

NICE

NATIONAL INITIATIVE FOR **CYBERSECURITY** EDUCATION

NIST
CYBER



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NICE/NIST, US Department of Commerce**

Working Groups



Communities of Interest

K12	Competitions	Apprenticeships	Framework Users	Research
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Some of the efforts the K12 group has and continues to work on

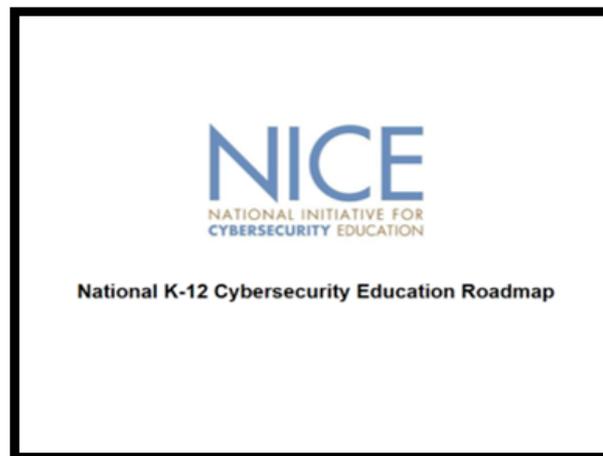


materials that can be used to inspire cybersecurity career awareness with students in elementary school, stimulate cybersecurity career exploration in middle school, and enable cybersecurity career preparedness in high school. View the full project charter [here](#).

- **K12 Cybersecurity Educational Instructional Professional Development (PD) Series** - Determining the professional development needs of K-12 educators in delivering K-12 cybersecurity content and outlining best practices for delivering cybersecurity instruction in the K-12 setting that have proven effective in similar disciplines. View the full project charter [here](#).

Accomplishments:

- Development of the K12 Cybersecurity Career Awareness for School Counselors and Administrators [one pager](#)
- Development of the Cybersecurity Career Awareness Key Talking Points [flier](#)
- Development of the Why Consider a Career in Cybersecurity Key Talking Points [flier](#)
- [NICE Strategic Plan](#) review
- Development of the [K12 Implementation Plan](#) (2016-2020)
- Development of Synergy between Cybersecurity and Computer Science [one pager](#)
- Review and recommendations on cybersecurity concepts in the [Computing Science Framework](#)^{cs}
- Review and recommendations on cybersecurity concepts in the [Computer Science Teacher's Association \(CSTA\) Standards](#)^{cs} refresh
- Development of K12 Cybersecurity Competitions [one pager](#)
- Review and input to the Joint Task Force on Cybersecurity Education Cybersecurity Curricula 2017 (CSEC v.5)
- Curation of known [K12 educational resources for at-home use](#)^{cs}
- Development of [Career and Technical Education Report outline](#)
- Development of the [K12 Cybersecurity Education Roadmap](#)



<https://www.nist.gov/itl/applied-cybersecurity/nice/community/community-coordinating-council/k12-cybersecurity-education>

Active Programs:

- [National Cybersecurity Career Awareness Week](#) for K12 audience
- [K12 Cybersecurity Education Conference](#)^{cs} planning

The Value Of Certifications

Computing and Cybersecurity Certifications have been used to detail the knowledge, skills, and abilities (KSAs) needed for key roles in information technology and cybersecurity since the late 1980s. The primary focus of a professional certification program is to provide an independent assessment of the KSAs required for performance of an occupational role or specific work-related tasks. The certification awarded is a quality benchmark and designates that participants have demonstrated the requisite KSAs and other requirements established by the certification program provider.

Certification Programs:

- provide hands-on learning and performance-based assessments.
- validate competencies to perform work roles.
- supply learners with portable and stackable credentials.
- ensure continued competence in an evolving field through renewal requirement.

MORE THAN

1/4 of the employed U.S. population

holds a license or certification on top of any academic degrees they may hold.

