Annual Report of the Connecticut Commission for Educational Technology

Calendar Year 2018

Submitted in Accordance with CGS § 61a, Sec. 4d-80(c)(8)

Hartford, Connecticut
January 2, 2019

CTEDTECH
Connecticut Commission for Educational Technology

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Executive Summary

In 2018, the Connecticut Commission for Educational Technology continued to provide leadership and program resources to help ensure the effective and equitable use of technology for learning across the state. More than ever before, technology played an ever-increasing role in the education of Connecticut residents, from K – 12 and college students to adult, lifelong learners.

Connecticut schools, institutions of higher education, and libraries have never been better equipped technologically to prepare students for college and careers. The vibrant Connecticut Education Network (CEN) connects every K – 12 district as well as most libraries and colleges with virtually unlimited connections to the Internet for digital learning and collaboration. Nearly three-quarters of high schools and more than half of middle schools provide computers for each of their students, and virtually every public school student has a district-issued Google account for creating, sharing, and learning from digital content.

With all the promise of — and progress through — technology, it also brings challenges. Among the general public, these include the addictiveness of mobile devices, data breaches that compromise personal information, and the misuse of digital media to further political and social divisiveness. Similar challenges exist in education, with heated discussions over the appropriate use of technology (e.g., too much or too little screen time); protecting student privacy while at the same time encouraging innovation; and ensuring readiness among all learners for the workforce of tomorrow.

With technology playing such a prominent role in learning, the work of the Connecticut Commission for Educational Technology has become increasingly important in the last year. The following highlights reflect the impact of these efforts across the Commission's three focus areas — digital learning, infrastructure, and data & privacy — and through programs and services that the Commission launched and continues to champion.

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1st State

To equip students with the skills they need for digital learning, the Commission has adopted state competency standards. Connecticut remains the first and only state to adopt the ISTE Student, Educator, and Leader standards, international benchmarks for digital learning.

→ See Proficiency Standards, pages 13 – 16

$22M Opportunity

Connecticut schools have not taken advantage of more than $20M in available federal (E-rate) funds to connect to the Internet. The Commission has addressed this significant gap through research and reporting on the challenges to fully utilizing the program. The Commission continues outreach efforts to schools and libraries to increase awareness of and provide assistance with the E-rate program.

→ See E-rate Maximization, pages 17 – 18

40,000 Students

The Commission's work continues to address the estimated 8 percent (40,000) K – 12 students who do not have access to the Internet outside of school. More than 100 communities have used the Digital Equity Toolkit, a playbook to help towns and cities provide for 24 X 7 learning using existing free and low-cost solutions, including the promising Eduroam system.

→ See Digital Equity, pages 18 – 20

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7,000%
Return

To ensure that schools efficiently comply with the State's data privacy law, the Commission launched the Educational Software Hub, an investment that has netted a 7,000 percent return on investment, saving an estimated 10,000 staff hours this year.

→ See Educational Software Hub, page 21

National Privacy Model

The Hub and the Commission's negotiations with technology leaders such as Google and Microsoft have not only resulted in significant efficiencies for the state's public schools but have also garnered significant press and positioned Connecticut as a model for managing student privacy at scale.

→ See Vendor Relations, page 21

$36M
Content Savings

The Connecticut State Library continues to deliver exceptional value through researchIT (formally iCONN), the digital library free to all Connecticut residents. This service delivered $38M in digital content subscriptions at a cost to the state of less than $1.6M.

→ See researchIT CT, page 29

$20M
Network Savings

The Connecticut Education Network (CEN), launched in 2000 through the Commission, delivers Internet connections, federally mandated content filtering, and cyber protection services to schools, colleges, libraries, towns, and open access members at a cost that saves these institutions approximately $20M this year alone.

→ See Connecticut Education Network, page 33

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Introduction

The Connecticut Commission for Educational Technology ("the Commission" or "CET") was established in 2000 by Public Act 00-187 to serve as the State's principal educational technology policy advisor. This document summarizes the Commission's activities and progress in attaining its statewide technology goals during the past calendar year, in accordance with its governing statute (CGS § 4d-80). The report serves to inform and provide recommendations to the joint standing committee of the General Assembly having cognizance of matters relating to education, appropriations, and the budgets of state agencies; the State Board of Education; and the Board of Governors of Higher Education. Readers accessing this report online may use the embedded links to view meeting minutes, publications, and Web sites directly.

Background and Membership

Name and Position	Representing or Appointed By
Mark Raymond, CIO, Chairman	Department of Administrative Services
Catherine Smith, Commissioner	Department of Economic and Community Development
Michael Mundrane, Vice Provost and CIO	University of Connecticut
Ken Wiggin, State Librarian	Connecticut State Library
Ellen Cohn, Deputy Commissioner	Connecticut State Department of Education
John Vittner, Director of IT Policy	Office of Policy and Management
Scott Zak, Senior Director of Learning Technologies	CT Board of Regents for Higher Education
Bill Vallee, State Broadband Policy and Program Coordinator	Office of Consumer Counsel
Jennifer Widness, President	CT Conference of Independent Colleges
Nick Caruso, Senior Staff Associate	CT Association of Boards of Education
Scott Shanley, General Manager, Town of Manchester	CT Conference of Municipalities
John Elsesser, Town Manager, Town of Coventry	CT Council of Small Towns
Colleen Bailie, Director, West Haven Public Library	CT Library Association
Bart Stanco, Vice President, Gartner	Governor's Office
Russell Feinmark, CT General Assembly	Speaker of the House
Rich Mavrogeanes, President, Discover Video	President Pro Tem of the Senate
Carl Fortuna, First Selectman, Town of Old Saybrook	Minority Leader of the Senate
Charles Dumais, Executive Director, Cooperative Educational Services	Governor's Office
Tom Dillon, Founder, Flagship Networks	Minority Leader of the House

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In September, the Commission welcomed new member Carl Fortuna, First Selectman of the Town of Old Saybrook. His appointment by the Minority Leader of the Senate filled the only seat left vacant in 2017.

Leadership

Mark Raymond, the Chief Information Officer for the State, continued his service as Chair of the Commission by the appointment of Governor Malloy. Douglas Casey serves as the Commission's Executive Director, with responsibility for the CET's planning and activities, as described on the Connecticut General Assembly Web site (Chapter 61a) and on the Commission Web site (www.CT.gov/CTEdTech) in the Bylaws section. In June, the members elected Michael Mundrane to serve as Vice Chair of the Commission.

In addition to its members, the Commission benefits from the insights of Advisory Council members who address the Commission's three focus areas of Digital Learning, Infrastructure, and Data and Privacy. Ten Commission members and alternates as well as nearly 40 subject matter experts from across the state serve on these Advisory Councils, representing a broad diversity of constituencies to help guide the Commission's priorities and programs. The list of Advisory Council members follows:

Data and Privacy Advisory Council

- Brian Czapla — Superintendent, Somers Public Schools
- Ben FrazziniKendrick — Associate, Locke Lord LLP
- Brian Kelly — Chief Information Security Officer, Quinnipiac University
- Scott Matchett — Director of Technical Operations and Services, South Windsor Public Schools
- Jason Pufahl — Partner, TBNG Consulting
- Bethany Silver — Assistant Superintendent, Bloomfield Public Schools
- Michael Swaine — Northeast Regional Manager, Gaggle

Digital Learning Advisory Council

- Nick Caruso (Chair) — Senior Staff Associate for Field Service, CABE*
- Katie Bauer — Director of Library Research Services & Collections, Trinity College
- Kevin Corcoran — Executive Director, Executive Director, Digital Learning, Connecticut State Colleges and Universities
- Jonathan Costa — Assistant Executive Director, EdAdvance
- Larry Covino — Director, Bristol Adult Education
- Andy DePalma — Director of Technology, EASTCONN
- Sarah Edson — Dean of Academic Technology and Innovation, Ethel Walker School
- Josh Elliott — Director of Educational Technology, Fairfield University Graduate School of Education and Allied Professions
- John Elsesser* — Town Manager, Town of Coventry
- Barbara Johnson — Library Media Specialist, Colchester Public Schools
- Jason Jones — Director of Technology, Stonington Public Schools
- Jae-Eun Joo — Director of Online Programs, Neag School of Education, University of Connecticut
- Karen Kaplan — Technology and Communications Director, Hamden Public Schools
- Marijke Kehrhahn — Head of School, Independent Day School

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- Dawn La Valle* — Director, Division of Library Development, Connecticut State Library
- Shannon Marimón — Executive Director, Connecticut Council for Education Reform
- Laura McCaffrey — Director of School Support and Academic Services, Hartford Archdiocese
- Greg Mcverry — Professor, Southern Connecticut State University
- Jim Mindek — Information Technology, Connecticut Technical High School System
- Josh Smith — Superintendent, Region 15 Public Schools
- Karen Skudlarek — Educational Technologist, University of Connecticut
- Jim Spafford — Coordinator of Business Services and Partnerships, Manchester Adult Education
- Shelley Stedman — Past President, Connecticut Association of School Librarians
- Chinma Uche — Computer Science Teacher, CREC Academy of Aerospace and Engineering, and President, CT Computer Science Teachers Association
- Christopher Weiss — Principal, Riverside School (Greenwich)
- Jennifer Widness* — President, CT Conference of Independent Colleges
- Scott Zak* — Senior Director of Learning Technologies, CT State Colleges and Universities

Infrastructure Advisory Council

- Tom Dillon (Chair)* — Founder, Flagship Networks
- Colleen Bailie* — Library Director, West Haven Public Library
- Joe Campbell — Educational Technology Consultant, Connecticut Technical High School System
- George Claffey — Chief Administration Officer, Central Connecticut State University
- Robert DeVito — Technology Director, University of Hartford
- Aaron Herold — Director of Technology, New Fairfield Public Schools
- Fred Kass — Director of Networking & Infrastructure Services, Trinity College
- Kerri Kearney — Supervisor of Instructional Technology, Manchester Public Schools
- Ryan Kocsondy — Director, Connecticut Education Network (CEN)
- Michael Mundrane* — Vice Provost and CIO, University of Connecticut
- Susan Shellard* — Chief Administrative Officer, Department of Economic and Community Development
- Sabina Sitaru — Former Chief Innovation Officer, Metro Hartford Information Systems
- Bill Vallee* — CT Broadband Policy and Programs Coordinator, CT Office of Consumer Counsel
- Rick Widlansky — System Manager, Libraries Online (LION)
- Rob Wilson — Director of Technology and Information Services, Somers Public Schools

*Also serves as a Commission member or alternate.

