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Link Oregon

High-speed Fiber Broadband for Oregon's Public & Non-profit Sectors

Presented to

Joint Legislative Committee On Information Management and Technology

Steve Corbató – Executive Director

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What is Link Oregon?

- A non-profit consortium (Oregon Fiber Partnership) of state government and Oregon's four largest public research universities that supports the state's **public and non-profit sectors**

- An advanced, statewide **middle-mile network** using primarily existing dark fiber assets to provide cost-effective, resilient high-speed connectivity for our members
- Ethernet-based transport and comprehensive Internet services
- A platform for additional collaborative IT services

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Core Principles

Our Mission

Link Oregon's mission is to serve Oregon's public and non-profit sectors by:

i) operating an advanced statewide broadband network that is resilient, cost-effective, and sustainable and

ii) fostering innovation and collaboration through forward-looking technology leadership

Our Vision

By providing enhanced networking capabilities, Link Oregon seeks to ensure that all Oregonians have access to essential digital resources for learning, working, and engaging in society, and to build the foundation for Oregon's future prosperity.

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Strategic & Sustainable Governance

A Non-profit Organization

- Oregon non-profit with federal tax-exempt status (501c3)
- Asset vessel and operational entity
- Vehicle for other collaborative information technology projects
- **Public-private partnership (P3)** through collaboration with commercial providers and public entities
- Operates statewide, facilities-based optical network
- Governance balanced between state government and higher education
- Annual external audits since founding

Board of Directors

- **Terrence Woods, State CIO, EIS (Chair - FY25)**
- Abhijit Pandit, UO, VP IT & CIO (Vice Chair - FY25)
- Bridget Barnes, OHSU, SVP IT & CIO (Treasurer)
- Andrea Ballinger, OSU, Associate Provost & CIO
- Ryan Bass, PSU, CIO
- Scott Emry, EIS, State of Oregon, Asst State CIO
- James Foster, EIS, State of Oregon, Dir, State Data Center
- Stuart Long, NW Regional ESD & CTA CIO (K-12)
- Kai Turner, ODE, Asst Superintendent of Finance & IT
- *Ex officio* Link Oregon Executive Director & Chief of Staff (Secretary)
- Two open seats

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What is Middle Mile?

Last mile:

- The final leg of a network that provides service to the home, business or community anchor institution.
- The end user's effective speed usually will be no greater than the bandwidth of this connection.

Middle mile:

- The physical mid-section of the Internet infrastructure required to enable internet connectivity for homes, businesses, and community institutions.
- Made up of high-capacity fiber lines that carry large amounts of data at high speeds over long distances between local networks and global Internet backbones.
- In general, middle mile connections across the state tie together two or more provider nodes.