COMPARED TO

beginner-level salaries in IT, the salary premium for specializations such as Security and Network Technologies is:

10% higher with an intermediate certification (e.g. Security+)
26% higher with an advanced certification (e.g. CISSP)
45%+ higher with an expert certification (e.g. CISM)

IN THE U.S.

the difference between salaries of certified and noncertified IT staff is nearly **\$8,400** or **11.7%**.

IN THE WORKPLACE

94% of survey respondents reported that their certified team members brought **added value** above and beyond the cost of certification.

GLOBALLY

3 is the average number of certifications IT practitioners hold.

ON A NATIONAL LEVEL

there are approximately **215,371** job openings requiring certifications such as Security+, CISSP, CISSP, GIAC, CSA, and CISM as of 2018.

AFTER DEVELOPING NEW SKILLS

from acquiring certifications or other training, survey respondents reported a **9 to 16% pay raise**.

<https://www.nist.gov/itl/applied-cybersecurity/nice/resources/one-pagers>
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Cybersecurity Career and Technical Education Programs

Career and Technical Education (CTE) programs have proven to be an effective approach to prepare secondary and postsecondary students to succeed in cybersecurity careers.

CTE provides students with the academic, technical, and employability skills through rigorous and applied coursework, work-based learning experiences, dual or concurrent enrollment, and industry-recognized certifications.

WHY CTE?

CTE provides opportunities for students to gain technical, academic, and professional leadership skills for college and career success.

- CTE works for high school students
- CTE works for college students
- CTE works for the economy
- CTE works for business



The top 3 benefits benefits for students are the attainment of:

- **COMPETENCIES** to qualify them for a cybersecurity career
- **EMPLOYABILITY SKILLS** such as teamwork
- **REAL-WORLD EXPERIENCES** to apply learning

Students can take advantage of CTE cybersecurity content through:

- Individual CTE courses
- A sequence of classes
- Career Academies
- Programs of Study
- Early College High Schools
- Content across the 16 Career Cluster®



The U.S. Department of Education, Office of Career, Technical, and Adult Education administrators. CTE programs funded under the Perkins Act through grants to states. Visit <https://doe.ed.gov>.

APPLIED LEARNING
 an integral topic integrated with rigorous academics and employability skills

PORTABLE CREDENTIALS
 such as industry-recognized certifications and college credits

PRACTICAL APPLICATION
 of knowledge and skills through work-based experiences

CTE Programs of Study (POS) are authorized and funded through the Carl D. Perkins Career and Technical Education Act of 2006. A high-quality POS includes the 10 components of the **Programs of Study Design Framework**, such as:

- providing non-duplicative progression of courses that align secondary to postsecondary education;
- including opportunities for dual or concurrent enrollment programs;
- leading to an industry-recognized certification, certificate at the postsecondary level, or an associate or baccalaureate degree; and
- including work-based learning experiences, such as apprenticeships and internships.



The National Career Clusters®, maintained by Advance CTE, provides the organizing structure for delivering quality CTE programs with **16** career clusters and **79+** pathways.

Cybersecurity is most often included in the Information Technology Career Cluster. Visit <https://www.nctech.org>.

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FINAL



National K-12 Cybersecurity Education Roadmap

nist.gov/nice

*The **K12 Cybersecurity Education Roadmap** establishes a coordinated, coherent portfolio of National K-12 Cybersecurity Education activities so that efforts and assets are deployed effectively and efficiently for greatest potential impact. The intent is to encourage a more deliberate focus among new and existing efforts and create synergies among programs and agencies.*



National K-12 Cybersecurity Education Roadmap

PURPOSE

WHAT?

Document establishing a coordinated, coherent portfolio of National K-12 Cybersecurity Education activities.

WHY?

Allows efforts and assets to be deployed effectively and efficiently for greatest potential impact.

HOW?

Encourages a more deliberate focus among new and existing efforts and create synergies among programs and agencies.