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Meetings

The dates and agendas of the Commission and Advisory Council meetings appear below, with meeting minutes and, in some cases, video archives available from the Commission Web site, www.CT.gov/CTEdTech.

Commission Meetings

Monday, March 5

- Cybersecurity Education
- E-rate Maximization
- Student Technology Competencies
- Commission Bylaw Review

Meeting Minutes

Monday, June 4

- Vice Chair Election: Michael Mundrane
- Educational Software Hub Impact
- Open Education Resources
- Teacher Competency Certification

Meeting Minutes

Video Archive

Monday, September 10

- New Member: Carl Fortuna
- ISTE Standards Campaign
- E-rate Survey
- Digital Learning Policy Recommendations

Meeting Minutes

Video Archive

Monday, December 3

- Strategic Goals and Plan Review
- Bylaw Revisions
- CEN Pricing and Threat Mitigation
- Adoption of Education Leader Standards
- Draft E-rate Report
- Libraries and the Digital Divide

Meeting Minutes

Video Archive

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Advisory Council Meetings

Data and Privacy Advisory Council

Tuesday, February 6

- Trusted Learning Environment
- Educational Software Hub
- Connecticut Data Privacy Statute Updates
- EU GDPR Impacts

Meeting Minutes

Digital Learning Advisory Council

Monday, February 12

- ISTE Standards Adoption and Public Comment
- Guidance and Supports for District Adoption of ISTE Standards
- Open Education Resources

Meeting Minutes

Thursday, August 9

- ISTE Education Leader Standards
- ISTE Campaign and School Supports
- Open Education Resources Advocacy and Supports
- Alternative Learning Days

Meeting Minutes

Infrastructure Advisory Council

Thursday, February 15

- Digital Equity Toolkit Use and Impact
- E-Rate Supports and Assessment
- Wireless Services and Needs
- Connectivity Measurement

Meeting Minutes

Monday, August 6

- Digital Equity Updates
- Education Broadband Spectrum (EBS) Changes
- E-rate Survey Results

Meeting Minutes

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State Educational Technology Goals and Plan

In 2017, the Commission released its five-year State Educational Technology Goals and Plan, with the following Vision Statement:

> ***THAT EVERY LEARNER AND EDUCATOR IN CONNECTICUT BENEFITS FROM THE FULL POTENTIAL OF TECHNOLOGY TO SUPPORT PERSONALIZED AND IMPACTFUL TEACHING, LEARNING, RESEARCH, AND ADVANCEMENT.***

To support that vision, the following Mission Statement defines the strategies and activities of the Commission:

> **DESIGN, STEWARD, AND PROMOTE POLICY, PROGRAMS, INSIGHTS, AND RESOURCES THAT SUPPORT THE EFFECTIVE USE OF TECHNOLOGY FOR ALL LEARNERS AND EDUCATIONAL ORGANIZATIONS IN CONNECTICUT.**

In the past year, the Commission has faithfully stewarded, promoted, and enlisted assistance to deliver upon the initiatives defined in the Goals and Plan. That blueprint for educational technology in our state addresses eight broad initiatives falling under three focus areas: Digital Learning, Infrastructure, and Data and Privacy.

Digital Learning

- Open Education Resources
- Student-Centered Learning
- Technology Proficiency Standards

Infrastructure

- E-rate Maximization
- Digital Equity
- Educational Technology Standards and Best Practices

Data and Privacy

- Privacy Compliance
- Privacy Best Practices

At the December 3 quarterly meeting, Director Casey provided members with an update on progress made against the Goals and Plan, reflecting the insights and efforts of the Commission members, Advisory Council members, and other subject-matter experts enlisted to support this work. The following page provides a high-level summary of these efforts.

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2018 Goals and Plan Progress Updates

Objective	Status
Digital Learning	
Open Education Resources	
Obtain GoOpen Status	Completed (June 2017)
Promote OER Framework and Initiatives	In Progress and Ongoing
Engage in National OER Communities	In Progress and Ongoing
"Frontiers in Personalized Learning" Report	Completed (November 2017)
Student, Teacher, and Administrator Standards	
Student Standard Endorsement	Completed (September 2016)
Commission Endorsement of Teacher Standards	Completed (September 2017)
Curation of Educator and Leader PD Supports	In Progress and Ongoing
Administrator Standards Input and Design	Completed (June 2018)
Adoption of Administrator Standards	Completed (December 2018)
Infrastructure	
E-rate Maximization	
Statewide Survey Design and Feedback	Completed (July 2018)
Statewide E-rate Report	Completed (November 2018)
Digital Equity	
Digital Equity Toolkit	Completed (December 2018)
Identification of "Beta" Communities to Use Toolkit	Completed (November 2018)
Data and Privacy	
Educational Software Hub Design and Launch	Completed (August 2017)
Privacy Best Practices Framework Promotion	In Progress and Ongoing

The following sections provide details on each of the above initiatives, as well as other related activities of the Commission and its Advisory Councils to ensure the effective use of technology in Connecticut schools, libraries, and institutions of higher education.

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Digital Learning

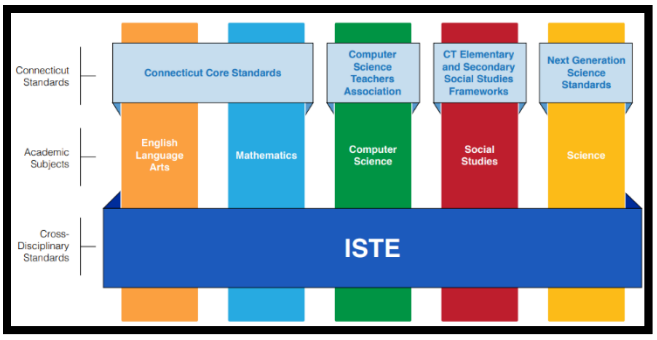
Technology Proficiency Standards

The Commission recognizes that identifying and supporting digital learning competencies for all learners, educators, and educational leaders remains a cornerstone of effectively using technology. In addition to defining such competencies as one of its core statutory functions [CGS § 4d-80(c)(2)(D) and (E)], the Commission took active measures in 2018 to assist educators and leaders across the state to bring about real adoption of digital learning best practices. Key milestones include the adoption by the State Board of Education of the Standards for Students by the International Society for Technology in Education (ISTE), development of guidelines for boards of education, adoption of the Standards for Education Leaders, and a statewide campaign to promote digital learning.

Student Standards

In order to facilitate the adoption by the State Board of Education of the ISTE Student standards, Director Casey worked closely with Commission member and Deputy Commissioner Cohn as well as leaders in the Academic Office of the State Department of Education (SDE). This work included gathering public comment on the Student standards in the form of an online survey and in-person awareness session. More than 100 parents, teachers, and other education stakeholders from across the state responded to the survey Director Casey developed. That instrument helped increase awareness of the standards, with more than 90 percent of respondents indicating that the standards address well the skills and competencies that students need for college and careers.

Collection of public comment on the Student standards continued, with Director Casey leading an in-person workshop February 14 to illustrate and gather input on the competencies. Nearly 30 attendees engaged in hands-on activities to understand how the ISTE standards help develop digital literacy, computational thinking, online collaboration, and other skills among students. The event also reflected the collaborative nature of this work, with support from members of the SDE, the Connecticut Educators Computer Association (CECA, Connecticut's ISTE chapter), and the Connecticut Science Center, which hosted the workshop.



The overwhelming support gathered through these public comment channels, in addition to the development of a formal position paper and presentation before the State Board of Education, led that body to adopt the ISTE Standards for Students at its June meeting. Director Casey worked closely with the SDE each step of the review process, including the development of materials illustrating the relationship between these standards and the CS standards, also adopted at the June 2018 State Board of Education meeting.

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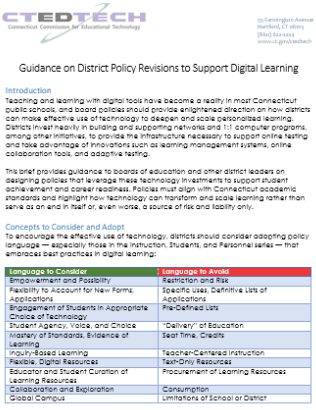
To help schools understand the Student Standards and put them into practice, Director Casey arranged with ISTE to waive the $14.95 per copy fee for its publication, "ISTE Standards for Students: A Practical Guide for Learning with Technology." The publication provides sample lesson plans aligned with the ISTE Student as well as the Connecticut Core Academic Standards, defines grade-level competency indicators, and includes a scope and sequence for implementing the ISTE standards. The Commission has seen more than 250 downloads of the guide by educators across the state.

