such, a formal cybersecurity plan is not seen as necessary for OpenCI.

In addition, OpenCI PI Towns is a member of the Cybersecurity Governance Council (see Section 4.3) and will participate in order to provide comment and input based on past experience and facilitate communications within the program (largely with the EC and possible the EAB) and with communicating relevant policies and procedures to the community.

17. Data Management plan

17.1 Types of Data

Primary data products of OpenCI will include: reports and plans of various types (i.e. annual reports and program plans, the Communications Plan, the Community Building & Engagement Plan); records (minutes) of all ACCESS Executive Council and External Advisory Board meetings; and evaluation reports (those resulting from coordinated evaluation efforts across the program and those specific to external evaluation of OpenCI).

Secondary data products include: documentation of project activities such as quarterly and annual reports; publications written by project staff describing OpenCI activities or technologies; meeting agendas, minutes, and decisions; planning documents; and materials developed for public dissemination and re-use.

Excluded from this are the data products generated by the individual Service team awardees in fulfillment of their service obligations. However, the OpenCI team is making the IDEALS digital repository at Illinois available to other program awardees to support their data management needs.

17.2 Data and Metadata Standards

Digital objects created by OpenCI will be deposited in the IDEALS (Illinois Digital Environment for Access to Learning and Scholarship)[2] system within a "community" defined for OpenCI. The University of Illinois Library operates this repository as a service to Illinois researchers. These services provide persistent identifiers for all objects deposited and provide for long-term preservation of the data, metadata and persistent identifiers. All objects deposited in IDEALS follow the *Metadata Best Practices* as indicated in the IDEALS *Metadata Policy,*[4] which employs best practices in *Controlled Vocabularies and Standards in Use.*[5]

This environment is in alignment with *The Digital Public Library of America Policy Statement on Metadata*[6] and the best practices expressed in the *Harvard Dataverse General Terms of Use.*[7]

17.3 Policies for Access, Sharing, and Privacy

Providing access to the primary data produced by OpenCI is dependent upon implementing appropriate access controls that ensure privacy for personal information while also making non-personal information widely available. It is not anticipated the primary data produced by OpenCI will be subject to this, but the OpenCI team is sensitive to these issues and will work diligently to protect privacy. It is anticipated that there may be some surveys conducted during the course of the project in collaboration with the ACCESS Service team awardees. These surveys will be performed under the guidance of an Institutional Review Board (IRB). For data that OpenCI might steward, anonymized, de-identified versions of the raw survey data will be made available, subject to IRB approval. Derived data will be made openly accessible (subject to privacy and IRB constraints) as it is generated based on surveys.

---

[2] https://www.ideals.illinois.edu
[3] htpps://wiki.illinois.edu/wiki/display/IDEALS/Metadata+Best+Pracces
[4] https://wiki.illinois.edu/wiki/display/IDEALS/Metadata+Policy
[5] https://wiki.illinois.edu/wiki/display/IDEALS/Controlled+Vocabularies+and+Standards+in+Use
[6] https://pro.dp.la/hubs/metadata-application-profile
[7] https://best-pracces.dataverse.org/harvard-policies/harvard-terms-of-use.html

17.4 Policies for Re-Use, Re-Distribution, Derivatives

Providing access to the repository within IDEALS to external researchers will be dependent upon privacy and confidentiality concerns, but the goal will be to provide the maximum degree of access possible to all primary and secondary data. In all respects, OpenCI will attempt to provide open access to software code and other data generated by the project.

17.5 Plans for Archiving and Preservation

All digital products of the OpenCI project will be preserved in the IDEALS environment. For data in IDEALS (primarily reports and related documents), the data will be preserved for the

foreseeable future as per the IDEALS *Digital Preservation Policy.*[8]

17.6 Roles and Responsibilities

As noted above, all data products of the OpenCI project will be deposited into the IDEALS repository. References to all objects will be provided from the ACCESS website during the life of the project, with the objects in IDEALS as the definitive sources. This eliminates dependencies on the PI or co-PIs in ongoing availability of these resources.

18. Configuration and Change Management

18.1. Configuration Management

The configuration management of all internal operations tools and services maintained by OpenCI, for use by OpenCI and all ACCESS service teams, are the responsibility of the program and project managers within the OpenCI Project Office. Applicable policies and processes are approved by the appropriate leadership levels and made available to OpenCI staff and all ACCESS service team staff through the ACCESS Collaboration Portal.

The ACCESS homepage (access-ci.org) is maintained by the Communications and Outreach team within OpenCI and they are responsible for the configuration management of the website. Applicable policies and processes are approved by the appropriate leadership level and made available to OpenCI staff and all ACCESS service team staff through the ACCESS Collaboration Portal.

18.2. Change Management

The change management and change control of all OpenCI and ACCESS program-level scope and collaboration are the responsibility of the program and project managers within the OpenCI Project Office. Applicable policies and processes are approved by the appropriate leadership levels and made available to OpenCI staff and all ACCESS service team staff through the ACCESS Collaboration Portal.

