Broadband in Oregon

A Report of the

Oregon Broadband Advisory Council

Presented to the

Senate Interim Committee on Business and Transportation

for

The Seventy-Eighth Legislative Assembly

November 1, 2014

Broadband in Oregon
2014

Contents

Executive Summary

This is the third report of the Oregon Broadband Advisory Council (OBAC) to the Legislative Assembly on the affordability and accessibility of broadband technology in all areas of the state and on broadband technology use in healthcare, energy management, education and government. The 2014 report will also present key broadband related challenges and opportunities facing the state. The report is best read on-line as it contains many links to other reports and references.

Oregon continues to benefit from significant investments in broadband infrastructure by the state's many service providers. Franchised telephone companies, cable companies, competitive access providers, fixed and mobile wireless companies, satellite service providers and publicly owned networks continue to invest in upgrading their infrastructure to meet the growing needs of Oregon's businesses, institutions, and individual residents for broadband connectivity and services. The industry is migrating to fiber and wireless network technologies and also is trending toward consolidation through acquisitions and mergers. Broadband telecommunications is increasingly recognized as essential infrastructure that Oregon must have to successfully compete in an Information Age digital world.

Broadband telecommunications networks constitute essential infrastructure for Oregon and the nation.

> *"Improved telecommunications infrastructure, particularly fast and widely-accessible wired and wireless broadband networks, enables synergistic technological advances in business, healthcare, education, public safety, entertainment, and more. In education alone, it carries enormous potential to improve student learning and reduce achievement gaps."*
>
> - *Jason Fuhrman, Chair*
> *Council of Economic Advisers (2013)*

Oregon continues to be a leader in the adoption and utilization of broadband technologies when compared to other states. The 2014 Oregon Broadband Survey conducted by the Oregon Business Development Department with the support of OBAC places broadband access in Oregon homes at 82% as compared to 80% nationally, though there are significant variations in rates of adoption across different regions and demographic groups in the state. Oregon continues to make progress in the adoption and utilization of broadband technologies in support of healthcare, government, education, and energy management applications.

Access to competitive high-speed broadband telecommunication networks and the Internet has great value for Oregon's institutions, businesses and individuals. Attention to public policy has resulted in success stories across the state. Continued action is required to ensure that Oregon's future broadband needs are met and that broadband benefits are realized. Broadband continues to grow in importance as an asset and strategic tool available for economic and community development in Oregon.

OBAC has identified the following key broadband challenges and opportunities facing Oregon:

Community Broadband Strategic Planning
Oregon needs to engage in strategic planning at the local community level for broadband adoption and utilization so that available economic and community development benefits from the use of these technologies may be fully realized.

Broadband Access and related IT resources in K-12 Schools
Oregon needs to address the challenge of statewide broadband access in its K-12 Schools. Information technology and broadband network access are now essential infrastructure for Oregon's K-12 schools. Oregon is currently implementing *Common Core* standards and *Smarter Balanced* online student assessment, just as school administration systems, educational delivery systems, professional development resources and course content are migrating to digital formats.

Public Safety
Oregon needs to continue to plan for a statewide migration to the next generation of public safety communications. Oregon has long been pursuing interoperability in public safety communications systems as has the entire nation. FirstNet, as a national initiative to build a nationwide broadband public safety network supported by federal funds and dedicated radio frequency spectrum, may provide Oregon with an opportunity to effectively address long standing public safety communications needs and public policy goals.

Disaster Recovery Planning
Oregon needs to re-assess its plans for the significant risks it faces from major subduction zone seismic events and other large-scale disasters. Telecommunications will be key to the state's ability to recover from major tsunamis, earthquakes, volcanic eruptions, and other major disasters. The disaster readiness of this infrastructure and the ability of service providers to recover from such events need to be assessed. Provisions for post-event communications and coordination between telecommunications service providers and government emergency management agencies need to be established.

Federal Funding
Oregon needs to fully utilize and leverage the broadband related federal initiatives and funding programs available to help meet its broadband needs.

Cyber Security
The security of data and communications systems is a growing challenge and significant risk exposure for individuals and organizations. Oregon will benefit from an increased focus on and coordination of cyber security education, training and workforce development. OBAC joins the Oregon University System, the Office of the Oregon Attorney General, and local government associations in generating awareness of this issue.

Infrastructure

All sectors of the telecommunications industry continue to invest in broadband infrastructure, services, and service quality in Oregon. Telecommunications is a capital intensive industry. The Progressive Policy Institute recently reported that of the top 25 private U.S. companies ranked by their domestic capital spending, AT&T and Verizon are at the top of the list with significantly higher levels of investment than companies in other industries. AT&T at $20.9 billion in 2014 far exceeds the first non-telecommunications company, Exxon-Mobil at $11.1 billion, and has led this list for the past three years. Verizon invested $15.4 billion in 2014. Telecommunications companies including cable providers had a combined capital investment of $46 billion in 2014. The report may be viewed at http://www.progressivepolicy.org/issues/economy/u-s-investment-heroes-2014-investing-home-connected-world/

Broadband is thought of by many as being synonymous with "fiber." It is important, however, to be aware of all the many broadband transmission technologies that are available to provide connectivity solutions.