Education Leader Standards

During the first half of 2018, Director Casey served on the ISTE technical working group that authored the Standards for Education Leaders. Designed to support the Educator and Student standards, this new set of competencies defines the skills and indicators that principals, superintendents, and other leaders need to support effective digital learning. Following ISTE's release of the Standards for Education Leaders in June, the Digital Learning Advisory Council reviewed the competencies and recommended their adoption by the full Commission. Members discussed the standards at both the September and December meetings and unanimously approved the Endorsement of ISTE Standards for Education Leaders. The Commission acknowledges that equipping students with strong digital learning and literacy skills requires the commitment of leaders to model and champion these skills among learners and educators.

Policy Recommendations

To support best practices in digital learning at the highest levels, a subset of the Digital Learning Advisory Council created guidance for consideration by Connecticut boards of education. Advisory Council chair Nick Caruso enlisted the support of Vin Mustaro, who leads the policy team at his own organization, the Connecticut Association of Boards of Education (CABE), to assist with this initiative. The resulting Guidance on District Policy Revisions to Support Digital Learning suggests language that districts can adopt in policies governing student graduation expectations, staff development, and instruction. Rather than suggesting a wholesale re-write of board policy manuals, which typically include hundreds of different sections, the Guidance points to revisions in a relatively small number of policies that can have a significant impact on preparing students for college and career.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Guidance on District Policy Revisions to Support Digital Learning

Introduction

Teaching and learning with digital tools have become a reality in most Connecticut public schools, and board policies should provide enlightened direction on how districts can make effective use of technology to deepen and scale personalized learning. Districts invest heavily in building and supporting networks and 1:1 computer programs, among other initiatives, to provide the infrastructure necessary to support online testing and take advantage of innovations such as learning management systems, online collaboration tools, and adaptive testing.

This brief provides guidance to boards of education and other district leaders on designing policies that leverage these technology investments to support student achievement and career readiness. Policies must align with Connecticut academic standards and highlight how technology can transform and scale learning rather than serve as an end in itself or, even worse, a source of risk and liability only.

Concepts to Consider and Adopt

To encourage the effective use of technology, districts should consider adopting policy language — especially those in the Instruction, Students, and Personnel series — that embraces best practices in digital learning:

Language to Consider	Language to Avoid
Empowerment and Possibility	Restriction and Risk
Flexibility to Account for New Forms, Applications	Specific Uses, Definitive Lists of Applications
Engagement of Students in Appropriate Choice of Technology	Pre-Defined Lists
Student Agency, Voice, and Choice	"Delivery" of Education
Mastery of Standards, Evidence of Learning	Seat Time, Credits
Inquiry-Based Learning	Teacher-Centered Instruction
Flexible, Digital Resources	Text-Only Resources
Educator and Student Curation of Learning Resources	Procurement of Learning Resources
Collaboration and Exploration	Consumption
Global Campus	Limitations of School or District

Educator Preparation and Certification

The Digital Learning Advisory Council has explored several ways of ensuring that teachers receive the skills they need to make effective use of technology in their classrooms. To that end, the group has suggested outreach to Connecticut's colleges of education, which prepare teacher candidates and certify current educators. Encouraging these institutions to include and model best practices in digital learning will help ensure that students benefit from the promise of personalized learning at scale.

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To these ends, Director Casey has engaged with members of the Connecticut Association of Public School Superintendents (CAPSS) teacher preparation committee as well as deans of schools of education in the state. These conversations have begun to bridge current preparation and certification practices with digital learning standards, with the intent of equipping teachers to foster 21st century learning environments. In addition, Director Casey has worked in partnership with ISTE to launch in Connecticut that organization's Educator Certification program. This program provides a competency-based, vendor-neutral teacher certification based on the ISTE Standards for Educators. He has encouraged various organizations and institutions to offer this certification program to interested teachers. As of this writing, Fairfield University has committed to providing the certification, with several regional educational service centers (RESCs) expressing interest as well. Across pre-service and in-service programs and certification programs, the Commission remains committed to helping teachers deepen and scale learning through technology.

Promotion and Awareness

To raise awareness of these integrated efforts to support digital learning, the Commission continued to promote these competencies across multiple venues. In addition to regular presentations across the state, Director Casey used the annual CECA Conference in October to share the Commission and Advisory Council's work. In November, Nick Caruso, Director Casey, and Digital Learning Advisory Council members Josh Elliott of Fairfield University and Josh Smith of Region 15 presented the standards to an engaged audience of local board members and superintendents.

This fall, the Commission launched a series of online presentations to address each of the ISTE standard sets and highlight the exemplary work around digital learning taking place in schools across the state. The first Webinar (screen shot at left) took place November 20 and featured Carolyn Sykora, who directs the development of standards at ISTE. Other presenters spoke to how they have integrated digital learning standards into teaching and learning, with Christopher Weiss, Principal of Riverside School in Greenwich, and a team from the CREC Discovery Academy in Wethersfield that included Kurt Stanco, Principal; Tom Reed-Swale, Assistant Principal; Clare Neseralla, STEM Coach; and Ann Gargula, Library Media Specialist. The series will continue in the winter and spring of 2019, with sessions addressing the Educator and Education Leader standards that highlight the work of Connecticut school leaders. The Commission is also recording the presentations to allow for free, on-demand viewing.

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Open Education Resources

The use of open education resources (OER) — free and openly licensed digital learning materials such as textbooks, lesson plans, tutorials, and assessments — holds great promise to benefit educators and students alike. The Commission continues to champion OER because of its many advantages to students and schools, including cost savings, flexibility, equity of access, and currency and relevancy of materials.

Efforts to support the benefits of OER concentrated this year on identifying the areas of greatest need and opportunity. Director Casey worked with members of the Digital Learning Advisory Council to enlist OER experts from colleges, school districts, and libraries to define and prioritize work in this area. Meetings among and survey results from members of this task force identified the promising practices already underway to support the creation, curation, and sharing of high-quality digital learning materials. Feedback from the task force also helped to define a set of related initiatives that the Commission will undertake:

- Awareness and Communications: Define and share with the broader educational community the benefits of OER
- Inventory: Through the design of a statewide survey, collect information about existing OER efforts and how the Commission may help to amplify this work
- OER Site: Identify the functional, technical, staff, and cost requirements for an online collection of OER materials for use by institutions across the state

Soon after identifying the above steps, several members of the task force shared these efforts as part of the 2018 Northeast OER Summit at the University of Massachusetts.

In addition to such presentations, Director Casey continues to share Connecticut's work with and gather insights from colleagues through state and federal government agencies as well as local and national professional organizations. These include leaders from 20 states participating in the "GoOpen" work around OER. The Commission continues to foster the use of free and open digital resources as part of its "GoOpen" pledge in 2017, working with state leaders as well as the U.S. Department of Education, the Council of Chief State School Officers (CCSSO), and the State Educational Technology Directors Association (SETDA).

In addition to tapping state and national insights around OER, the Commission will begin leveraging the assistance of the University of Connecticut's Digital Media and Design program in the coming months. Director Casey has engaged with UCONN's program to enlist the skills of faculty and students to develop a social media awareness campaign, design and analyze the above-mentioned survey, and build an interactive Web site to serve as a clearinghouse of existing OER guidance, training, and instructional materials.

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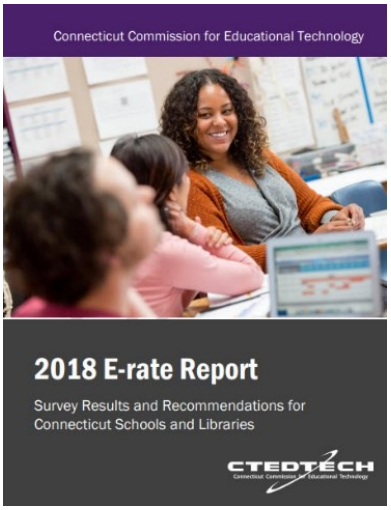
Infrastructure

E-Rate Maximization

As defined in its statute (CGS Sec. 4d-82), the Commission has several initiatives underway to reduce the administrative burden and maximize the return on investment of the federal universal service Schools and Libraries Program. Known as "E-rate," the fund provides financial offsets to connect schools and libraries to the Internet and to fund their internal wired and wireless networks. Based on usage data, Connecticut schools and libraries have not taken advantage of available funding. For example, our state's schools (not even counting libraries) were eligible for a total of $49M over the past four years to pay for internal network connections and hardware, and yet our districts have only filed for $27M in funding.

E-rate Survey and Report

To identify the barriers limiting full participation in the E-rate program, members of the Infrastructure Advisory Council designed a statewide survey of schools and libraries. Key leadership partners including CABE and CAPSS encouraged their members to complete the survey. A total of 48 percent of districts and 19 percent of libraries submitted responses, which captured quantifiable and open-ended feedback on topics ranging from historical participation in E-rate, perceived benefits and challenges of the program, and use of external consultants. Director Casey shared the draft 2018 E-rate Report at the December Commission meeting, which includes the following conclusions:



- Barriers: Predominant challenges to leveraging E-rate are lack of matching funds (schools) and reluctance to filter content (libraries)
- Common Support Providers: Nearly all schools use the same third-party E-rate consulting firm; most libraries leverage one State of Connecticut employee (Maria Bernier) as their consultant
- Value: Both schools and libraries find strong value in the assistance provided by paid or state consultants with deep knowledge of the program
- Complexity and Inefficiency: The technical and administrative complexities of fully leveraging E-rate drive dependence on support services, leading to inefficiencies in the form of direct and indirect costs as institutions engage such providers independently
- Return on Investment: Schools using consultants find a high (2X) return on investment, even when accounting for consulting fees
- Equity: Schools and libraries offer programs and resources to help students learn outside these institutions, and support exists to see changes that would allow E-rate funding to provide universal access anywhere learning takes place

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In the first part of 2019, the Commission will consider formal recommendations and next steps to encourage the use of E-rate. These may include outreach to members of local education leaders (e.g., board members and superintendents); state elected officials; and members of the Connecticut Congressional delegation to raise awareness of the program. Other options include the design of cooperative approaches to procuring support from third-party consultants, whose services the survey respondents have found extremely valuable.