---

[8] https://wiki.illinois.edu/wiki/display/IDEALS/Digital+Preservaon+Policy

19. Policies for Data Access and Software

Any specific policies relating to program-level and/or cross-service team collaborative and operational data access and software will be maintained on the ACCESS Coordination Portal at: https://access-ci.atlassian.net/wiki/x/VYAD

Much of the internal operations and information made available to ACCESS community and service teams is categorized as "public" information. This information is made available to the public through the ACCESS Collaboration Portal. Information categorized as "internal use only" will not be made available to the public and will be made available to the ACCESS service

teams, as needed. Examples of internal use-only information include:

- remote coordinates for internal-program and project meetings,
- information relating to activities and/or deliverables that are in process yet incomplete,
- information relating to a specific community or service team entity or individual that is deemed sensitive.
- Program and/or Service Team corrective measures
- Some Service Team financial details

Personnel / Communications

20. Internal communications

Currently, the ACO Communications Plan calls for the development of an internal newsletter to ACCESS staff. This will go out on a monthly cadence, beginning in October, 2022. In addition, communication is facilitated through Confluence Wiki Working Groups and other spaces along with channels in our ACCESS Slack account. We will explore other options for the future.

The OpenCI Communications & Outreach Coordinator will be responsible for monthly meetings of the virtual ACCESS Communications team, which will improve processes, address issues, and hold communications quality to the highest standard. In addition to a communications plan, the OpenCI Communications & Outreach Coordinator will work with the virtual ACCESS Communications team to develop a style guide to ensure quality and consistency in all ACCESS communications.

21. External communications

The communications plan—developed in collaboration with the Service teams, and submitted for approval to the EC—will support ACCESS goals and will include, but not be limited to, the following tactics:

- Regularly scheduled science feature stories about ACCESS-allocated projects, PIs, etc.
- Press Releases announcing major updates or changes to the program. Please note, there is some crossover between what's considered a "press release" and what the communications team deems a "feature story," one being more of an announcement tied to a decision or event, and the other being more evergreen. These will be reviewed by appropriate personnel, including the NSF as needed.
- Encouraging participation in events such as PEARC, Tapia, SC, etc. by staff across the ACCESS program; where possible we will coordinate with appropriate Service team staff to share project resources to best facilitate this participation
- Emails, as needed, to curated lists of ACCESS researchers and staff
- ACCESS newsletters to internal and external audiences
- Social media, including Twitter, Facebook and YouTube, with other platforms to be considered as necessary and appropriate

The above tactics will be overseen by Senior Personnel Dina Meek and Cynthia Dillon, leveraging allocated personnel, primarily at NCSA including a feature writer, social media specialist, graphic designer and newsletter specialist. Through regularly scheduled meetings, a communications team - consisting of representation from each Service team - will address communication needs brought forth through this committee or the ACO and execute upon as time and budget allow within the parameters submitted in the ACCESS OpenCI proposal. Additionally, Meek will coordinate regular meetings with developers from all Service teams to help facilitate a seamless experience for web visitors across all ACCESS sites. As the ACO does not have a staff developer, funds will be allocated to a contracted team to support technical updates to the ACO site, and to guide other program web developers in promoting brand adherence.

This team understands the importance of digital communications—particularly to a newer generation of science and engineering researchers and educators—and has an excellent track record in using digital tools to promote information. The success of this staff will be reflected in digital undertakings for ACCESS. Additionally, XSEDE's existing contacts, social media subscribers, and e-mail lists have been transitioned from XSEDE to the ACCESS Communications & Outreach team, jump-starting communications.

The team will develop metrics and targets to continually monitor and improve communications efforts. Using both Meltwater, a leading tool in media placement and monitoring, and Sprout Social, specific to social media listening, the OpenCI communications team will fine-tune ACCESS communications efforts as we review statistics - monthly, quarterly, and annually.

To foster and promote an inclusive environment for the community, OpenCI will facilitate the creation of an ACCESS-wide working group analogous to the XSEDE Terminology Task Force. Building upon the important work started by XSEDE, this group will review, address, and define processes to help the ACCESS community avoid offensive terms in ACCESS communications.

Finally, the OpenCI Communications & Outreach Coordinator (with direction from the EC) will facilitate the development and production of annual community reports highlighting ACCESS-supported research activities, progress of the Service teams over the preceding year, plans for the Service teams going forward, and other milestones. This annual deliverable will be published to the community and broader public, as well as being referenced in the OpenCI Annual Report.

Further details on Communications & Outreach can be found on the ACCESS Program wiki: https://access-ci.atlassian.net/wiki/spaces/ACP/pages/40960001/Communication+Outreach+Coordination.

22. Broader Research Community Relationships

OpenCI will form a virtual community building and engagement team comprising a small group from the OpenCI project, a representative from each ACCESS Service team award and additional representation from the Computational Science Support Network (CSSN) established by the ACCESS team 2 awardee. The CSSN, in particular, is charged with a significant amount of

researcher- and CI-community engagement efforts that are critical to the success of the ACCESS program to advance adoption of ACCESS services and resources within the broader ecosystem. These engagement efforts include a strategy to engage with funded NSF efforts, both with explicit expectations for connecting with ACCESS (CIP efforts, Resource Providers, ...) and others that are silent on this (eg, CSSI). Commensurate with this we are working on a strategy to measure progress on engaging these investments, through the potential evaluation supplement. The strategy will need to be implemented jointly between the service areas and the ACO. This virtual team will develop and implement an ACCESS community-building and engagement plan which is focused on broad community building and engagement across stakeholder communities, and will incorporate principles of diversity, equity and inclusion to increase participation from underserved and underrepresented communities.

