

CYBER WORKFORCE AND EDUCATION ECOSYSTEM TOOLKIT

*Connecting People Who Connect
Communities*

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INTRODUCTION

On July 31, 2023, the Biden-Harris Administration launched the inaugural National Cyber Workforce and Education Strategy (NCWES), *Unleashing America's Cyber Talent*. Mobilizing America's cyber talent and creating sustainable ecosystems is critical to fostering the lifelong development of cyber skills, as well as increasing diversity and inclusion within the workforce. Cyber ecosystems vary based on geography and sector, yet typically entail collaboration between K-12 education systems, higher education institutions, employers, non-profits, labor unions, parents, students, workers, and more. Stakeholders underpin the framework of successful cyber ecosystems; however, it is not always clear what the general recipe is for creating a cyber workforce and education ecosystem that bolsters our cyber talent pipelines.

Today, there is an urgent requirement to fill hundreds of thousands of cyber jobs throughout the Nation. Projections suggest the demand will increase, particularly for talent in emerging technologies such as quantum computing and artificial intelligence. The rapid proliferation of these technologies requires investment in the Nation's cyber workforce to combat the evolving threat landscape, especially for attacks targeting critical infrastructure and operational technology. Local and regional workforce and education ecosystems will drive resiliency through the power of strategic partnership and resource allocation.

This Cyber Workforce and Education Ecosystem toolkit guides anyone who wants to develop or expand their local offerings and contribute to national efforts in cybersecurity. Ongoing collaboration, strategic planning, implementation, and coordination are critical. The Office of the National Cyber Director (ONCD) is committed to building collaborative networks and expanding existing and emergent cyber workforce and education ecosystems to create lasting and positive impacts across all levels from local to international. The end goal is to foster the growth of strong talent pipelines and help people secure good-paying cyber jobs and find meaningful careers.



CYBER WORKFORCE AND EDUCATION ECOSYSTEMS

Cyber workforce and education ecosystems consist of multi-sector partners united by a collective vision of supporting cyber skills development through the creation of accessible and inclusive cyber learning opportunities spanning all education stages and career pathways. A cyber workforce and education ecosystem continuously evaluates its activities and adapts as needed, plans for the long-term, and communicates its work to build broad support and advance best-practices.

Ecosystems can be sparked by any local champion, but a wide range of organizations enable an ecosystem to flourish. Ecosystems can be led at the local, state, or regional level and can be sector or population specific, depending on the goals of the ecosystem. Successful cyber workforce and education ecosystems prepare learners of all ages with the knowledge and skills to safely and securely leverage technology.