Connecting Connecticut Classrooms

In addition to undertaking this landscape study, the Commission continued to partner with the Office of the Governor and educational nonprofit Education SuperHighway around the Connecting Connecticut Classrooms (C3) initiative. The C3 program delivers online training sessions and consulting services provided by Education SuperHighway at no cost to the State or its schools.

Outreach included promotion among the state's educational leadership organizations and to K – 12 district technology directors, who generally manage E-rate submissions directly. Director Casey personally reached out to more than 40 districts to address shortfalls in funding applications, based on data collected and available through E-rate's reporting site. These continued efforts should increase awareness of the program's benefits and help connect schools and libraries to the free resources available to assist them in filing for E-rate.

Digital Equity

Connecticut remains strong in providing the essential conditions for digital learning within its learning institutions. The CEN connects all districts and many libraries and towns to the Internet via virtually unlimited broadband circuits. Yet learning takes place increasingly outside the four walls of these institutions, leading to disparities in opportunity between those students with high-speed broadband at home and those without. While 58 percent of middle schools and 71 percent of high schools provide computers for every student (2017 Commission survey), an estimated 8 percent (approximately 40,000) of public school students do not have access to the Internet at home, according to data from the U.S. Census Bureau and the Pew Research Center. In order to address this "digital divide," the Commission has undertaken several initiatives as part of its Educational Technology Goals and Plan.

Eduroam

While universal and ubiquitous access to high-speed Internet connections at home would address the digital divide, and the Commission has promoted programs that assist families in getting online, existing, community-based resources can also help learners access digital learning resources outside of school and college. One such approach is an international program known as Eduroam (www.eduroam.org). This mixture of technology and convention allows students to log into wireless hotspots across the globe using the credentials (user name and password) issued by their local school or university. Eduroam has proven highly successful among institutions of higher education, allowing faculty and students to get online at any participating college or university. The Commission sees Eduroam as an effective platform through which anchor institutions in local communities can grant Internet access to students and has launched a pilot initiative to do just that.

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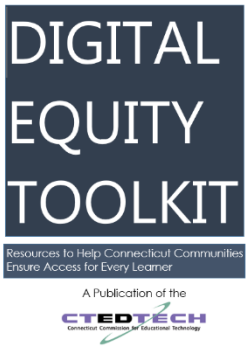
Following discussions among members of the Infrastructure Advisory Council and with the strong support of its chair, Tom Dillon, the group identified Middletown as a promising testbed for an Eduroam deployment. Leaders from Middletown Public Schools (MPS), Wesleyan University, and Russell Library have developed a multi-phased plan to roll out Eduroam, starting with the wireless networks of MPS and the library. Later phases may include provision of Eduroam credentialing on the networks of other Middletown partners, such as Middlesex Community College (MCC), the local YMCA, and other trusted institutions. The promise of this initiative is to offer students at MPS, Wesleyan, MCC, and any other Eduroam institution access to the Internet across many trusted physical locations in the city. The lessons learned through this work will also assist other communities that have expressed an interest in leveraging Eduroam to provide students of all ages access to the digital resources they depend on for learning.

Digital Equity Toolkit and Resources

In early 2018, the Commission published the state's first Digital Equity Toolkit, a set of resources to support community-based approaches to getting students online. This year, nearly 100 cities and towns have taken advantage of this resource, which highlights several key components of a digital equity program:



- Leadership: Communities should start by enlisting a team of participants to plan the work of getting learners online. Doing so leverages the collective insights of leaders and advocates who can best define the local challenges to and resources for connecting students.
- Measurement: Designing effective ways to identify students in need of broadband and devices outside of school remains a challenging and nuanced endeavor. The Toolkit provides exemplars to help communities gather the data to make informed decisions about where to focus resources to connect learners.
- Existing Resources: Whether national connectivity initiatives or local programs offered by carriers, libraries, and businesses, many channels may already exist to provide broadband access. Simply creating and sharing an inventory with families can provide immediate benefits. This work also addresses the development of digital literacy skills among parents and students to make effective use of technology.
- Expansion Programs: Communities may consider a variety of proven models used to connect students, including public wireless zones and installing access points on school busses. No single solution may work for every community, but the local perspective on all of these options will guide plans around adoption and sustainability.

To promote the Digital Equity Toolkit as well as ways that communities across the state help students get online outside of school, Director Casey held a workshop at the annual CEN Conference on May 18. That session featured a panel discussion among K – 12 technology leaders from Hartford, Manchester, Norwalk, West Hartford, and the Technical High Schools. The workshop provided attendees with resources to support all aspects of digital equity programs, from community outreach to design, funding, and sustainability.

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The Toolkit has also attracted national attention from organizations such as Digital Promise, a nonprofit committed to ensuring equity of access in K – 12 education, as well as the Consortium for School Networking (CoSN). Last spring, CoSN reached out to State Broadband Coordinator and Commission member Bill Vallee as well as Director Casey to discuss Connecticut's Digital Equity Toolkit. Those conversations informed the development of CoSN's set of national school guidelines entitled "Supporting Students & Families in Out-of-School Learning."

Data and Privacy

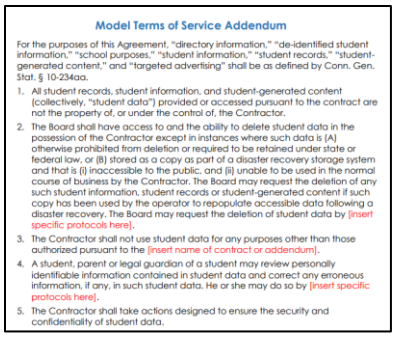
Privacy Compliance

Efforts continued in 2018 to support school districts, technology companies, and the Connecticut General Assembly in the shared goal of using software to support personalized learning while still protecting student data privacy. This work had significant, measurable impacts across a number of coordinated fronts and in partnership with state and national leaders.

Legislative Support

During the 2018 session, the Commission provided guidance and coordination that informed revisions to Connecticut's statute governing student data privacy (CGS §§10-234aa-dd). These updates, instituted in Public Act 18-125, stem in part from advice solicited from Director Casey that reflect the concerns many district leaders have shared with him regarding the law.

Among the recommendations instituted in the revised law, schools may now claim an exemption to the statute's contractual requirements for software used to support individualized education plans (IEPs) and accommodations provided through Section 504 of the Rehabilitation Act of 1973. The revised law calls on the Commission to collect annual reports from all districts on their use of this IEP and 504 exemption. At no additional cost to the State, Director Casey has worked with the Department of Administrative Services legal team, the SDE's Student Services bureau, and state leadership organizations to develop and promote awareness of a reporting interface that will support this requirement.



Model Terms of Service Addendum

For the purposes of this Agreement, "directory information," "de-identified student information," "school purposes," "student information," "student records," "student-generated content," and "targeted advertising" shall be as defined by Conn. Gen. Stat. § 10-234aa.

1. All student records, student information, and student-generated content (collectively, "student data") provided or accessed pursuant to the contract are not the property of, or under the control of, the Contractor.
2. The Board shall have access to and the ability to delete student data in the possession of the Contractor except in instances where such data is (A) otherwise prohibited from deletion or required to be retained under state or federal law, or (B) stored as a copy as part of a disaster recovery storage system and that is (i) inaccessible to the public, and (ii) unable to be used in the normal course of business by the Contractor. The Board may request the deletion of any such student information, student records or student-generated content if such copy has been used by the operator to repopulate accessible data following a disaster recovery. The Board may request the deletion of student data by [insert specific protocols here].
3. The Contractor shall not use student data for any purposes other than those authorized pursuant to the [insert name of contract or addendum].
4. A student, parent or legal guardian of a student may review personally identifiable information contained in student data and correct any erroneous information, if any, in such student data. He or she may do so by [insert specific protocols here].
5. The Contractor shall take actions designed to ensure the security and confidentiality of student data.

Public Act 18-125 also requires the Commission to develop a Model Terms of Service Addendum as a means of assisting schools and educational technology providers in complying with the law. Districts and their providers can use the language in that addendum to bring existing contract language into compliance with the law, providing direct cost savings by obviating the need for external counsel as well as indirect efficiencies at the local level. The Commission completed and published the Addendum in the early summer and has since seen it used more than 500 times.

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Educational Software Hub

This year's student privacy legislation also points to the Commission's Educational Software Hub, which has significantly reduced the burden of compliance on districts and the companies developing software to support teaching and learning in those schools. The Hub provides a single point of reference for software developers to understand and pledge compliance to the State's data privacy law. In turn, educators and district leaders can search the site for software developed by companies that have pledged to take steps to comply with Connecticut's statute.

