Agenda

- Overview of eduroam
- Why eduroam for K-12?
- The eduroam Support Organization program - scaling eduroam for K12s
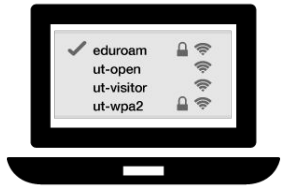- What's next?

What is eduroam?

- Federated authentication service for global wireless access for the research and education community

- Participating institutions provide access to their wireless networks to users from other eduroam connected institutions.

- Users are authenticated by their home institutions.

What is eduroam?

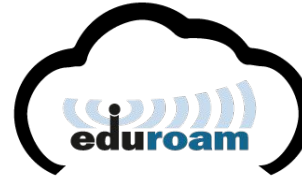Brian, a LSU Student, is visiting University of Tennessee and joins eduroam

Brian's credentials (brian@lsu.edu) are securely sent to eduroam

eduroam routes the information to LSU

Brian's credentials are verified by LSU

✓ eduroam
ut-open
ut-visitor
ut-wpa2

brian@lsu.edu
****

Brian has secure, seamless, and instant WiFi

UTK grants Brian network access

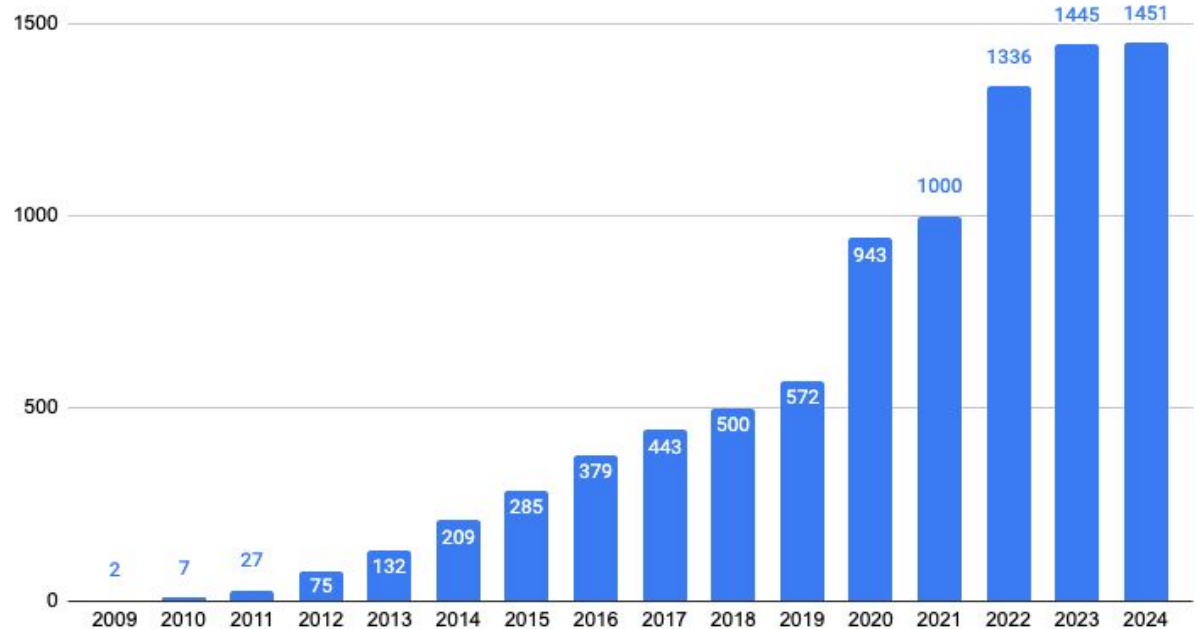eduroam routes the information to UTK

LSU confirms Brian's credentials to UTK

eduroam in the US

- Over 1,400 subscribers

- 3,300+ service locations in the US
  - *2nd highest number in the world!*

- 300+ K12s, libraries, museums

US eduroam Subscribers by Year

| Year	Subscribers
2009	2
2010	7
2011	27
2012	75
2013	132
2014	209
2015	285
2016	379
2017	443
2018	500
2019	572
2020	943
2021	1000
2022	1336
2023	1445
2024	1451

Why eduroam for K-12?