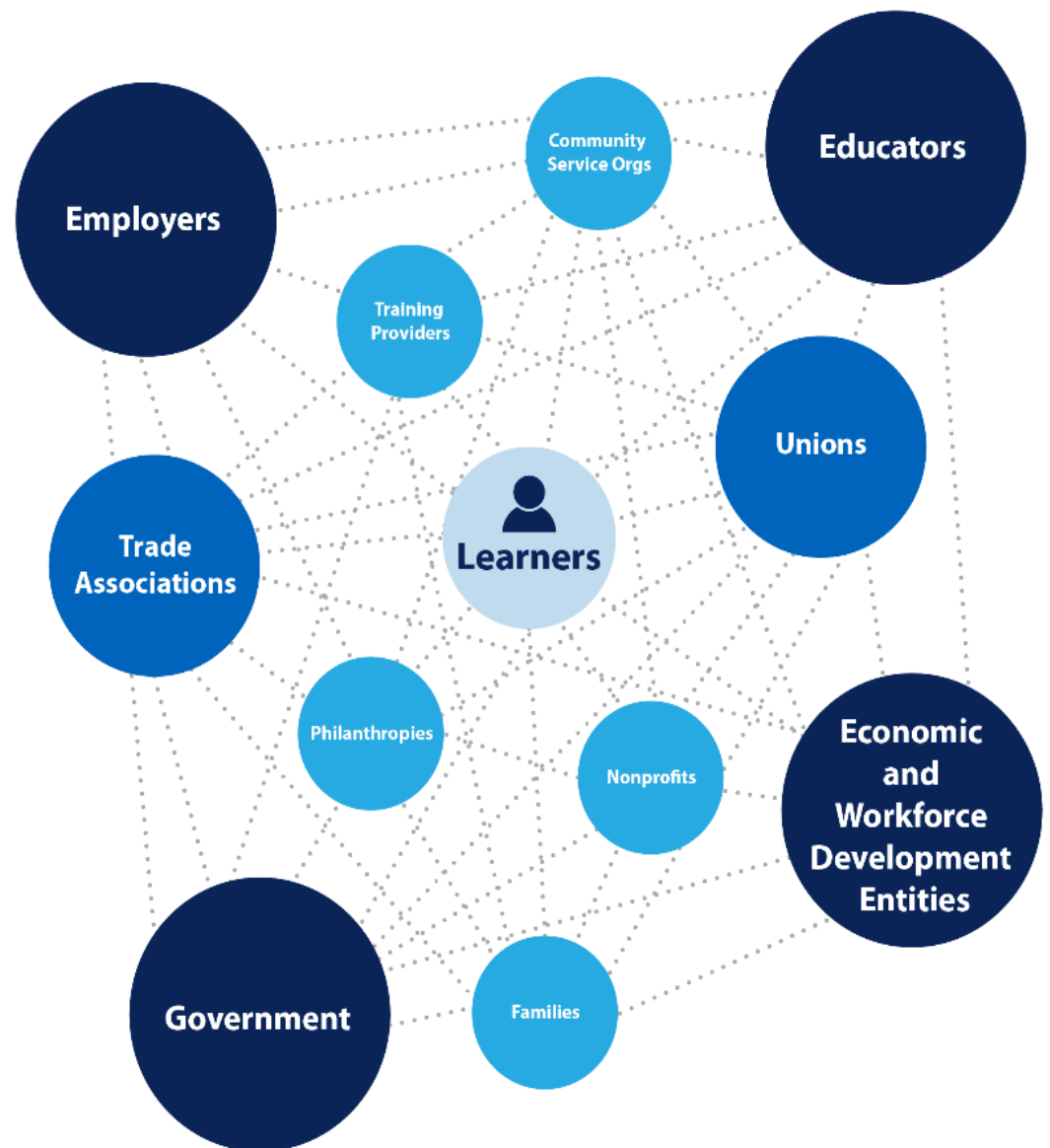


Figure 1. Example of a Cyber Workforce and Education Ecosystem. Find more examples at <https://whitehouse.gov/cyberworkforce>



MOVING FORWARD

Cyber workforce and education ecosystems are dynamic in nature, with similarities and distinctions based on geographic, demographic, economic, and related needs. Cyber workforce and education ecosystems experience similar stages of development and maturation, which include initiation, incubation, and expansion. Ecosystems can mutually benefit from connections with other ecosystems by sharing strategies, resources, and experiences.

Cyber workforce and education ecosystems begin and end with people. Ecosystems are only as strong as the people who commit to a shared vision for the cyber workforce they serve. If you are embarking on creating an ecosystem, you should consider the resources and institutions that are already in place, such as an economic development program or chamber of commerce in your area. Connect with all types of education systems, including K-12 districts, community and technical colleges, universities and other public and private institutions. As stakeholders begin to collaborate, consider key factors that impact ecosystem growth and sustainability. Think about the people, vision, goals, technical capabilities, infrastructure, and processes needed to initiate, support, and expand cyber workforce and education ecosystems. This advance work will optimize collaboration, impact, and outcomes for the ecosystem.

FACTORS TO CONSIDER

Whether you are a student entering the workforce or an employer adopting skills-based hiring, there is a role that you can take to support cyber workforce and education ecosystems. The following steps to success highlight how ecosystems can take impactful actions to build and amplify the widespread impact of cyber workforce and education ecosystems across the Nation.