Since its launch in August 2017, the Hub has brought about significant direct and indirect cost reductions to conduct compliance activities. This year, 80 percent of districts indicated that the Hub helped them decrease by at least 10 percent their allocation of staff time to review and negotiate terms, or approximately 10,000 hours statewide. Nearly a third of schools see the Hub as either "Vital" or "Extremely Valuable" to their compliance work. Even a conservative estimate of loaded, indirect staff costs of $70 per hour equates to a $700,000 savings to districts. In light of the Hub's Year-1 cost of $10,000, the project has seen a 7,000% return on investment at no cost to its core stakeholders.

Nearly 2,500 educators and leaders representing 218 public and charter school systems use the service to track nearly 1,500 products for compliance. The Hub's FAQ section has served more than 4,000 visitors, primarily educational technology companies looking for guidance on how to comply with the State's law. Content on this page and on the Commission's site directly relieves the burden on districts of advising third-party providers on Connecticut's student data privacy law and requirements. The Hub sees an average of 784 visits per month, a rate that has increased by about 25% per quarter since its launch. Use of the service affords other benefits to districts, including the ability to track actual usage of educational software to help school leaders gauge the return on their technology investments. This data also allows schools to adjust their technology spend by eliminating unused software.

Vendor Relations

The Commission continued its efforts to support privacy compliance by providers that house large stores of sensitive student data across a significant percentage of Connecticut districts. As in 2017, Director Casey has engaged with educational technology firms to raise awareness of State statute and, with the assistance of DAS counsel, guide vendors to comply with Connecticut law.

In May, these efforts resulted in Google developing an addendum that districts could execute with the company to bring their agreements with the provider into compliance.

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Given the virtual ubiquity of Google in Connecticut classrooms (an estimated 95 percent of schools use the provider), the availability of the addendum came as a huge relief to districts and garnered national attention (see Media Coverage on page 27). Other educational technology companies that revised their terms as a result of the Commission's efforts include Apple, Khan Academy, and Code.org, a partner with the State Department of Education in support of the SDE's work to support computer science education.

Privacy and Security Best Practices

Beyond legal compliance with State statute, Connecticut schools need to adopt broader security best practices. To support the demand for guidance and resources in this area, the Commission has promoted privacy frameworks that educational institutions can leverage to ensure the privacy and security of academic, personal, financial, and medical data.

Trusted Learning Environment

In 2018, the Commission continued its awareness campaign of the Trusted Learning Environment (TLE) framework (www.TrustedLearning.org) for designing and operating institutional privacy programs. This program comes from CoSN in partnership with the national associations for superintendents, boards of education, curriculum directors, and school business officers and so speaks to the specific concerns of schools and libraries. The TLE provides free resources to help districts assess and improve their practices across leadership, business (procurement), data security, classroom instruction, and professional development.

In partnership with Connecticut Educational Technology Leaders (CTETL, the state's CoSN chapter), Director Casey has raised awareness of the TLE program. Outreach via electronic communications and presentations at state conferences and association meetings has provided direct support to the initiative. Participants in the first cohort of Connecticut districts pursuing the TLE seal, a demonstration of mature privacy practices, will apply for certification in 2019.

K – 12 National Advisory Council on Cybersecurity

In addition to the TLE framework, Director Casey has shared other best practices, including those of the K – 12 National Advisory Council on Cybersecurity (NACC). He and other NACC board members have leveraged speaking and publishing opportunities to encourage school leaders to adopt best practices in cybersecurity. These recommendations include establishing a senior district leadership team around privacy and security, adopting the Center for Internet Security Controls, and leveraging the capacity of trusted industry partners. Presentations through partner organizations such as the National School Boards Association have reached district leaders across the country. Connecticut board members and superintendents have shared their appreciation with Director Casey for the insights and resources that NACC has provided.

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Related Activities

In addition to the above accomplishments aligned with the State Educational Technology Goals and Plan, the Commission has engaged in other activities that support its mission of promoting the effective use of technology for teaching and learning.

Computer Science and Cybersecurity Education

The Commission remains committed to working with partner agencies and organizations to address the shortage of skilled computer science (CS) and cybersecurity professionals in the state. In alignment with the 2017 Connecticut Cybersecurity Strategy and this year's Connecticut Cybersecurity Action Plan, and under the guidance of Chairman Raymond, the Commission has dedicated resources to support the adoption of CS in Connecticut schools. Director Casey serves on the SDE's CS Advisory Committee and worked through the spring in partnership with the SDE's Academic Office to position the CS and ISTE standards for State Board of Education adoption.

In February of this year, the Commission helped promote Connecticut's participation in the CyberStart program that introduces high school girls to further study and careers in cybersecurity. With the endorsement of the Office of the Governor and various state agencies, the program centers around team challenges in which participants work together to solve problems in a fun, virtual gaming environment. More than 400 girls in 175 teams across the state took part in the competition, with five Connecticut teams placing in the top 100 nationally. The Commission will again support the program in 2019.

Libraries and the Digital Divide

Connecticut libraries play a pivotal role in providing the connections, devices, digital literacy, and support services that citizens across the state need to participate fully in society. To raise awareness of this reality, Vice Chair Michael Mundrane introduced a Draft Resolution on the Role of Libraries to Combat the Digital Divide, intended to spur dialog among local and state elected officials. The document includes two resolutions: (1) that libraries can and should play the role of providing local access and support to address digital inequities and (2) that the State should acknowledge and support libraries in this role. Commission members Kendall Wiggin and Colleen Bailie provided input on the draft Resolution, a final version of which should include a set of recommended initiatives to bridge the digital divide through the work of local libraries.

Alternative Learning Days

The Commission has joined other educational leadership organizations and agencies in looking at ways to ensure continuity of learning when students cannot attend school. The mandate to provide 180 days of "school sessions" (CGS §164, Sec. 10 – 16) in the context of weather-related school closings has led to discussions about the role of technology to support learning outside of school. To meet the 180-day requirement in 2017 – 18, school calendars ran to the end of June, and at least one district used the first days of fall 2018 to count toward the previous academic year.

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To avoid these complications, and recognizing the current reality that learning already takes place outside the four walls of school (e.g., homework and group projects), educational leaders have begun considering the use of home study to count against the 180 "school sessions." The Digital Learning Advisory Council and full Commission membership have addressed technology's role to support distance learning in such Alternative Learning Day plans. The coming year will likely see guidance and possible suggestions for legislative changes from CAPSS' Technology Committee, which Commission member Charles Dumais co-chairs, as well as from other organizations.

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Communications and Outreach

To raise awareness of its work and gather feedback from its diverse constituents, the Commission leverages several online media channels, including the CET Web site, Twitter account, and listserv. Director Casey continues to present at state and national events, produce research and publications, submit news to educational media outlets, and participate actively in a number of professional and advocacy groups. The following sections provide highlights of these communication and outreach efforts.

Online Media

- Web: The site, www.CT.gov/CTEdTech, continues to serve as the reference point for information about the body and its members, meeting minutes, and publications, among other resources. Director Casey will migrate and expand the site's content to the State's new, responsive content-management system in 2019.

- Twitter: The Commission's Twitter account, @CTEdTech, serves as a means of communicating important research and policy updates to nearly 400 followers.

- Statewide Listserv: In early 2016, the Commission launched a statewide e-mail listserv through the Department of Administrative Services as a platform to share research, best practices, and announcements with the K – 12 educational technology community. Since that time, the list has grown to include approximately 300 participants, including school technology leaders from nearly every public school district in the state. In the past year, contributors have submitted more than 1,000 posts that include event announcements, requests for recommendations on software and hardware solutions, and time-sensitive security alerts. Comments from district technology leaders indicate that the service provides an easy and powerful means of quickly communicating with and sharing best practices among members of the Connecticut educational technology community.

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Presentations

Director Casey and other members of the Commission took many opportunities to share the CET's work statewide and nationally in 2018. The following list summarizes these presentations and speaking engagements.

Organizer – Audience	Topic(s)	Date
EdAdvance: K – 12 Technology Leaders	Commission Goals and Plan	Feb 28
Shipman & Goodwin (Hartford): K – 12 Leaders	Student Privacy Compliance and Resources	Mar 15
Shipman & Goodwin (Stamford): K – 12 Leaders	Student Privacy Compliance and Resources	Mar 27
CAPSS: Superintendents and Deans of Colleges of Education	Digital Learning Standards and Teacher Preparation	Apr 27
LEARN: K – 12 Technology Leaders	Commission Goals and Plan	May 2
Shelton Schools: Parents and Community	Digital Safety and Literacy	May 8
CEN: Members	Panel on Cyber Insurance	May 18
CEN: Members	Panel on Digital Equity	May 18
University of Massachusetts: State OER Leaders	Open Education in Connecticut: State and District Progress	May 31
Future of Privacy Forum: State Privacy Leaders	Connecticut Model for Supporting Privacy Compliance	Jul 25
CT Public Risk Management Association (PRIMA): Members	Data Privacy and Cyber Risk Panel	Sep 14
NACC: New York City CIO and CISO	Security Framework Presentation	Sep 21
The Learning Council: K – 12 District Leaders	Digital Transition Panel at Meriden High School	Sep 25
CREC: Library Media Specialists	Commission Updates and Resources	Oct 3
CTETL: K – 12 Technology Leaders	Privacy Updates and Resources	Oct 4
National School Board Association: Members	K – 12 Cybersecurity Best Practices	Oct 10
CASBO: K – 12 School Business Officers	Privacy Updates and Resources	Oct 11
CECA: Teachers and Education Leaders	Commission Supports for Implementing the ISTE Standards	Oct 22
CT Bar Association: Hartford-Area Attorneys	Student Data Privacy Updates and Resources	Nov 13
CABE and CAPSS: Members of Boards of Education and Superintendents	ISTE Student, Educator, and Leader Standards[1]	Nov 16
CEN: Members	Student Data Privacy Updates and Resources	Nov 20
Commission: K – 12 Educators and Leaders	ISTE Standards Overview Webinar: Standards for Students[2]	Nov 20
ACES: K – 12 Technology Leaders	ISTE Standards, Student Privacy, and E-rate Maximization	Dec 14

1. With Commission member Nick Caruso and Digital Learning Advisory Council members Josh Elliott and Josh Smith
2. With Digital Learning Advisory Council member Christopher Weiss

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Media Coverage

Outreach campaigns and publishing opportunities promoted the work of the Commission and resulted in coverage across a number of media channels this year. The following table lists stories, interviews, and publications that highlight the Commission's efforts and impact.