Five Elements of the ROADMAP

- 1. Increase Cybersecurity Career Awareness:** *Grow and sustain youth and public engagement in promoting cybersecurity career awareness and exploration*
- 2. Engage Students Where Disciplines Converge:** *Identify, design, and share cybersecurity resources for the future STEM and cybersecurity workforce*
- 3. Stimulate Innovative Educational Approaches:** *Enrich K-12 cybersecurity education instruction*
- 4. Promote Cybersecurity Career Pathways:** *Cultivate youth pursuing cybersecurity or cybersecurity related credentials (e.g., diplomas, degrees, certificates, certifications, badges)*
- 5. Prioritize Research:** *Enhance efficiency and effectiveness of K12 cybersecurity programs and instructional practices*



K12 Cybersecurity Education ROADMAP

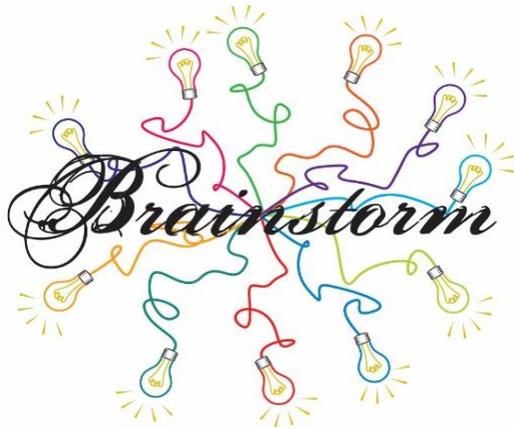
How are your cybersecurity K12 efforts encompassed in the Roadmap?



NICE Goals & Objectives	K-12 ROADMAP Strategy	Action or Tactics	Measure/s & Metric/s or Success Indicators
<u>Increase Cybersecurity Career Awareness: Grow and sustain youth and public engagement in promoting cybersecurity career awareness and exploration</u>			
<p>Collaboration, coordination, and communication are part of the NICE SP Mission and Values</p>	<p>1.1</p>	<p>Communicate the value and purpose of a national K12 cybersecurity education strategy (i.e., the K12 Cybersecurity Education Roadmap) and the need for engagement</p>	<p>Review and analyze previous K12 Implementation Plan.</p> <p>Convene multiple stakeholders to provide input on development of new K12 Cybersecurity Education Roadmap</p> <p>Engage leadership and other stakeholders on the value of cybersecurity education and programs as critical enablers of the nation's K12 ecosystem missions, requirements, and technology superiority and support stakeholders through strategic communications resources.</p> <p>INDICATOR: Completion of environmental scan of activities and resources aligned to previous K12 Implementation Plan.</p> <p>INDICATOR: Completion of report highlighting environmental scan of activities and resources aligned to previous K12 Implementation Plan.</p> <p>INDICATOR: Completion of K12 Roadmap.</p>

1.1, 1.2, 1.4	1.3	Support effective co-curricular experiences (e.g., competitions, camps, clubs, boy/girl scouts, etc.) for youth that excites them about careers in cybersecurity and introduces them to the corresponding career pathways	Promote increased partnerships between academia, industry and government for STEM and Cybersecurity initiatives and activities. Identify and track current programs and best practices that attract, retain, and network the cybersecurity professionals and share them across the K12 ecosystem.	INDICATOR: Increased number of, and enrollment in, different types of cybersecurity or cybersecurity related programs. INDICATOR: Increased levels of cooperation and collaboration among the universities, community and private colleges, schools, competitions, museums, clubs, businesses and other groups.
1.1, 1.2, 1.4, 1.5	1.4	Improve the appeal and understanding of the cybersecurity work roles and promote participation of underserved groups in cybersecurity activities and education programs to support diversity, equity, and inclusion	Build on the marketing plans of existent initiatives and efforts to promote cybersecurity and other STEM professions, including teaching as valued and important. Improve upon the inventories that have begun through existent initiatives to make accessible and frequently updated records of programs and resources	INDICATOR: Improved student achievement (participation in STEM/cybersecurity competitions, camps, clubs, challenges, majors, course selection, course completions,) notably a particular gain made by students of underrepresented minorities INDICATOR: More proportional