Benefits for K12 and adjacent communities

- Simplify network access, reduce support burden on IT staff
- Professional development/conferences
- Traveling activities - STEM competitions, athletics, debate teams...
- Field trips
- Dual enrollment students - access at community colleges, technical schools, universities
- Shared instructors, HE student teachers
- **Equity of access for underserved students made easier, more securely**

Why eduroam for K-12?

Cool example of digital equity

- UETN had enabled eduroam for most districts in Utah by 2020
- Granite school district had many at-risk students during COVID
- Used anonymized free lunch data to identify at-risk neighborhoods
- Deployed LTE wifi enabled buses during school hours for virtual learning
- Students with eduroam enabled devices authenticated automatically, securely
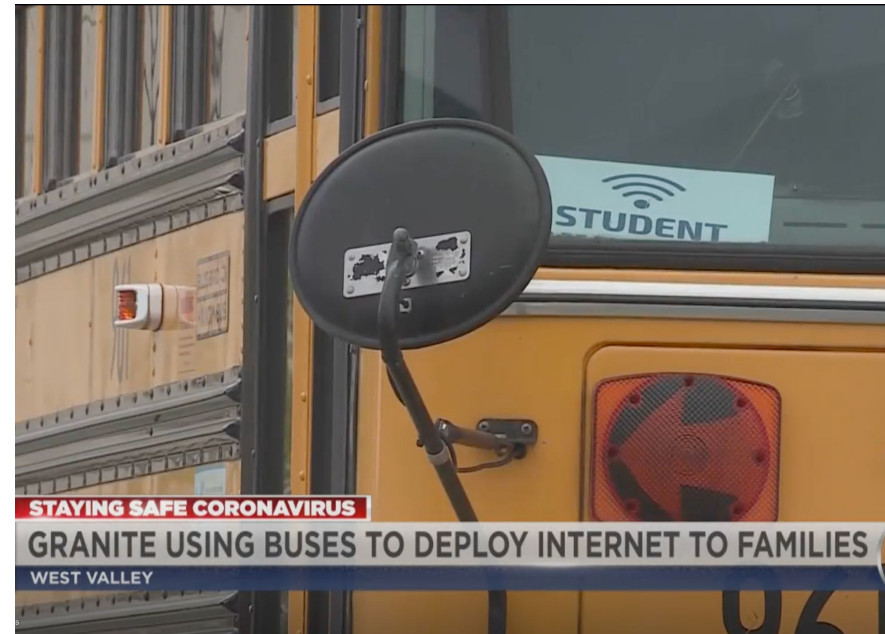
Why eduroam for K-12?

Other DE examples enhanced by eduroam

- Libraries, especially those with eduroam hotspots provided 24/7
- eduroam on municipal buses, mass transit
- Other public hotspots partnerships
  - *City governments*
  - *Downtown development associations*
  - *Private businesses*
- Existing HE eduroam community members
- Local ISPs

eduroam Support Organization (eSO) in a Nutshell

State-wide deployment of unlimited eduroam identity providers for K-12, museums, and libraries with "Hotspots" anywhere.