Publisher	Title	Date
CABE	Resources to Address School Data and Security	Jan 2
CoSN	Tips for School Leaders in a Post Net Neutrality World	Jan 9
ISTE	ISTE Advocacy News (Callout to Standards Adoption)	Jan 10
FERPA|SHERPA	State Action to Streamline Compliance: The Connecticut Story	Jan 16
EdSurge	Cybersecurity Report Spotlights Privacy Concerns on State Education and District Websites	Jan 31
the ct mirror	Three New "R's" for Connecticut Education	Feb 1
the ct mirror	A Proposal That Could Empower State's Metros (Highlights CEN)	Mar 2
EdSurge	States Issue Privacy Ultimatums to Education Technology Vendors	Mar 12
ISTE	Total Turnaround: How LAUSD's Troubled Rollout Became a Model for Tech Success (Highlights Commission Standards Supports)	Mar 18
ctnext	Connecting Connecticut's EdTech Community	Apr 27
edscoop	Google Adds New Terms to Comply with Connecticut Student Data Privacy Laws	May 11
Education & the Workforce Committee	House Education and Workforce Committee Testimony (Highlights Commission Progress)	May 17
CABE	Google Complies with CT Student Data Privacy Law	Jun 1
Connecticut Public Radio	School Districts Struggle To Comply With New Student Data Privacy Law	Jun 4
CoSN	Prioritizing the Privacy Work for the Technology-Enabled School District	Jun 5
CABE	Board Policies That Support Digital Learning	Nov 1
edscoop	Connecticut's Self-Service Portal Builds Privacy into Ed Tech	Dec 21

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Professional and Advocacy Groups

To garner support for Commission initiatives, deepen understanding of constituent needs, and identify funding opportunities, Director Casey actively participates as a member of the following groups:

- CAPSS Technology Committee: Monthly Commission updates to state superintendents
- CCSSO and U.S. Department of Education — State GoOpen Leaders: Monthly discussions sharing best practices on the design and governance of state-level OER programs
- CECA Board: Monthly meetings, including chairing a CECA subcommittee dedicated to supporting the Commission's statewide initiatives
- CTETL Board: Partnership efforts to build awareness of programs such as TLE
- ISTE Policy Advisory: Input on digital learning policy at the national, state, and local levels, including the recently published Guide to Implementing the Student Support and Academic Enrichment Grant, shared with Connecticut districts to support the effective use of federal technology funds (ESSA Title IV-A)
- ISTE Technical Working Group — Administrator Technology Standards: Collaboration with other national leaders to define the competencies of school and district leaders
- NACC Board: Definition and promotion of best practices in K – 12 cybersecurity and privacy through presentations and publications
- Representative Elizabeth Esty's Council on Science, Technology, Engineering, and Mathematics (STEM): Identification of needs in Connecticut to inform national legislative agenda to promote STEM education and workforce preparation
- Skills21 Board: Support to regional service center that provides technology-based curriculum and programming in STEM subjects
- SDE CS Advisory Committee: Assistance in establishing curriculum frameworks, teacher certification standards, and talent pipeline initiatives
- SETDA: Service on State Action and Broadband committees to build awareness of, and gain insights that inform, Commission initiatives

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Connecticut State Library

researchIT CT

As part of the Connecticut Education Network and administered by the Connecticut State Library, researchIT CT (https://researchitct.org/) provides all Connecticut students, faculty, and residents with online access to essential library and information resources. The researchIT CT service provides a core level of information resources, including secured access to licensed databases, and is available to every resident in Connecticut. These resources support the Division of Library Development's effort around the seven literacies: Digital Literacy, Health Literacy, Financial Literacy, Legal Literacy, Civic/Social Literacy, Basic Literacy, and Early Literacy. In addition, the researchIT service provides college students and faculty access to specialized research information. The researchIT CT service also includes a collection of downloadable eAudios and eBooks for access on mobile devices such as smartphones and tablets.

Goals of researchIT CT are as follows:

- Ensure universal access to a core level of library and information resources for every resident of Connecticut through their public library, school, and college and from home
- Provide necessary information resources to every school in Connecticut so that all students are prepared to function in an information society
- Provide information resources to the increasing number of students taking advantage of online courses at Connecticut's colleges and universities
- Support the information needs of all Connecticut residents

Budget

Recent legislative and gubernatorial cuts to the researchIT CT database line item were absorbed by enacting cost sharing on the part of academic libraries, applying some federal funds to maintain a public-libraries–only resource, cutting two nonessential and underutilized databases, and by reducing the renewal cost of an historical newspaper license.

Annual Savings / Cost Avoidance (FY 2018)

The value of all researchIT CT databases to local communities exceeds $38 million in one year, while the cost to provide those databases was just less than $1.6 million. This represents a cost avoidance of more than $36 million. For more details, see the following publication:

Cost Benefit: What researchIT CT Saves the State's Libraries and Municipalities

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The researchIT CT Word Press Web site was converted to a secure connection (https://) to ensure the safe transmission of data between users' computers and devices and our vendors' file servers. Titles selected for addition to the RBDigital eAudiobook and eBook collection included machine-readable catalog (MARC) records at no additional cost. Providing these records to vendor EBSCO now allows for discovery of all researchIT items through the OneSearch interface. One-stop search boxes were added near the top of all resource Web pages to enable fast, ubiquitous access to search for all researchIT CT resources ("Resources for the Public" search box pictured above).

Usage (FY2018)

For researchIT CT's licensed, full-text databases, there were 6,421,750 page views (a measure of when someone views search results), with 667,284 (10.4%) from public library patrons; 1,309,183 (20.4%) from school library patrons; and 4,445,283 (69.2%) from academic library patrons. The total number of page views represents a 13.3% decrease compared to the previous fiscal year. In addition, public library patrons viewed Connecticut State Library Collections in Ancestry.com 11,135,981 times in FY 2018.

The researchIT CT statewide collection of downloadable eAudios and eBooks includes 3,953 titles, which were checked out 12,662 times, a 14.1% increase compared to the previous year's activity.

findIT CT

Connecticut's statewide library catalog, findIT CT, went live in May 2016 and now contains the holdings of more than 310 libraries in Connecticut, with additional libraries joining on an ongoing basis. As of July 2018, findIT contained 12 million records and 20 million items.

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requestIT CT

Rollout of requestIT CT, the statewide Interlibrary Loan service in findIT CT, began in September 2017, and as of July 2018, 144 libraries in Connecticut participate in the service. Librarians can easily place requests on behalf of patrons, update requests, and track the status of requests as they make their way through the Interlibrary Loan process. Participating libraries filled 8,071 Interlibrary Loan requests during the fiscal year using the system. System improvements in spring 2018 facilitated multiple copy requests for book discussion groups.

Digital Collections

The Treasures of Connecticut Libraries digital collection remains available and had 10,980 item views in 2018. It contains 1,799 objects from 51 libraries and their partnering institutions. Readers can find more information about the Treasures project at:

http://cslib.cdmhost.com/cdm/landingpage/collection/p128501coll0

The State Library added the first issues of the Newspapers of Connecticut digital collection in 2011. This collection includes 7,359 issues from 95+ newspaper titles. The collection had 18,540 item views in FY2018 and has remained among the top five most popular Connecticut State Library digital collections for the past seven years. During FY2018, the State Library added 27 more of these newspapers to the Connecticut Digital Archive. Readers can find more information about the project at:

http://cslib.cdmhost.com/cdm/landingpage/collection/p15019coll9

Increasing Usability and Removing Barriers to Access

Given the rebranding from iCONN to researchIT CT, the State Library converted existing iCONN permalinks to the new domain name to ensure ease of access. The researchIT CT Web site took the same WordPress theme used for the State Library site, providing a consistent look and navigation toolset across those properties. The site also includes new accessibility functions such as toggled high contrast, grayscale, and font size adjustments; a revised color scheme for accessible contrast levels; and Google text translation. All database researchIT Web buttons now include voice browser – readable tags.

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eGO

Platform

During 2018, the State Library worked with the Digital Public Library of America (DPLA) and library member organization LYRASIS to begin development of the Connecticut statewide eBook platform for public libraries called eGO. This effort made eGO available through existing library cards to patrons from 119 member libraries through the installation of circulation management software across three regional library consortia, Bibliomation, Library Connection, and Libraries Online. Those 119 libraries began beta testing the SimplyE app for iOS and Android. SimplyE will be the means by which library users will access eGO content from their mobile devices.