The following sections can help you advance your efforts to create and expand your ecosystem.

PEOPLE

Leverage the collective knowledge, expertise, and background of your ecosystem partners to broaden your perspective and gain new ideas.

CULTURE

Encourage a culture of inclusion and inspiration that unites ecosystem stakeholders.

SHARED VISION

Collaborate with ecosystem stakeholders to weave the fabric that brings different backgrounds and perspectives into a common vision of future success.

RESOURCES

Identify stakeholders that can benefit from a skilled cyber workforce and provide resources to support your efforts, including influencers and validators.

TECHNOLOGY

Leverage the cyber skills and systems of stakeholders to help organize your efforts, amplify your vision, and expand your reach.

BARRIERS

Identify systemic barriers that are limiting access to learning and employment opportunities and find ecosystem partners with the expertise and resources to offer solutions.

PROCESSES

Establish and streamline approaches to collaboration that lead to measurable outcomes and continuous improvement of the ecosystem.



ENGAGE YOUR LOCAL COMMUNITY

Take the first step in making a positive impact on cyber workforce and education programming in your local community: connect and collaborate. Whether you are encouraging others to join you in volunteering, attending events, or starting a program or initiative, your leadership can drive meaningful change.

Are you identifying and engaging with local communities supporting cyber workforce and education programs, events, or initiatives?

- ☐ Find stakeholders in those communities and explore ways that you can create and/or support their cyber workforce and education programs and initiatives.
- ☐ Identify ways that everyone can contribute with their combined expertise, networks, and resources.

Are there any local organizations or communities hosting cyber events, conferences, training days, or meet-ups?

- ☐ Explore opportunities to attend cyber events in science, technology, engineering, and mathematics (STEM), policy, law, government, healthcare, entertainment, the arts, and other sectors to find and expand opportunities across industries.
- ☐ Research cyber events and programming in your local communities, neighboring towns, cities, and/or counties.

Are there skills-based training providers, initiatives, or cyber programs at high schools or colleges in your community? Is there a National Center of Academic Excellence in Cybersecurity in the area?

- ☐ Utilize tools such as the [Cybersecurity Education and Training Providers Tool](#) at [CyberSeek.org](#), as well as the [National Centers of Academic Excellence in Cybersecurity \(NCAE-C\) Program](#) to find cyber education and training providers. NCAE-Cs are cybersecurity education programs located at more than 450 colleges and universities.

Are employers and educators aware of the variety of cyber roles available in your community and cyber skills that are in demand?

- ☐ The [Workforce Framework for Cybersecurity \(NICE Framework\)](#) is a resource to help employers develop their cybersecurity workforce. The NICE Framework applies across public, private, and academic sectors.
- ☐ The [National Initiative for Cybersecurity Careers and Studies \(NICCS\) Cyber Careers Pathways Tool](#) presents an interactive method of exploring cyber roles within the NICE Framework.



CONNECT WITH STAKEHOLDERS

Connecting with stakeholders starts with identifying opportunities to cultivate relationships throughout your cyber workforce and education ecosystem. Engage with stakeholders through events, discussions, and other efforts to gather support.

Are there any city, county, or statewide economic or workforce development initiatives, events, or related activities focused on cyber workforce and education?

- ☐ Identify programs, events, conferences, and active employers in the community.
- ☐ Consult the [National Initiative for Cybersecurity Careers and Studies \(NICCS\) website](#). The NICCS website is a resource for cybersecurity training, education, and career information and connects students, educators, and industry with cybersecurity resources and training providers throughout the Nation.
- ☐ Email, call, or visit people leading initiatives. Attend events and ask questions.
- ☐ Read news articles in the community and connect with people and organizations.
- ☐ Research local employers focused on cybersecurity and/or high-tech jobs.
- ☐ Share information gleaned from events and sources with other stakeholders.

Are any elected or appointed officials leading or sponsoring cyber initiatives or programs? Do they host events where you can make personal connections with their offices?