- REN or other organization serving K-12s in a state/region
- One agreement, single fee for all K-12s, libraries, and museums
- Can add SP-Only "hotspots" without cost
- Takes on portions of service delivery
- Internet2 provides multi-day training course to staff of eSO and its constituents
- Provides first line of eduroam support to their constituents
- Assists constituents in provisioning eduroam service
- Manages any contracting or invoicing of its constituents
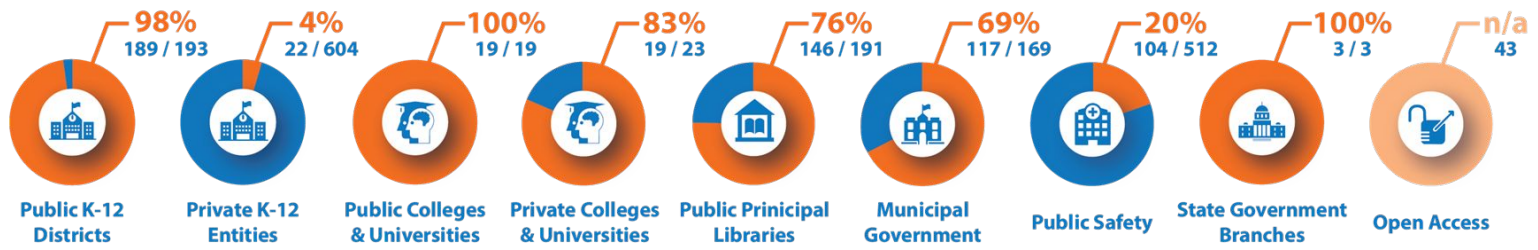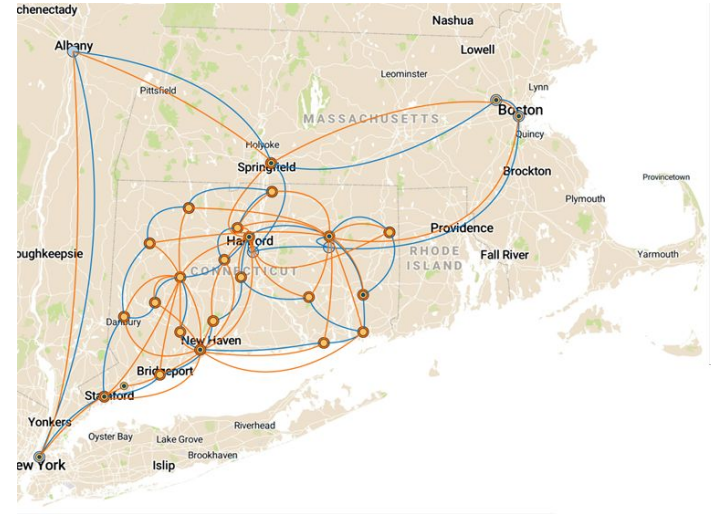- Only one eduroam Support Organization per state

What does it take for a K12 to use eduroam?

- Must work with the participating eSO in their state
- An internet connection
- 802.1x compliant wireless APs and controller
- A RADIUS server
  - *Can be Microsoft NPS, Cisco ISE, Aruba Clearpass, many other commercial offerings, or open source solutions (FreeRADIUS)*
  - *Google ID integration is also an option*
- That's it!

CEN
Connecticut's Trusted Internet
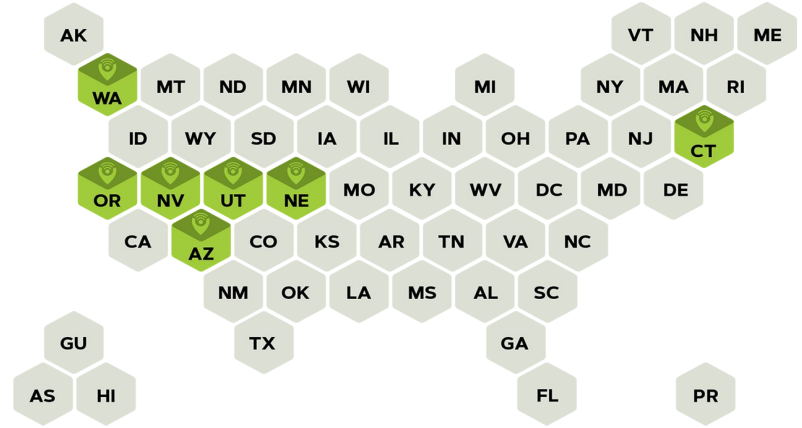
- Connecticut Education Network (CEN)
- Established in 2000
- Governed by the CET (https://ct.gov/ctedtech)
- State of CT owned, managed by UConn
- Main office in Hartford, CT
- CT's only Open-Access Middle Mile Network
- ~3500 Route miles of fiber
- Nation's first all optical network to connect every K-12 district (2005)

98% 189 / 193	4% 22 / 604	100% 19 / 19	83% 19 / 23	76% 146 / 191	69% 117 / 169	20% 104 / 512	100% 3 / 3	n/a 43
Public K-12 Districts	Private K-12 Entities	Public Colleges & Universities	Private Colleges & Universities	Public Prinipal Libraries	Municipal Government	Public Safety	State Government Branches	Open Access

- Completed transition to full eSO, moving support of existing districts under our team

- Continued support of 3 initial school districts, 3 in process, engaging with new schools and other constituents.