Books. Research. Historical Documents. Go!
A service of the CT State Library

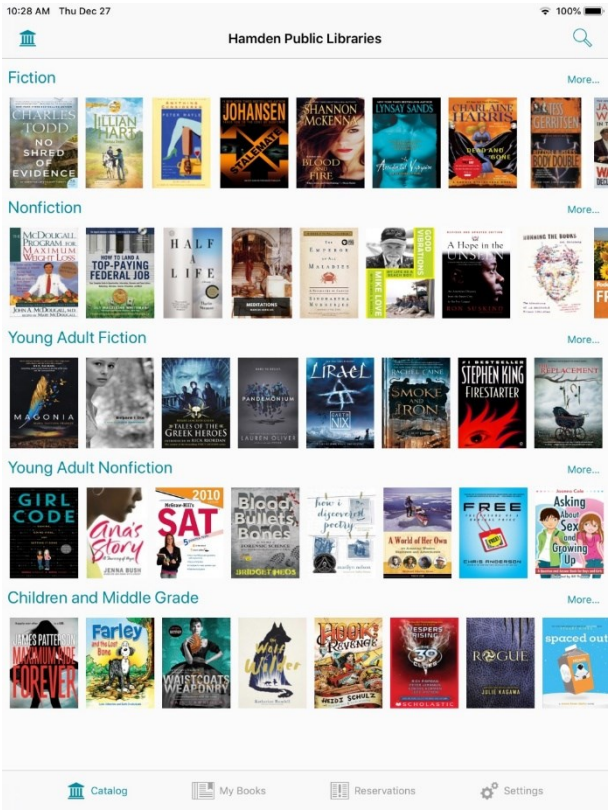
Content

The State Library contracted for content from DPLA's Content Exchange, an eContent acquisitions service for libraries. At this writing, 11 library carts have been ordered for eGO from the Content Exchange for 1,219 titles. These new holdings add to existing titles from LYRASIS for access by all eGO libraries as follows:

Source	Titles
SimplyE Bookshelf (NYPL)	6,092
Open Bookshelf (DPLA)	3,238
Total	9,330

User Interface

Besides the above content, the 119 libraries referenced above will have access to all OverDrive, Baker & Taylor, and Bibliotheca titles owned jointly by their consortia. Each library will also have access to their individual library's independently owned eBooks as well. All of the above content will be available via SimplyE to eGO library users in a single, easy-to-use interface. A sample screen of the SimplyE app appears at the right.



At this writing, the State Library is negotiating with LYRASIS to extend the eGO development agreement to the end of June 2019.

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Connecticut Education Network

Overview

The Connecticut Education Network (CEN) continues to provide value through the delivery of high-quality, secure, high-performance Internet and network-based services to Connecticut's community institutions and open-access members. The distinctive nature of this network saves the state millions of dollars a year over comparable services. CEN's statewide fiber-optic network connects more than 1.8 million students, educators, researchers, State and municipal employees, and citizens in support of Connecticut's workforce and economic development.

Established in 2000 and expanded to suit the needs of Connecticut's anchor institutions, CEN provides critical infrastructure assets that could not be built for their replacement cost today. CEN's approach to service delivery is fundamentally different when compared to that of commercial providers. CEN provides robust services at scale and operates on a cost-recovery, chargeback model that keeps prices comparably low. CEN sets *the standard* in Connecticut for advanced, high-performance, secure, and economical Internet and network-based services. CEN is:

- An organization operated in partnership between the University of Connecticut and the State of Connecticut
- One of roughly 40 research and education networks (RENs) in the country
- The *first* and one of *four* RENs nationally that connect *every* K – 12 district in the state
- Able to attain the lowest commodity Internet rates resulting in aggregate savings to members
- The exclusive regional connector in Connecticut to Internet2, the national REN
- Part of the North East Research and Education Network (NEREN), a partnership among New England states for shared infrastructure and cost savings
- A member of The Quilt, a coalition of RENs that share best practices and consortium contracts
- A trusted advisor for scalable, efficient, secure, and economical services
- Connected with its members through Technical, Service, and Engagement advisory groups
- Capable of delivering 1, 10, 40, and 100 gigabit per second (Gbps) fiber-optic Internet service throughout Connecticut
- Delivering uniform and equitable Internet service to every CT K – 12 school district
- Actively protecting all schools, most towns, and state agencies from cybersecurity disruptions through advanced distributed denial of service (DDoS) mitigation services

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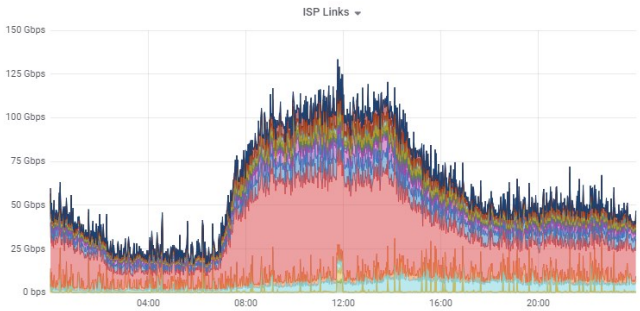
Activities and Achievements

During the 2018 calendar year, CEN expanded the network physically, supported increased bandwidth usage, implemented technical improvements, and increased engagement with members. In addition, CEN completed its second year without any general fund support from the State, and as a USAC E-Rate service provider, helped many K – 12 schools and libraries take advantage of federal subsidies applied toward their technology budgets. In addition, FY20 service rates remain largely flat to help sustain the cost-recovery model and ensure operational continuity. Costs for the 50 Mbps tier decreased to help those members transitioning up from the 25 Mbps subscription level.

Network Expansion and Utilization

CEN continued to expand its physical network by adding 47 new members. Overall breakdown of the membership is as follows:

	Public K – 12 Entities	Private K – 12 Schools	Public Colleges & Universities	Private Colleges & Universities	Public Libraries	Municipal Gov't	Public Safety	State Gov't Branches	Open Access
Connected	186	16	19	17	144	102	55	2	37
CT Total	194	n/a	19	20	238	169	n/a	3	n/a
% of Total	96%	n/a	100%	85%	61%	60%	n/a	66%	n/a



In addition to this physical growth, CEN now regularly sustains 80 Gbps aggregate traffic during business hours with peaks of up to 130 Gbps. These high points represent a 62% increase from the previous year's peaks and the largest to date. This year's increases stem from the additional growth in membership, increases in regular usage from existing members, and additional research-based activity through intermittent large data transfers.

In collaboration with its NEREN partners, CEN continues its expansion to New York City to connect directly into one of the busiest telecommunications areas in the world, thus increasing CEN's capability and reach. This project was expected to be completed within 2018 but experienced buildout delays. Completion of the project in 2019 will result in lower commodity (backbone) Internet rates; increased commercial peering options to reduce costs; increased backhaul opportunities to Ashburn, VA and Chicago, IL; and increased

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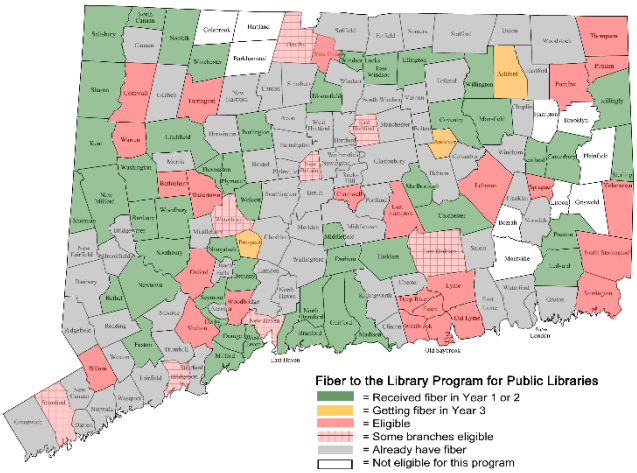
peering partnerships with other regional optical networks (RONs) within the REN space. All of these advantages should help reduce costs for CEN members for years to come.

In 2018, CEN entered the third year of a project to move libraries to high-speed fiber connections. The CT Library Fiber Consortium awarded the CEN bid for this work in early December 2018. Grant funding provided by the CT State Library as well as subsidies from the federal E-rate program have enabled the connection of an additional 54 libraries through the first three phases of the project and have made an additional 49 eligible during this latest phase. Eligible libraries that pursue funding, as with their predecessors, will transition from slower digital subscriber line (DSL) or cable Internet connections (3 – 12 Mbps) to CEN's fiber-optic network, offering speeds of 1 Gbps initially with capacity for 10 – 40 Gbps.



Technical Improvements

In May, CEN and our help desk and monitoring partner, Global NOC, upgraded our monitoring portal with a Grafana user interface. This new tool provides more robust monitoring of circuit usage and outage conditions for all CEN members. In addition, CEN staff have leveraged this new tool to enhance network performance monitoring activities and improve capacity management.

CEN continues to provide DDoS detection and mitigation at no additional cost to members with locally installed Arbor / Netscout threat mitigation service. CEN strengthened this capability by increasing capacity to the Arbor solution in June. The team also configured its Akamai Prolexic DDoS service in November for select overrun conditions. This layered approach provides members with robust detection and mitigation services from two industry leaders providing unparalleled protections to CEN's connected community. Estimated cost savings to the state from CEN's DDoS services are approximately $12 – $18 Million annually.

In July, CEN upgraded the three core routers of the network to add 200 Gbps connectivity to each, with an additional 100 Gbps (300 Gbps total) between Storrs and Hartford. Doing so helps maintain capacity required for the research corridor between the UConn Storrs and Farmington campuses, as well as with Internet2. This upgrade more than doubled the current capacity of the core for access to the public Internet, Internet2, commercial peers, and on-net caches. Later in August, CEN completed additional infrastructure upgrades to replace older aggregation-level chassis. Installation of the new devices helps reduce space, power, and heat while bringing increased scale, port speed, and link capacity to busy member rings. The level of effort for these initiatives was significant due to the

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complexities and amount of coordination of moves while ensuring service continuity. The CEN Technical team executed many moves in the background without affecting data traffic to CEN's connected member base.