- ☐ Utilize the U.S. General Services Administration's [USA.Gov](#) website to learn how to contact federal, state/territorial, and local elected leaders.
- ☐ Subscribe to newsletters and attend town halls to learn about existing programs.



DEVELOP A PLAN

Develop a detailed plan for your ecosystem. Outline shared goals, strategies, and a timeline that results in a clear roadmap to guide the objectives and outcomes for the ecosystem from start to finish.

Have you explored other workforce or education plans, strategies, or roadmaps that you can use to model your ecosystem?

- ☐ Identify existing leaders or organizations creating workforce plans in cybersecurity. See if stakeholders who contributed to these efforts can serve as subject matter experts to assist you in developing your plan.
- ☐ Review meeting notes and research. Share common themes with stakeholders.

Which stakeholders in your ecosystem are equipped to lead the development of the plan, and how can all stakeholders in the ecosystem work together to build momentum?

- ☐ Determine who will lead the effort and how to build momentum together.
- ☐ Convene stakeholders and build the ecosystem's plan, including the shared vision, goals, objectives, resource requirements, practical and attainable outcomes, and collaborative strategies.
- ☐ Ensure that the plan includes diverse perspectives.
- ☐ Assign action items that stakeholders can complete and set deadlines.

As you develop your plan, what resources do you anticipate will be essential for successfully implementing it and achieving your goals and desired outcomes?

- ☐ Remember to take into account common constraints such as cost, scope, and time to get the best estimate on funds and resources needed.



SECURE RESOURCES

Ensure your cyber workforce and education ecosystem is sustainable. Collaborate with stakeholders to identify and secure resources to begin and expand the ecosystem. Identify and secure funding, materials, and expertise to provide a strong foundation for your cyber workforce and education programs and initiatives.

Which existing physical, digital, and financial resources are available and being utilized within your ecosystem?

- ☐ Create a list of existing funding, including grants and donations.
- ☐ Identify current systems used for communication and sharing information.
- ☐ Consider any current physical resources that are available, including meeting spaces, computers, or other assets.
- ☐ Check with employers and government offices to see if they have off-lease or used equipment that can be repurposed at little or no cost.

Have you explored all available opportunities to secure more resources?

- ☐ Identify existing cyber ecosystems in action and explore how they were funded.
- ☐ Review grant programs that can provide funding and resources. You can find resources for cities and states at www.whitehouse.gov/cyberworkforce.

Which key partnerships could assist you in securing these resources? Are there specific stakeholders within your ecosystem who can help facilitate these connections?

- ☐ Resources such as the [Roadmap for Successful Regional Alliances and Multistakeholder Partnerships to Build the Cybersecurity Workforce](#) can help facilitate partnerships.

Are there local, state, or Federal funding opportunities to supplement these resources?

- ☐ See if your community is in the [Tech Hubs Program](#) that aims to strengthen economic and national security to become globally competitive in the technologies of the future.

Are there local philanthropic organizations or private funding in the community to support new opportunities?

- ☐ Seek strategic partnership and collaborations with industry, education, and individuals.
- ☐ Review www.whitehouse.gov/cyberworkforce for companies and organizations that have made commitments that may include partnerships or resources.



IMPLEMENT YOUR PLAN

Bring your strategy to life by implementing your plan. Don't forget to leave room to remain flexible as your cyber workforce and education ecosystem evolves. Follow your plan, monitor progress, and make adjustments as needed to stay on track.

How can you encourage stakeholders to consistently contribute and infuse resources and stakeholder expertise into the ecosystem?

- ☐ Invite stakeholders to choose specific action items to complete and set deadlines.

Are you prepared to adjust plans to meet emerging trends and opportunities to ensure your ecosystem's continued development and sustainability?

- ☐ Measure the number of resources used to support and accomplish each action item.

Are all stakeholders aware of each other's contributions to maintain accountability and enable the achievement of measurable outcomes?

- ☐ Continue to connect people to one another, and share progress as action items are completed.