1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 4.4, 5.4	4.2	Support and promote cybersecurity career preparedness for students through a variety of learning pathways (e.g., Career Technical Education-CTE, Programs of Study-POS, youth apprenticeship, pre-apprenticeship, PTECH, early college programs, and other "alternative" opportunities)	Increase number of rigorous programs for CTE POS Network security Measure success for Prep programs: research best practices, develop rubric, track programs, curate programs in cyberroots project directory or other tracking mechanism Partner with CTSO and individual programs to – help them know more about cybersecurity and cybersecurity work roles (NICE Framework) FBLA, TSA, BPA, SkillsUSA etc. , create resources for students and educators Create mentorship and speaker's bureau to help CTSO students and programs Increase national level uniformity – development and dissemination of rubric or "checklist" for best practices Create and disseminate resources highlighting multiple program options Allowed CIP codes flex because no one CIP Research and disseminate list of CIP and SOC codes What do people really want from their program? Creation of instance reports	INDICATOR: Increase in the number of students enrolling and completing or graduating in cybersecurity or cybersecurity related programs, apprenticeships, or majors at community colleges and universities, certifications, and other boot camps or stackable credentials, notably including an increase in participation of students from underrepresented groups. INDICATOR: Development of asset map tracking CTE programs, numbers, students enrolled, etc. INDICATOR: Increased supply of highly qualified cybersecurity ready workforce.
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Join us

SAVE THE DATE

NICE K12

**CYBERSECURITY EDUCATION
C O N F E R E N C E**

DECEMBER 6-7, 2021

Categories



Building Blocks: Tasks, Knowledge, and Skills (TKS)