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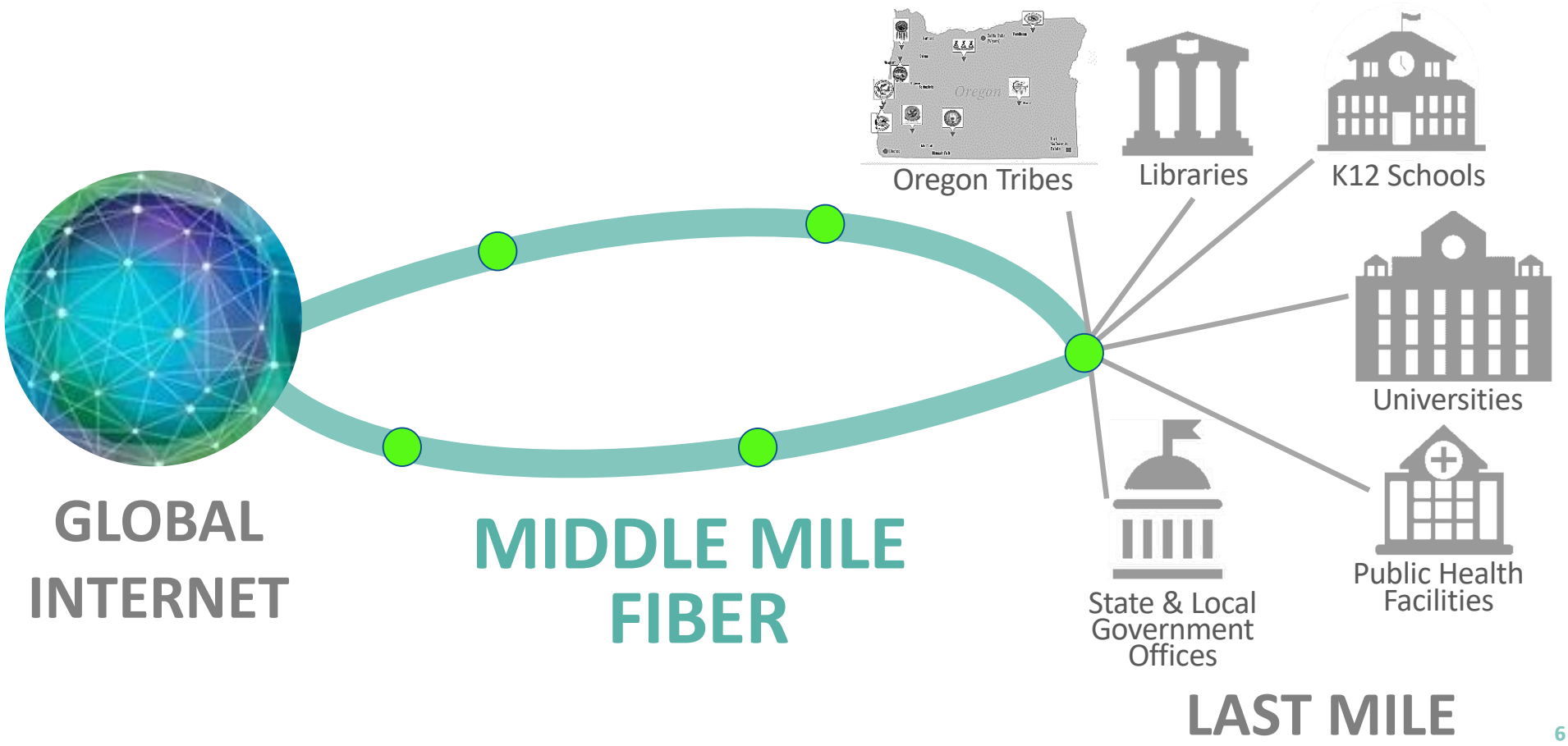
Link Oregon's Middle Mile