- Promoted eduroam to community, positioning the service as an important part of equity of access

- Need to add to project team, bringing in existing networking and wireless experts to help with support and deployment
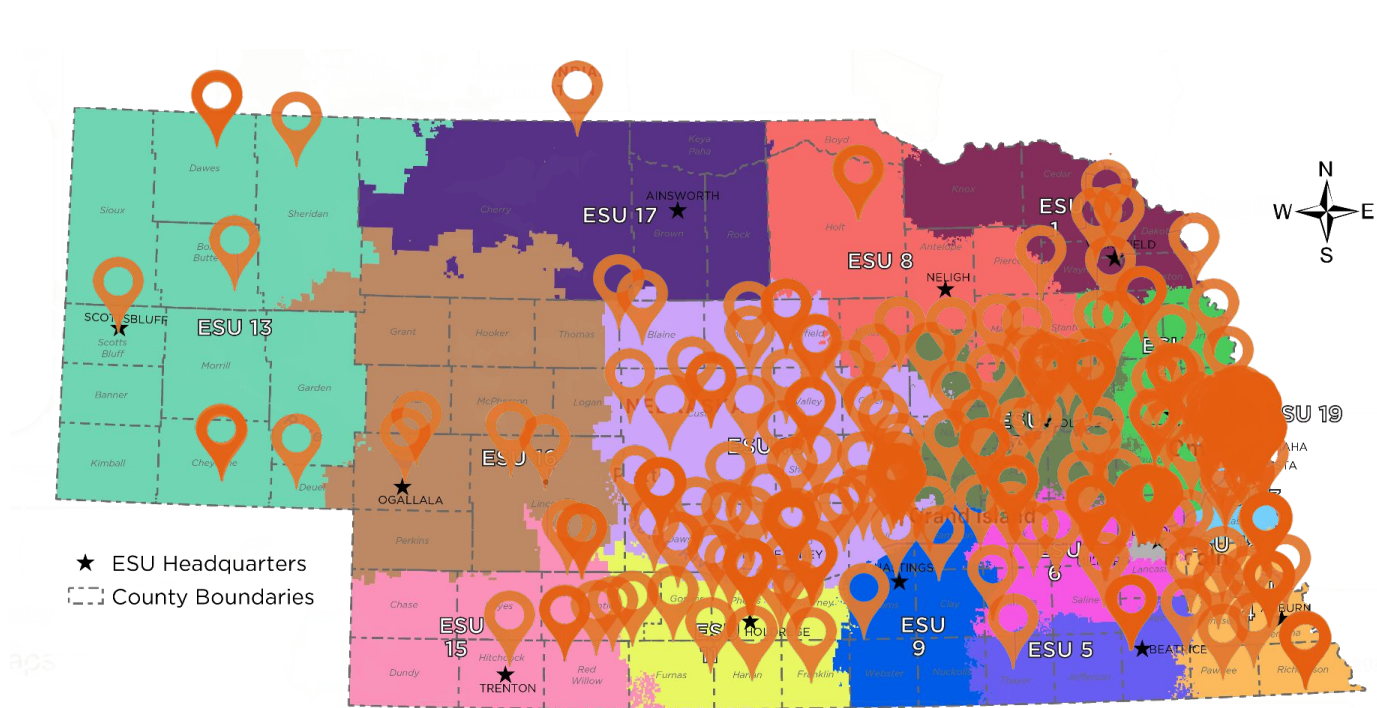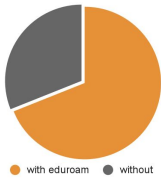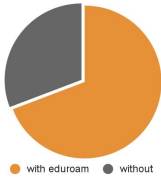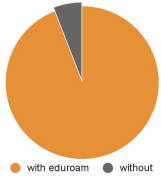
cen

ConnectEd Nebraska

- Nebraska Department of Education
- State of Nebraska
- University of Nebraska
- ESU Coordinating Council

https://connectednebraska.com/

[14]

Successes in 2023

94% ESUs
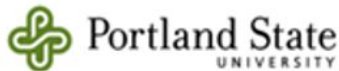
69% Districts

70% Students

internet2.edu

[15]

@internet2

About Link Oregon

Founded in 2019, Link Oregon is the non-profit consortium of Oregon's four largest research universities and the State of Oregon through its Enterprise Information Services division.