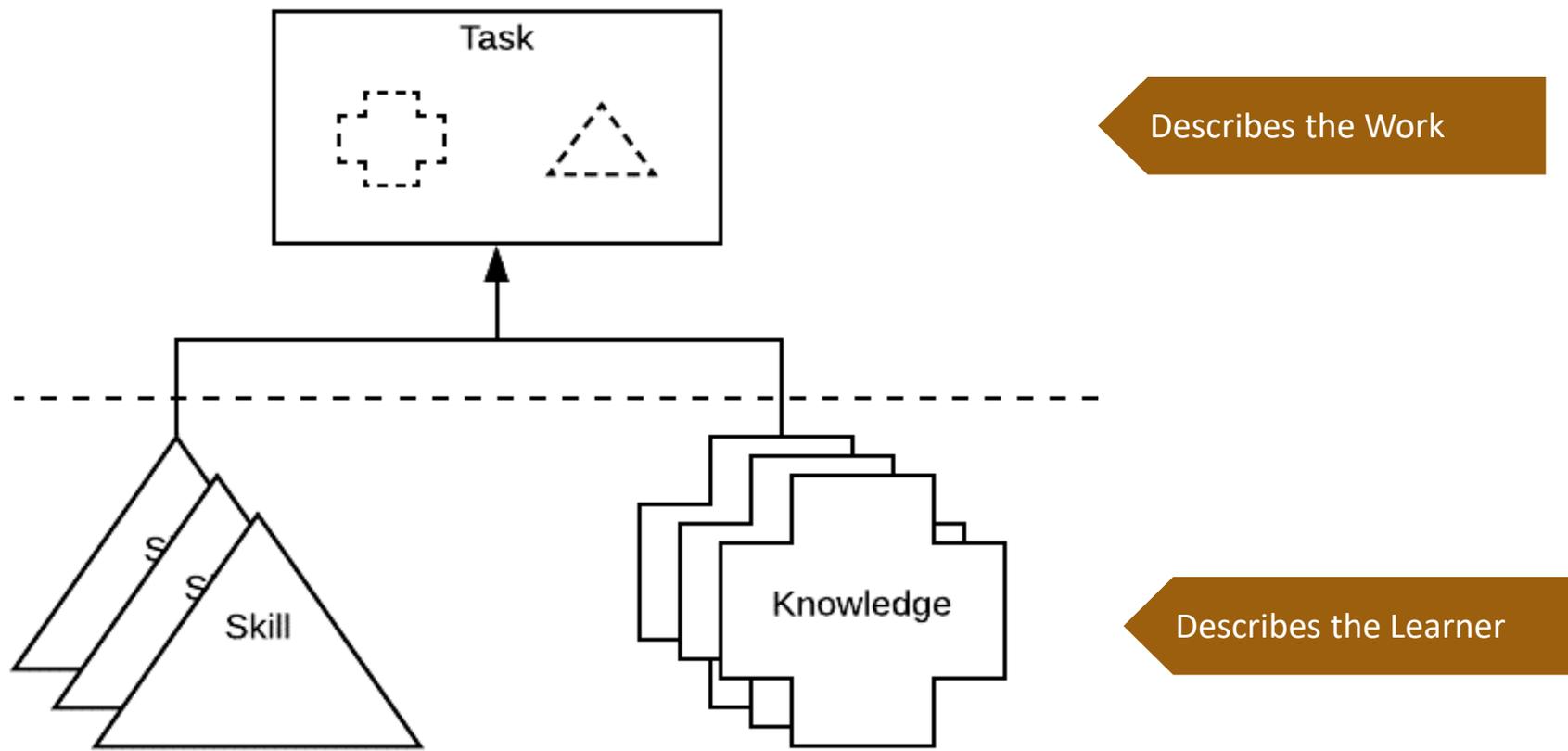


Table 6 - NICE Framework Skills Descriptions

Skill ID	Description
S0001	Skill in conducting vulnerability scans and recognizing vulnerabilities in security systems.
S0002	Skill in allocating storage capacity in the design of data management systems.
S0003	Skill of identifying, capturing, containing, and reporting malware.
S0004	Skill in analyzing network traffic capacity and performance characteristics.
S0005	Skill in applying and incorporating information technologies into proposed solutions.
S0006	Skill in applying confidentiality, integrity, and availability principles.
S0007	Skill in applying host/network access controls (e.g., access control list).
S0008	Skill in applying organization-specific systems analysis principles and techniques.
S0009	Skill in assessing the robustness of security systems and designs.
S0010	Skill in conducting capabilities and requirements analysis.
S0011	Skill in conducting information searches.
S0012	Skill in conducting knowledge mapping (e.g., map of knowledge repositories).
S0013	Skill in conducting queries and developing algorithms to analyze data structures.
S0014	Skill in conducting software debugging.
S0015	Skill in conducting test events.
S0016	Skill in configuring and optimizing software.
S0017	Skill in creating and utilizing mathematical or statistical models.
S0018	Skill in creating policies that reflect system security objectives.
S0019	Skill in creating programs that validate and process multiple inputs including command line arguments, environmental variables, and input streams.
S0020	Skill in developing and deploying signatures.
	Skill in designing a data analysis structure (i.e., the types of data a test must generate and



Operate and Maintain

Analyze

Collect and Operate



Securely Provision

Protect and Defend

Investigate



Oversee and Govern

Cybersecurity Career Awareness Week

CALL FOR COMMITMENTS

Third Week in October

We invite you to join us in observing Cybersecurity Career Awareness Week, a celebration to focus local, regional, and national interest to inspire, educate and engage children through adults to pursue careers in cybersecurity. Commitments are actions taken by the community to promote awareness & exploration of cybersecurity careers. Commitments come in all sizes and don't always require financial investment. You can host an event, distribute career awareness materials, or engage through social media. Be creative!

Learn more and register how you will participate at nist.gov/nice/ccaw

nist.gov/nice/ccaw

Cybersecurity Career Awareness Week



Inspiring and promoting awareness & exploration of cybersecurity careers

Join us in promoting awareness & exploration of cybersecurity careers by hosting an event, participating in an event engaging students with cybersecurity content!