LINK OREGON
WASHINGTON
PACIFIC OCEAN
IDAHO
CALIFORNIA
NEVADA
10,000 ft
7,500
5,000
2,500
0
WARRENTON/ ASTORIA
Hillsboro
OHSU
Portland
Portland State University
MANZANITA (6)
NEDONNA BEACH
State of Oregon (EIS)
Salem
PACIFIC CITY (5)
Oregon State University
Corvallis
Newport
University of Oregon
Eugene
FLORENCE
BANDON
Roseburg
Grants Pass
Medford
Ashland
Klamath Falls
Chemult
Bend
Prineville
Maupin
The Dalles
Boardman
Pendleton
La Grande
Baker City
Ontario
Vale
Burns
Boise
Fiber Broadband Routes
Resilient Circuit
Current Service Locations
Link Oregon Founding Entities
Technical & Regional Universities
Link Oregon Connected School Districts
Commercial Data Center Concentrations
Transoceanic Cables
Transoceanic Cable Landing Points
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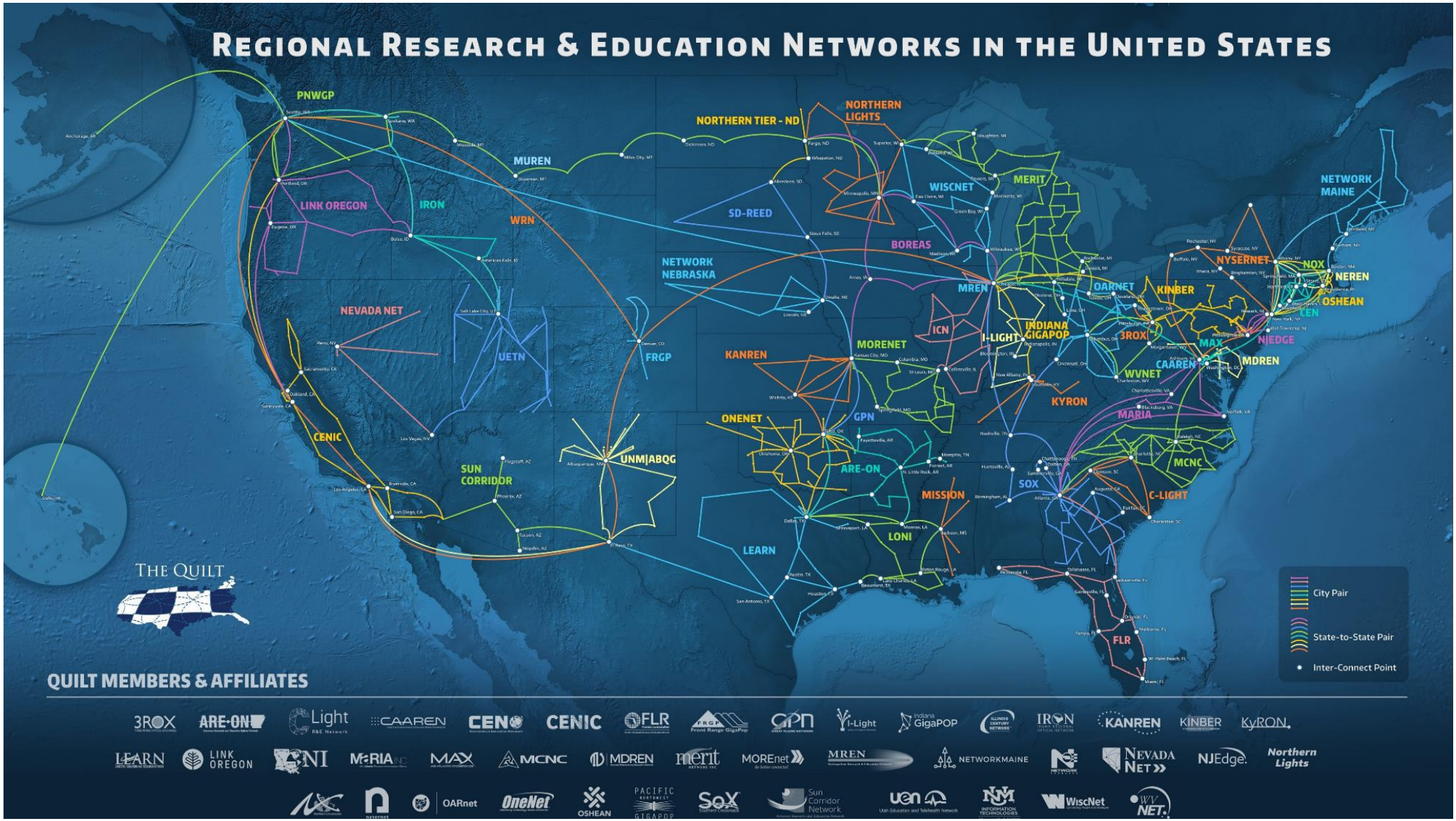
Regional Research & Education Networks in the United States
PNWGP
NORTHERN TIER - ND
NORTHERN LIGHTS
MUREN
LINK OREGON
IRON
WRN
SD-REED
WISCNET
MERIT
NETWORK MAINE
BOREAS
NETWORK NEBRASKA
NYSERNET
NOX
NEREN
OSHEAN
CEN
MREN
OARNET
KINBER
NEVADA NET
UETN
FRGP
ICN
INDIANA GIGAPOP
I-LIGHT
3ROX
MAX
NJEDGE
MDREN
KANREN
MORENET
CAAREN
WVNET
KYRON
MARIA
GPN
ONENET
CENIC
UNM|ABQG
SUN CORRIDOR
ARE-ON
MCNC
SOX
MISSION
C-LIGHT
LONI
LEARN
FLR
THE QUILT
City Pair
State-to-State Pair
Inter-Connect Point
QUILT MEMBERS & AFFILIATES
3ROX
ARE-ON
Light
CAAREN
CENIC
FLR
Front Range GigaPop
GPN
I-Light
Indiana GigaPOP
IRON
KANREN
KINBER
KyRON
LEARN
LINK OREGON
MAX
MCNC
MDREN
merit
MOREnet
MREN
NETWORKMAINE
Nevada Net
NJEdge
Northern Lights
OARnet
OneNet
OSHEAN
PACIFIC GIGAPOP
SoX
Sun Corridor Network
uen
WiscNet
WV NET