We are a member-based, middle-mile network backbone provider that supports K-12 & higher education, healthcare, libraries, Tribes, state & local governments, and other non-profit and public-sector entities.

- Engaged a technical facilitator from the K12 community to serve as a technical liaison between Internet2, Link Oregon, and our K12 members during implementation

- Successfully completed eduroam implementation at pilot Education Service District

- Developed a sustainable financial model, in collaboration with a statewide group of ESD technology leaders

- **Developed a contract structure that aligns with the membership model**

NSHE »SCS About us

*Connecting NSHE and Nevada through highly valued shared digital services*

- System Computing Services: NSHE's shared digital services provider (network, ERP, SIS, etc.)
  - also serving many K-12, state, and regional entities with network and video services
- NevadaNet: NV's trusted high speed research and education network (REN), backbone for NSHE and numerous state and regional public entities
- Two major, distant, population centers; many large but sparsely populated counties
  - Most are rural/"frontier": 15/17 counties have populations < 60,000; 8 of those have < 10,000

64 - 8,771   8,815 - 18,968   18,990 - 36,787   36,801 - 94,350   94,970 - 10,014,009
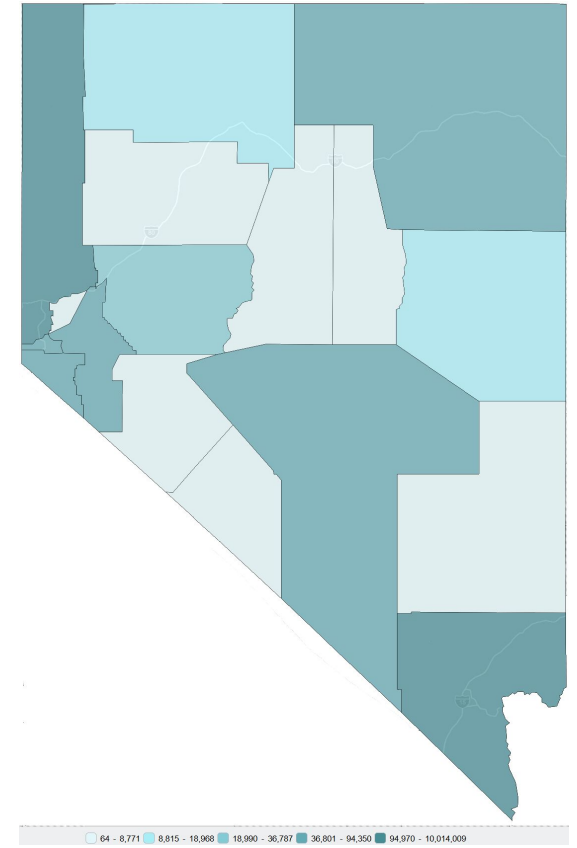
NSHE»SCS Successes from 2023

- We're new(ish) here!
- Reboot of 2021 university-led K-12 eduroam pilot
- Internal discussions mid/late 2022, formal eSO proposal submitted early 2023
- Reinvigorating/expanding higher-ed use of eduroam
- City of Las Vegas early adopter as first municipal SP
  - 60+ locations, 500+ APs: City Hall, tech centers, community centers, courts, parks…