SHARE YOUR PROGRESS

Keep your ecosystem engaged by sharing your progress regularly. Provide updates through reports, information sharing sessions, and presentations to maintain transparency and active participation among stakeholders.

Are there any local community forums, websites, newsletters, blogs, or influencers that can promote the work of the ecosystem?

- ☐ Use resources, such as social media, print and digital media outlets, press releases, and websites, to share how the plan was created and how people are collaborating.
- ☐ Identify local stakeholders that publish information about cyber, STEM, education, career pathways, and workforce development.

Are there stakeholders that can amplify the work of the ecosystem and facilitate connections that can open access to professional networks, employers, educators, and economic development partners?

- ☐ Update stakeholders on the community's progress, including elected and appointed officials, employers, government leaders, parents, teachers, and higher education institutions.
- ☐ Gather information from people and organizations who support and implement the plan, including challenges, success stories, photos, videos, dollars spent, and financial support received.

Do these platforms serve the differing needs in your community, such as accessibility requirements and information translation services to increase the reach of your content?

- ☐ Ensure resources are accessible to the diverse needs of the ecosystem and accessible in different languages and formats.
- ☐ Reach out to news media outlets and influencers to get the word out to the community.



EXPAND THE ECOSYSTEM

Broaden the reach of your ecosystem's contributions and partnerships by identifying opportunities to scale your ecosystem. Throughout implementation, work to establish new partnerships and collaborations across ecosystems to enhance your impact and drive further growth.

How can new stakeholders and other ecosystems expand your reach and foster growth?

- ☐ Identify new opportunities to collaborate with stakeholders through their events.
- ☐ Create accessible, consistent, and continuous processes for stakeholders to submit and share their accomplishments, ideas, questions, and feedback.
- ☐ Determine how often the plan should be updated to meet emergent needs.

Is your plan easily accessible for new contributors to understand the state of your ecosystem and how they can contribute to its expansion?

- ☐ Refine and adjust current plans as new opportunities and concerns arise to ensure the ecosystem's continued development and success.
- ☐ Estimate when the plan will run out of resources.



DEVELOPING SUSTAINABLE CYBER WORKFORCE AND EDUCATION ECOSYSTEMS

Cyber workforce and education ecosystems are dynamic in nature, with similarities and distinctions based on geographic, economic, social, and other factors. Taking an intentional and persistent approach to addressing the areas in the *Factors to Consider* section will position your ecosystem for longevity and stability.

When these factors are addressed, they collectively enhance the cyber workforce and education ecosystem's capacity to scale and adapt, enabling the ecosystem to consistently engage and collaborate. Just as a cyber workforce and education ecosystem is strengthened by connecting stakeholders, you can also leverage workforce ecosystems in other communities or industry sectors. For example, how could a local healthcare or manufacturing ecosystem benefit from collaborating with your ecosystem?

ECOSYSTEMS AT WORK

The ecosystem approach is not a new idea. Ecosystems have emerged across the country to meet the needs of a variety of stakeholders, communities, and sectors. Examples of cyber workforce and education ecosystems are included in the NCWES. These examples can serve as models to emulate, and may provide you with valuable insights and inspiration as you spark, support, and scale your cyber workforce and education ecosystem. Further information and links to each of these ecosystems can be found in the NCWES which is available at www.whitehouse.gov/cyberworkforce.

ONLINE RESOURCES

ARE YOU READY TO UNLOCK THE POTENTIAL OF YOUR CYBER WORKFORCE AND EDUCATION ECOSYSTEM?

Visit the ONCD Cyber Workforce website at www.whitehouse.gov/cyberworkforce for resources that can spark innovation, support growth, and scale impact in your community. To continue unlocking opportunities in cyber, it is critical to understand who is driving efforts across the Nation and how to engage with the communities doing it. ONCD is dedicated to showcasing the impact and progress of cyber workforce and education ecosystems, and we invite ecosystems and stakeholders to share their commitments to success using the form on the website.