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Partner Ecosystem

Our partner ecosystem includes:

- **State**: EIS, ODE, HECC, State Library, ODOT, PUC, Broadband Office
- **Education**: P/K-12, community colleges, public universities, private colleges
- **Healthcare**: Public/non-profit hospitals & clinics, telehealth
- **Communities**: Urban, rural, and Tribal; Broadband Action Teams; ORECA
- **Commercial**: Telecommunications providers, data centers
- **Federal**: NTIA, FCC, USDA, NSF, NOAA
- **Local Internet Exchanges** (IXs): NWAX, WIX, COIX, SIX

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Support for Rural Broadband Development

We **are not** a common carrier (telco) and **do not** provide Internet service to residences and businesses.

We do:

- Serve as an **anchor tenant** through aggregation of community anchor institutions
- Partner with **Internet service providers making broadband investments** in rural and urban communities (example: EOARC south of Burns)
- Support **local exchange** of Internet traffic
- Provide **resilient connectivity** for rural regions
- Collaborate with local **broadband action teams**, in coordination with **OSU Extension**
- Assess **new technologies** (wireless, satellite)
- Enable **advanced hazard detection networks** (UO) – ALERTWildfire and ShakeAlert®

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Strategic Initiatives: K-20 Innovation

Comprehensive Statewide Networking & Research Innovation Ecosystem

- Statewide K-12 Network
  - **Education Service District (ESD) Bundled Service Model** providing up to 100 Gbps connectivity for K-12
  - Platform for shared services, collaboration, and disaster recovery
  - Clackamas and Multnomah ESDs are joining for FY26
- eduroam
  - *eduroam* for students, staff, faculty, and members of K-20 schools, libraries, and museums.
  - Provides users within these organizations with **secure** Wi-Fi access using their **home institution credentials** when at or near **any** eduroam-participating institution
  - Link Oregon is the designated "eduroam Support Organization" for Oregon – single license supports eduroam participation for **all** Oregon K-12, libraries, and museums
  - Technical support and national eduroam support community

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Strategic Initiatives: Research Innovation

Comprehensive Statewide Networking & Research Innovation Ecosystem

- NSF Campus Cyberinfrastructure (CC*) proposals supporting research, innovation and economic development:
  - **Oregon Regional Computing Accelerator** (ORCA) – PSU-hosted computational cluster enabling smaller institutions to engage in research and education related to AI, machine learning, data science, and other computing-intensive programs; led by PSU Professor Will Pazner - **FUNDED**
  - **Cyberinfrastructure Alliance for Oregon** (CIAO) – Partnership of all 8 public universities & Link Oregon to develop a strategic plan for statewide research cyberinfrastructure and educational programs to develop skilled workforce for Oregon; led by UO CTO Christy Long – **PENDING**
- Supporting OSU leadership in supercomputing and extending the benefits statewide
  - Huang Collaborative Innovative Complex – under construction
  - Active NVIDIA partnership for deploying national class high performance computing capability on campus
  - Link Oregon hosts statewide research computing collaboration

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Strategic Initiatives: 400 Gbps Upgrade