https://scs.nevada.edu/eduroam

Sun Corridor Network
Arizona's Research and Education Network
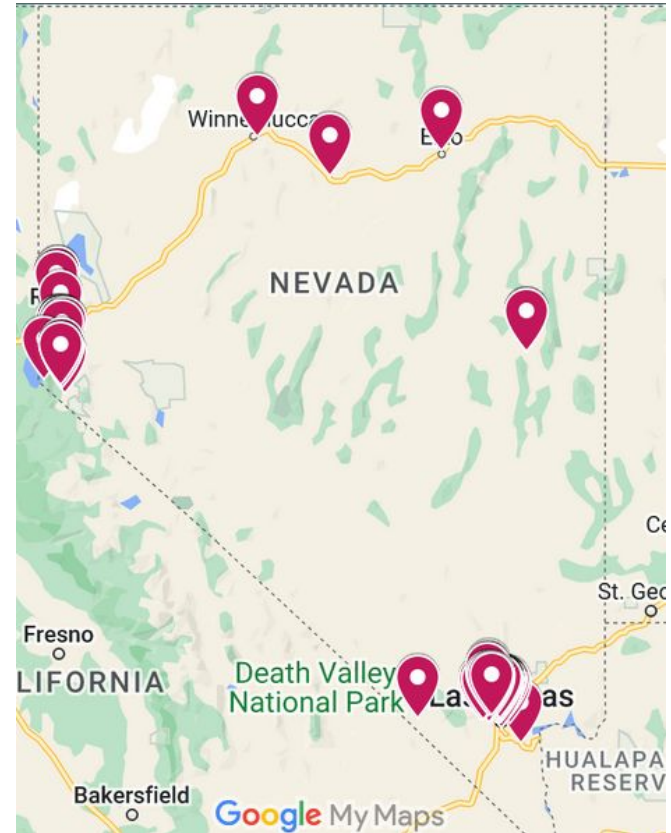
- Established in 2013 by the Arizona Board of Regents universities: Arizona State University, Northern Arizona University, and the University of Arizona
- Primary (initial) purpose: Internet2 Connector for Arizona
- Sun Corridor Network (SCN) administrative home is Arizona State University
- No direct state funding
- Began serving K-12s in 2016

Successes from 2023

- SCN noted eduroam and the eduroam program in a few presentations within the year

- Pinal County Schools, an eduroam pilot participant, advocated their schools to explore the benefits of eduroam

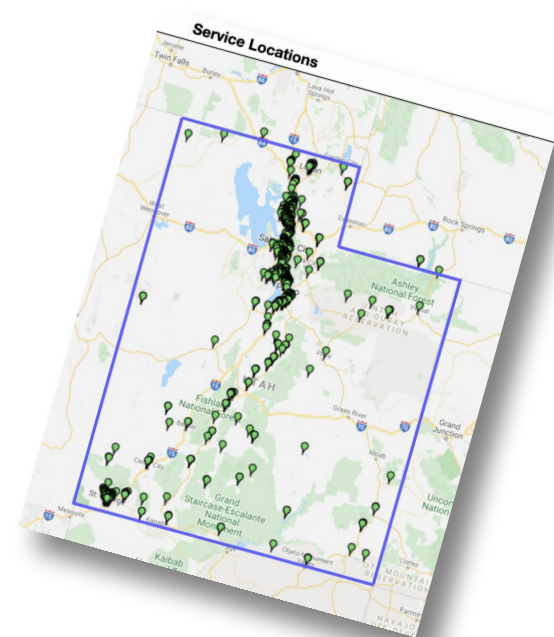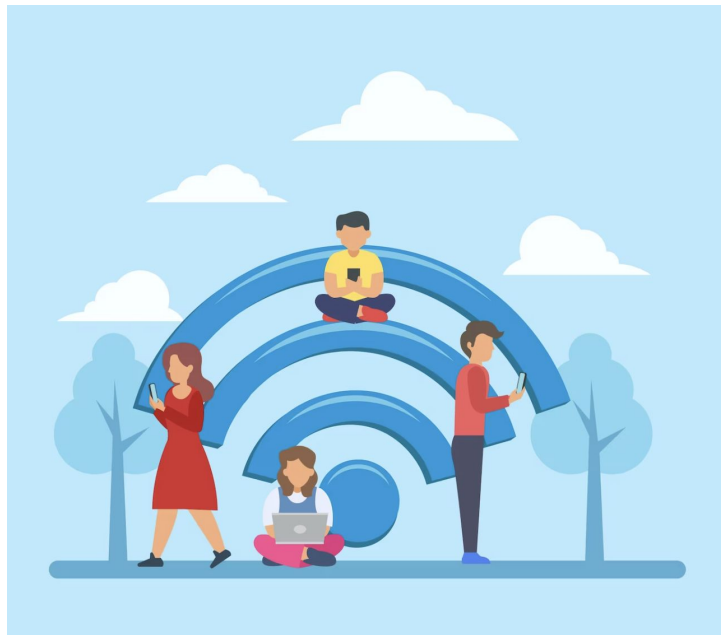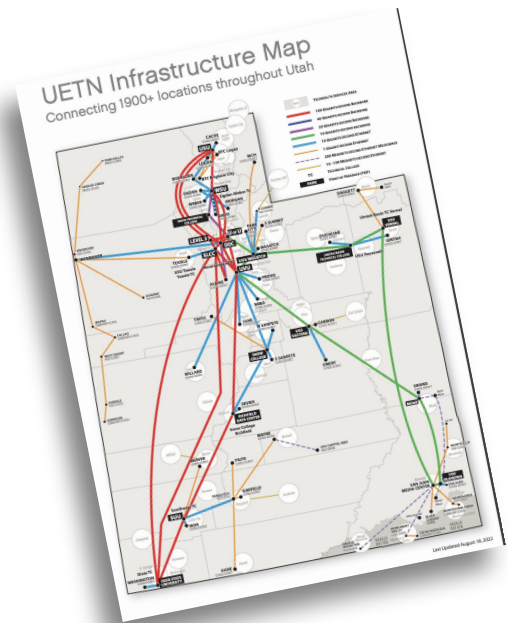- Southern Arizona district expressed keen interest in eduroam