As transition activities subside, the virtual team will cultivate a broad awareness of NSF-funded science and engineering research and education efforts and NSF-funded CI efforts, with input from the virtual team itself, the CI and S&E communities, and the EAB. This awareness will inform the development of an ACCESS community-building and engagement plan, the maintenance and facilitation of execution of which will be the primary outcome for ACCESS community-building and engagement efforts. The plan will ensure broad community-building and engagement across stakeholder communities and a coordinated approach that maximizes the value of these endeavors throughout the program. The plan will incorporate principles of diversity, equity, and inclusion to increase participation from underserved and underrepresented communities. Through these endeavors, the virtual team will increase the effectiveness and efficiency with which the ACCESS program develops relationships with new and expanding communities in the broad NSF ecosystem.

The community-building and engagement plan will be maintained by the virtual team and made available across the ACCESS program. A regular cadence for communications will be established, including remote meetings (e.g., via Zoom) and communications channels that blend synchronous and asynchronous exchange of ideas and content (e.g., Slack) to facilitate progress toward the following activities and outcomes:

- amplifying the community-building and engagement efforts of the ACCESS Service teams;
- development, facilitation of execution, and stewarding of the ACCESS community-building and engagement plan that will be effective and broadly inclusive'
- maintaining awareness of community-building and engagement efforts across the program;
- ensuring Service team community-building and engagement efforts will be developed in concert with one another;
- sharing messaging objectives and collateral amongst the Service teams.

The OpenCI Community Building & Engagement team will work in concert with the OpenCI Communication & Outreach team through regular meetings to share messaging and promote the collective community-building and engagement efforts of the program. The OpenCI Communication & Outreach team will, in turn, share information and relevant opportunities

gleaned from their communications efforts. OpenCI expects that the ACCESS community-building and engagement plan and virtual community-building and engagement team will be a valued resource to the Service teams as a connector between their efforts and the expanding community of ACCESS stakeholders.

23. Code of Conduct

OpenCI has expectations regarding employees' behavior towards their colleagues, supervisors and overall organization. Although we promote freedom of expression and open communication practices, all employees are obliged to conduct themselves in a professional manner. It is also important for OpenCI to provide a well-organized, respectful and collaborative environment.

As a virtual organization, formal policy exists for OpenCI staff as provided by their home institutions. OpenCI staff are expected to be cognizant of and comply with their institutional policies.

OpenCI partner institutions Code of Conduct links:
● Georgia Tech: https://www.usg.edu/audit/compliance/ethics/
● University of California at San Diego: hp://www.ucsd.edu/about/principles.html and https://blink.ucsd.edu/HR/policies/conduct/responsibilies.html

● University of Illinois:
https://www.ethics.uillinois.edu/compliance/university_code_of_conduct

Further the OpenCI team has also worked with the ACCESS EC to establish both a program-wide code of conduct for all ACCESS program-funded staff, as well as a code of conduct for use during ACCESS-hosted events and the members of the community that attend.

24. Broadening ecosystem participation of underrepresented community members

OpenCI will facilitate development of an ACCESS community-building and engagement plan, in concert with the cross-team community building and engagement team, which will incorporate principles of diversity, equity and inclusion to increase participation from underserved and underrepresented communities. This plan will leverage co-PI DeStefano's work in STEM education and evaluation to set measurable goals for Diversity, Equity and Inclusion and report results to hold the team accountable.

25. A mentorship or development plan for cyberinfrastructure professionals, if applicable

While OpenCI does not explicitly have a mentorship or development plan for cyberinfrastructure professionals, the project will coordinate and support Service team plans for mentorship and development of cyberinfrastructure professionals. Additionally, OpenCI will facilitate professional development on evaluation for the Service team PIs, creating a

professional learning community of evaluation points of contact from each Service team, and ultimately disseminating evaluation methods and findings through publications and presentations to both CI and evaluation professional communities.

Given the small size of the OpenCI team, we will pursue opportunities for professional development of OpenCI staff either as identified by OpenCI staff or as may be indicated by the external evaluation of OpenCI.

26. Safety or health issues

No health or safety issues are expected in the project. Nonetheless, a component of any successful project is to ensure that environment, safety, and health issues are addressed early in a project's life cycle and fully integrated into all project activities. The project team is committed to providing a safe work environment for all workers and the public. The project team will follow all relevant and applicable safety laws and procedures required by the state of Illinois, the University of Illinois, and the other partner institutions.

In addition, over the past few years, the COVID-19 pandemic has resulted in a heightened awareness and capacity for responding to public health crises. The OpenCI team takes these seriously and will ensure that appropriate public health guidelines are followed in projects and public events that bring people together.