ADD YOUR ACTIVITY



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[About the Campaign](#)

Learn more about Cybersecurity Awareness Week



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[Discovering Cybersecurity Careers](#)

Explore resources about cybersecurity careers



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[Cybersecurity in Your Neighborhood](#)

Explore cybersecurity in your neighborhood



Credit: Shutterstock

[Ideas for Engagement](#)

Explore ideas to promote careers in cybersecurity



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[Special Events](#)

Discover our live events page coming soon.



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[Social Media](#)

Help us spread the word



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[Proclamations](#)

Make it official
Explore our [templates](#) to get started.



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[Expanding Year-Round](#)

Build awareness about cybersecurity careers throughout the year page coming soon.

CYBERSECURITY SUPPLY/DEMAND HEAT MAP

All

Public Sector Data

Private Sector

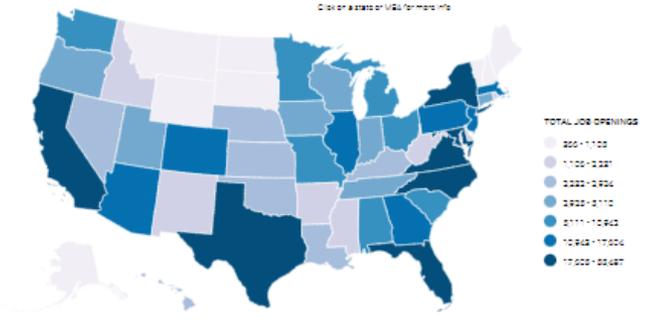
Total job openings

Cybersecurity talent gaps exist across the country. Closing these gaps requires detailed knowledge of the cybersecurity workforce in your region. This interactive heat map provides a granular snapshot of demand and supply data for cybersecurity jobs at the state and metro area levels, and can be used to grasp the challenges and opportunities facing your local cybersecurity workforce.

Share

Embed

States Metro Areas Search State



K12 CYBERSECURITY RESOURCES FOR AT HOME

HOME

Developed by like-minded individuals interested in sharing resources for students, parents, and educators to promote cybersecurity content
Resources curated by the NICE K12 Community of Interest. Disclaimer: This is not an official resource of the U.S. government. We do not endorse the organizations sponsoring linked websites, and we do not endorse the views expressed or the products or services they offer.



CYBERAWARENESS RESOURCES



RESOURCES FOR ELEMENTARY



RESOURCES FOR MIDDLE SCHOOL



RESOURCES FOR HIGH SCHOOL



CYBERSECURITY E-BOOKS



GAMES FOR KIDS AND FAMILIES



INTERNSHIPS/SCHOLARSHIPS



COMPETITIONS

nicek12athome.weebly.com

NIST Educational STEM Resource Registry

NEST-R

NIST Log In / Sign Up

NIST Educational STEM Resource Registry (NEST-R) Home Search Help

Welcome to NEST-R!

This registry provides access to STEM (Science, Technology, Engineering, and Math) educational resources produced by NIST, letting users search both by free text and using a highly-specific filtering system to locate the resources that are most applicable to their needs.

To get started searching, please click on one of the categories to the right, or on the "Search" link in the top navigation bar. If you would like to contribute a resource to the registry, you will need to first register for an account, and then click "Publish" at the top to submit a resource for review and publication.

This registry is developed at the National Institute of Standards and Technology as part of an effort by the multi-divisional team involving staff from the *Communications Technology Laboratory*, the *Material Measurement Laboratory*, the *Physical Measurement Laboratory*, the *Information Technology Laboratory*, the *Public Affairs Office*, and the *Information Services Office*. The system is not deployed for production, and data may be deleted at any time, so please do not enter any proprietary or important data into it at this time.

Resource Types

- Education**
Click here to discover STEM Education resources.
- Workforce Development**
Click here to discover STEM Workforce Development resources.
- Events**
Click here to discover STEM Events.

Designed by **NIST** Educational STEM Resource Registry Version: 2.17.0 (2012 - 2021) Powered by: CDCS

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Thank you!

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