In September, CEN technical staff implemented Ansible to help automate network software updates and device configuration changes. Ansible is an agentless, open-source automation tool that can save time, reduce or even eliminate repetitive tasks, reduce errors, and free staff to concentrate on operations, innovation, and collaboration. CEN's current implementation is modest, starting with the tasks associated with the largest two router platforms on the network and includes plans to develop playbooks to automate other device configuration changes in the future.

In October, CEN became certified in Mutually Agreed Norms for Routing Security (MANRS). MANRS is a global initiative, supported by the Internet Society, which increases overall network security and provides crucial fixes to reduce the most common routing threats, including filtering, anti-spoofing, coordination, and global validation. It requires collaboration among participants and shared responsibility for the global Internet routing system. Joining MANRS connects CEN to a community of security-minded organizations committed to making the global routing infrastructure more robust and secure. Doing so allows CEN to provide leadership for its member community and to work more closely with RENs nationally.

Engagement and Outreach

In March, CEN established three advisory councils: Service Management, Technical Advancement, and Engagement and Professional Development. An open call resulted in nearly 90 community members volunteering to participate in the councils. Members co-chair all three groups, with administrative support from CEN. An overview of each follows:

Services Management Advisory Council
Advise CEN staff on existing and new services, addressing issues such as quality, cost, and adoption. The greater member community is encouraged to provide feedback to ensure service quality.

Technical Advancement Advisory Council
Provide insights through education and exploration on advanced technical ability and applications that meet the needs of CEN members.

Engagement and Development Advisory Group
Provide guidance on professional development opportunities, such as technical, professional, and leadership sessions for CEN members. The group is responsible the development of the annual Member Conference program.

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CEN, with direction from the Engagement and Development Advisory Group, held its first quarterly seminar in November, titled "Student Data Privacy Legal Compliance and Best Practices." Ryan Kocsondy provided an opening welcome, with Gwen Zittoun of Shipman and Goodwin and Douglas Casey presented on compliance matters relating to Connecticut's data privacy law. The event took place at Central Connecticut State University, with remote video conference sessions held at Southern, Eastern, and Western Connecticut State Universities as well as at the Ferguson Library in Stamford. The event drew about 180 attendees across all sites.

6th Annual Conference

In May, CEN hosted the 6th annual Member Conference on May 18 at the Connecticut Convention Center. The theme was "Explore Network Possibilities, Discover Better Paths Forward, Grow Your Organization, and Engage with the CEN Community." The Conference provided 28 parallel sessions, with offerings for members across a variety of topics including security, community best practices, innovation and education, and awareness. A total of 568 people registered, with 520 attending. Nearly 50 sponsors (16 new) provided the majority of the funding for the event. The conference was the largest to date, representing the only event in Connecticut dedicated to community anchor institutions. Attendee survey feedback indicated that 94% of attendees were either satisfied or very satisfied with the Conference.

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New Members in 2018

CEN welcomed the following institutions in calendar year 2018.

Higher Education

Hartford Seminary

Libraries

The Beardsley Library (Winsted)
Windsor Locks Public Library
Scotland Public Library
Hagaman Memorial Library (East Haven)
Library Association of Warehouse Point
Clark Memorial Library (Bethany)
Canterbury Public Library
Durham Public Library
Preston Public Library
Sterling Public Library
Wintonbury Branch Library (Bloomfield)
Milford Public Library
Mansfield Public Library
Gunn Memorial Library (Washington)
Louis Piantino Branch Library (West Haven)
Ora Mason Branch Library (West Haven)
CT Library Consortium

K – 12 Schools

Brass City Charter School
Pomfret School
Chase Collegiate

State Agencies & Municipalities

CT DMV (Multiple Sites)
CT Military Department
Town of Colchester
Town of Weston
Town of Bethlehem
City of Ansonia

Open Access

CAS (CT Assoc. of Schools)
CNC Software
Capital Workforce Partners
WSHU (Sacred Heart Radio)
HC2 Broadcasting
Ideanomics (SSC) / Fintech Village, LLC
ACMT, Inc.

Public Safety

Tolland County Mutual Aid Fire Services, Inc.
Norfolk Fire Department
Naugatuck Police Department
Bridgeport EOC
Haddam Fire Department
Guilford Emergency Communication Center
Tolland Fire Dept.
West Stafford Fire Department
Riverton Volunteer Fire Dept., Barkhamsted
Pleasant Valley Fire Dept., Barkhamsted
Barkhamsted East Volunteer Fire Company
Simsbury Fire District
Bethlehem Fire Department
Ansonia Rescue Medical Services
Middletown Police Department
Metropolitan Transit Authority (MTA)

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Staffing

In February of 2018, CEN welcomed Rachael Collard as the Publicity and Marketing Coordinator. Rachael brings nearly 15 years of private sector sales and marketing experience, most recently with Superwinch in Dayville, Connecticut. She has a record of accomplishment in helping organizations grow through improved communications, service, and outreach. Rachael is a Connecticut native and graduated from Eastern Connecticut State University, where she earned a Bachelor of Science in Business Administration. Rachael helped manage the 2018 Member Conference and has implemented improvements in planning the 7th annual Member Conference May 10, 2019. She is also performing a comprehensive overhaul of the CEN Web site for release in early 2019.

The CEN leadership team currently seeks an additional network technician, with plans to have a candidate in place in the spring of 2019.

An organizational chart reflecting CEN staff and roles is available through the University of Connecticut's Information Technology Web site, http://uits.uconn.edu.

Financials

The Network continues to make significant progress operating in a self-sufficient business model, supporting operations while delivering unparalleled value to its expanding member base. Increases in bandwidth use and shifts to higher subscription tiers among existing members have led to increases in revenue. The addition of new members has also led to increased billings.

CEN received a reduced state appropriation in Fiscal Year (FY) 18 of $857,616, offset by the sweep of the CEN revenue account for $1,000,000, resulting in a -$142,384 (negative) start to the year. The CEN leadership team revised the budget mid-year to cover this shortfall, offset further by a reimbursement received through the E-rate program for services delivered the prior year. The fiscal year ended net positive and represented the first complete year of self-sustaining operations, one year earlier than expected. The Network allocated net profits from FY 18 to reserve funds to cover regular business operations throughout the year.

CEN received zero state general fund appropriations in FY 19, and the State continues to support the capital needs of the Network. The state Bond Commission approved and bonded $1.5 million to refresh a portion of the network infrastructure in February. In the 2020 – 2022 Biennium budget, a request was made to replace the equipment on a regular interval for the first two of five years, allowing the Network to replace end-of-life equipment, add capacity for increased member traffic, and provide cost savings to members and the State.

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CEN Operational Budget

Revenue	FY 18 Actual	FY 19 Projected
State Appropriation	$ 857,616	$ -
Member Billing	$ 4,853,055	$ 5,431,556
Member Billing AR	$ 550,772	$ 258,192
USAC (E-Rate) Reimbursement	$ 836,483	$ 1,174,729
Member Conference	$ 169,259	$ 174,500
Member Conference AR	$ 8,690	$ -
Leg/OPM Adjustment	$ (1,000,000)	$ -
Total Revenue	$ 6,275,875	$ 7,068,977
Expenses		
Staff (Salary & Benefits)	$ 2,178,435	$ 2,478,731
CET (Salary & Benefits, SW)	$ 296,545	$ 301,559
Contractual	$ 1,090,011	$ 1,350,560
Fiber Maintenance	$ 1,495,299	$ 1,400,841
Hardware	$ 160,043	$ 477,821
HW & SW Maintenance	$ 606,697	$ 648,989
Member Conference	$ 170,514	$ 157,830
Professional Services	$ -	$ 25,000
Total Expenses	$ 5,997,542	$ 6,841,331
Profit/Loss	**$ 278,333**	**$ 227,646**

Value

CEN strives to provide value across all its services that result in economic benefits to the state. Calculations this year for annual estimated savings and cost avoidance generated by CEN total between $19 and $29 million, as follows:

- $437,000 on federally required Web filtering for K – 12 districts
- $6.6 million average savings for Internet service across all members compared to costs in neighboring states
- $3.5 – 4.6 million for public K – 12 Internet service
- $11 million for K – 12 Internet service compared to national averages (Education SuperHighway data)
- $12 – 18 million in DDoS mitigation across all connected members
- $6 – 9 million in DDoS indirect cost for time saved

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Continued State investment in CEN infrastructure will help Connecticut continue to realize unparalleled return on investment and lead the nation in infrastructure supporting research, education, state and municipal government, and economic development.

2019 Outlook

The Network remains healthy and serves a vibrant and expanding membership. In 2019, CEN leadership will deliver a new Strategic Plan to map the future of the Network, continue with technical advancement and infrastructure upgrades, and offer new, value-added services driven by member demand and serving all of CEN's constituent communities.

Acknowledgments

CEN leadership thanks the following:

- The CEN membership for their loyalty and active participation in developing a community network with a collective value that far exceeds the sum of its individual parts
- The CEN staff for their dedication and diligent work in operating and expanding the network
- The Commission members for their leadership and advocacy on behalf of the Network
- Mark Raymond and Michael Mundrane, who serve as trusted advisors and partners to CEN
- Connecticut Executive and Legislative branches, whose support are critical and integral to CEN's long-term success and benefit to the state