Vision for eduroam

Participating educational faculty, staff and students in Utah will have ubiquitous wireless access in all educational sites in the state and in other eduroam participating sites throughout the world.

Successes from 2023

- Focus on public and private locations as community SP "Hot-Spots".
- "Eduroam2go" R&D, discussions and presentations including at the 2023 TechEx and Wireless Lan Professionals Conference in Arizona
- Facilitate K12-and-higher ed combined eduroam Usergroup meetings.
- Updated eduroam marketing and promotion materials.
- eduroam available and primary SSID at UCET (Utah Coalition for Education Technology

K-20 Education Network
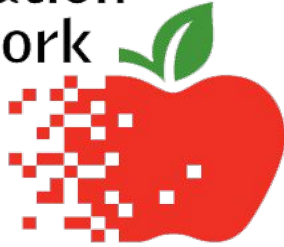
About the Washington K-20 Education Network

- The only high-speed, high-capacity network entirely dedicated to meeting the unique needs and diverse interests of Washington State's educational community.

- Serving >1.5M students, faculty, staff at ~400 member sites:
  - Community and Technical Colleges
  - K-12 School Districts
  - Public Library Districts
  - Public Universities
  - Private Universities, the Northwest Indian Colleges, TVW, KCTS9, KSPS

- Providing access to:
  - Business Class Intranet
  - High Speed Commodity Internet Access
  - Internet2
  - Zoom Pro Videoconferencing
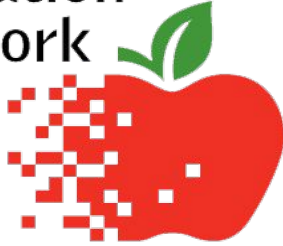
Lessons learned in 2023

- Advocacy effort required to get large project off the ground with diverse stakeholders

- Value, buy-in, and success can look very different for e.g.
  - K-12 students, teachers, admin
  - libraries
  - techies, leaders, funders, politicians

- ~~Support~~ Enthusiasm from K-12 leadership is critical

- ~~Support~~ Enthusiasm from ESDs is critical (for our support model)

Privacy, content filtering - our experience with K12s

- Routing of requests is done based on a user's institution, not based on user's identity
- Users are authenticated at home, not where they visit
- Users know the wifi they're connecting to is part of their community, hotspot operators know the users are part of theirs
- "Bad actors" can only be identified by coordinating with their home institution
  - Typically institutions are responsible for following up with those users
- eduroam pairs well with commonly used content filtering approaches for K12
  - School network filters for local users
  - Enabling eduroam mainly/only on district issued devices with an MDM client
  - Faculty/Staff devices or BYOD for educators
  - Some schools have also taken a BYOD approach for students

So what now?

- KINBER, IUs, other education serving networks discussing how to work together
  - *One eSO per state means we have to ensure everyone's included!*
- Know of schools, library systems that might be a good fit? Let us know
  - *Early adopters are key!*
- Internet2 holds monthly calls on the program - all interested organizations are welcome to attend
  - *Good place to hear what others have been doing, ask questions*

Questions?

mzawacki@internet2.edu

Link to slide deck

Funding Models

- Nebraska - Initially funded with CARES & GEER act, ongoing bundled into Network Nebraska benefits without raising membership fees.

- Utah - Currently evolving. UETN has historically leveraged both UETN and grant funding.

- Oregon - Membership model bundles eduroam for K12 into our Internet transit service fee.