- Objective:
  - Create a 400-Gbps, high-bandwidth ring around the Willamette Valley and Central Oregon, supporting the State, Research & Education
  - Support high-traffic activities such as OSU supercomputing, UO/OHSU life science research collaboration, and disaster recovery sites near Bend
- Benefits
  - Support 400 Gbps circuits on top of the existing Link Oregon network
  - Opens the door for a future move to 800 Gbps capability
  - Will enable 400 Gbps connectivity to Internet2, the national research and education backbone
- Extensive testing already completed
- Project budget (estimated): $1.1 million (capital), $100K (recurring – annual)

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Strategic Initiatives: Quantum Networking

- **Quantum Technologies for the Future**
  - Quantum computing can solve complex problems exponentially faster than classical systems, opening new horizons in cryptography, optimization, chemistry, and materials science.
  - Quantum encryption and sensing promise ultra-secure communications and unprecedented measurement precision.
  - UO leadership at Center for Optical, Molecular & Quantum Science (OMQ)
  - Link Oregon quantum activities led by our Chief Scientist, Dr. Ram Durairajan
  - Q-RISE Oregon – statewide working group in formation
- **Synergy with Artificial Intelligence**
  - The integration of quantum computing with AI – especially with *agentic AI* - can drive development of smarter, more efficient systems enhancing everything from healthcare to cybersecurity..
- **Quantum Network Testbed**
  - Testbeds are underway in Chicago, Research Triangle (NC), central Ohio, D.C., and S.F. Bay areas
  - Develop model for the joint operation and management of traditional and quantum networks
  - Workforce development to train network operators for the new quantum environment
  - Link Oregon has an available fiber pair for a quantum testbed to connect researchers in Portland/Hillsboro, Corvallis, and Eugene

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Other Strategic Initiatives

- Coordination with Cross-sector Cybersecurity Strategy
  - Oregon Cybersecurity Center of Excellence (OCCoE)
- Planning Network Expansion for Reach and Resiliency
  - Oregon Coast: Rings connecting the entire coast from Astoria/Warrenton and Brookings – initial focus on Newport-Bandon segments
  - Eastern Oregon: Lakeview, Prineville, John Day, and Enterprise to support Lake, Crook, Grant, and Wallowa Counties
  - California: Potential interconnects on US 101 and 199, 97 and 395, and I-5
- Member Services and Membership Growth
  - Developing value-add services that help our members fulfill their missions
  - Membership open to all Oregon public and non-profit entities and Tribes
- Support for Tribal Broadband Development and Sustainability

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Link Oregon Summary

- Key component of State of Oregon cyber-resiliency and disaster recovery strategies
- On-going focus on network hardening and capacity improvements to keep pace with the State's data transmission and cybersecurity requirements
- Provides the technical infrastructure and governance for collaboration and coordination across K-20 education ecosystem; efficiencies and innovation in education and workforce development

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Parting Thoughts - I

- Broadband is now broadly recognized as critical infrastructure for societal well-being and economic development in Oregon
  - The further development of AI will increase these dependencies
  - “To what degree is residential broadband a utility?” is a question that needs to be addressed
  - If it is, what is an appropriate modern regulatory framework that keeps pace with innovation?
- The need to cultivate Oregon’s broadband ecosystem will not end with the current wave of federal broadband investment (e.g., BDP, BEAD)
  - Maintain/evolve Oregon Broadband Office to keep pace with dynamic marketplace
  - Ongoing state-based mapping capability
  - Digital opportunity and literacy

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Parting Thoughts - II

- Middle mile infrastructure in Oregon requires continuing attention and work
  - Community redundancy gaps
  - Resiliency assessment in the face of natural and human hazards (e.g., wildfire, seismic, weather, vandalism, car accidents)
  - Hardened, resilient locations for Internet Exchanges and other major Internet nodes
- Importance of robust regulatory review of upcoming incumbent telecom acquisition(s)
- Continue to recognize Link Oregon as a long-term strategic asset for the state – both the infrastructure and the community
  - A tool that enables in-state collaboration and external 'coopetition'
  - Effective partnerships with ODOT, ODE, and OCCoE are critical
  - Platform for innovation and collaborative opportunities, such as quantum networks

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THANK YOU

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2024 Network Health Snapshot