Public Switched Telephone Network (PSTN)

The legacy PSTN that has been providing basic voice telephone service for decades may be reaching the end of its life. The network infrastructure which includes twisted pair copper wires into most of Oregon's homes and businesses continues to serve hundreds of thousands of customers, though, there is a strong and accelerating trend of customers migrating to competitive wireless and broadband technologies for voice service. The infrastructure continues to be a valuable asset, however, as new digital technologies enable it to deliver broadband services.

The current Federal Communications Commission (FCC) Chair, Tom Wheeler, has expressed his interest in shifting the nation's telecommunications capital investment away from legacy networks that are declining in use to the broadband networks needed to support current needs and applications using the new technologies needed to keep America competitive in a global economy. The FCC has made significant revisions to the Universal Service Fund and inter-carrier compensation rules and is refocusing its programs on the funding of broadband infrastructure.

The National Telecommunications Cooperative Association (NTCA) reported that 69% of small telephone companies have postponed or canceled plans to upgrade their landline communications networks due to uncertainty about their revenues following these major revisions. Small rural telephone companies have seen profit margins decrease by 3% between 2012 and 2013. Independent telephone companies have seen the same customer migration trends and are increasingly reliant on revenues from non-regulated services such as broadband Internet access [Telecompetitor 7/30/14].

Cable
Cable providers continue to upgrade their fiber and coaxial cable networks increasing their transmission capacity. They are currently leading in market share for wireline broadband Internet access services. The National Cable & Telecommunications Association (NCTA) introduced a name for the industry's next generation of broadband services, *Gigasphere*. It is anticipated that the new technology, *Data Over Cable Service Interface Specification (DOCSIS) 3.1*, will be deployed by cable companies in 2015 and will support gigabit speeds [Telecompetitor, 5/1/14].

Mobile Wireless
Mobile wireless is a rapidly growing telecommunications industry sector. Oregon's mobile wireless service providers have been aggressively investing in upgrading their networks to deliver *Fourth Generation* (4G) services to their customers who are in turn rapidly adopting smart phones, tablet computers and other mobile wireless devices to meet their personal and professional needs. A sense of the scale of the growth in this sector may be found in the Gartner Group's report that shipments of PCs, tablets, mobile phones and ultra-mobile devices will rise 7.6% in 2014, reaching 2.5 billion units worldwide [Telecompetitor, 1/17/14].

From 2010 through 2013, AT&T, alone, invested over $400 million in its wireless network in Oregon. The investment resulted in the expansion of 4G Long Term Evolution (LTE) services to Oregon communities including Astoria, Baker City, Burns, Christmas Valley, Elgin, Enterprise, Halfway, John Day, Mount Vernon, Ontario, Paisley, Pilot Rock, Prairie City, Riley, Ontario, Salem, Seaside, Silver Lake, Sumpter, Tillamook, and Wallowa and other network upgrades as a part of AT&T's Project Velocity IP, an investment plan to expand and enhance AT&T's IP broadband networks [IT News Online, 2013 / Sacramento Bee, 2013].

The 4G LTE wireless network expansion has also resulted in significant fiber optic infrastructure deployments that are needed to provide "back-haul" of wireless voice and data traffic to wireline networks and the Internet.

Fixed Wireless
Fixed wireless technologies are being used to provide primary service as well as to provide secondary physically diverse paths to traditional landline broadband services for redundancy. Fixed wireless solutions can deliver broadband where fiber and other alternatives are cost prohibitive to build or cannot reach. Freewire Broadband is an Oregon-owned and managed company founded in 2005, and is one of the largest fixed wireless broadband providers in the Pacific Northwest www.gofreewire.com.

Satellite
Satellite broadband services continue to improve and provide an alternative to terrestrial service providers. Satellite providers are now delivering download speeds of up to 20 Mbps. Hughes Network Systems recently announced that it now has over one million broadband Internet access users in North America.

Optic Fiber
As noted, extensive fiber builds have been ongoing in Oregon driven by the expansion of 4G networks and the customer migration to broadband and wireless services. Optic fiber is a preferred transmission medium because it is virtually unlimited in its data carrying capacity, limited only by the equipment connected to it.

Another driver for fiber deployment is the increasing interest in the concept of the *gigabit city*. Former FCC Chair Julius Genachowski issued a challenge for every state to have at least one gigabit city by 2015. By the end of 2014, Oregon will have at least five; Canby, Independence, Monmouth, Portland and Sandy.

In addition to CenturyLink's 2014 roll-out of symmetrical Gigabit Internet access services in Portland, Google fiber is currently exploring the deployment of a fiber-to-the-premises (FTTP) network to serve areas of Portland and possibly including the Cities of Beaverton, Hillsboro, Gresham, Lake Oswego and Tigard.

The Fiber to the Home (FTTH) Council Americas has released the results of a survey on the usage and impact of FTTH networks in North America and has noted several trends and findings.

Major trends:

- The importance of broadband to the consumer lifestyle increases with each passing year
- End-to-end fiber optic networks are becoming more and more differentiated from other types of broadband in terms of performance, use, and perception

Major findings:

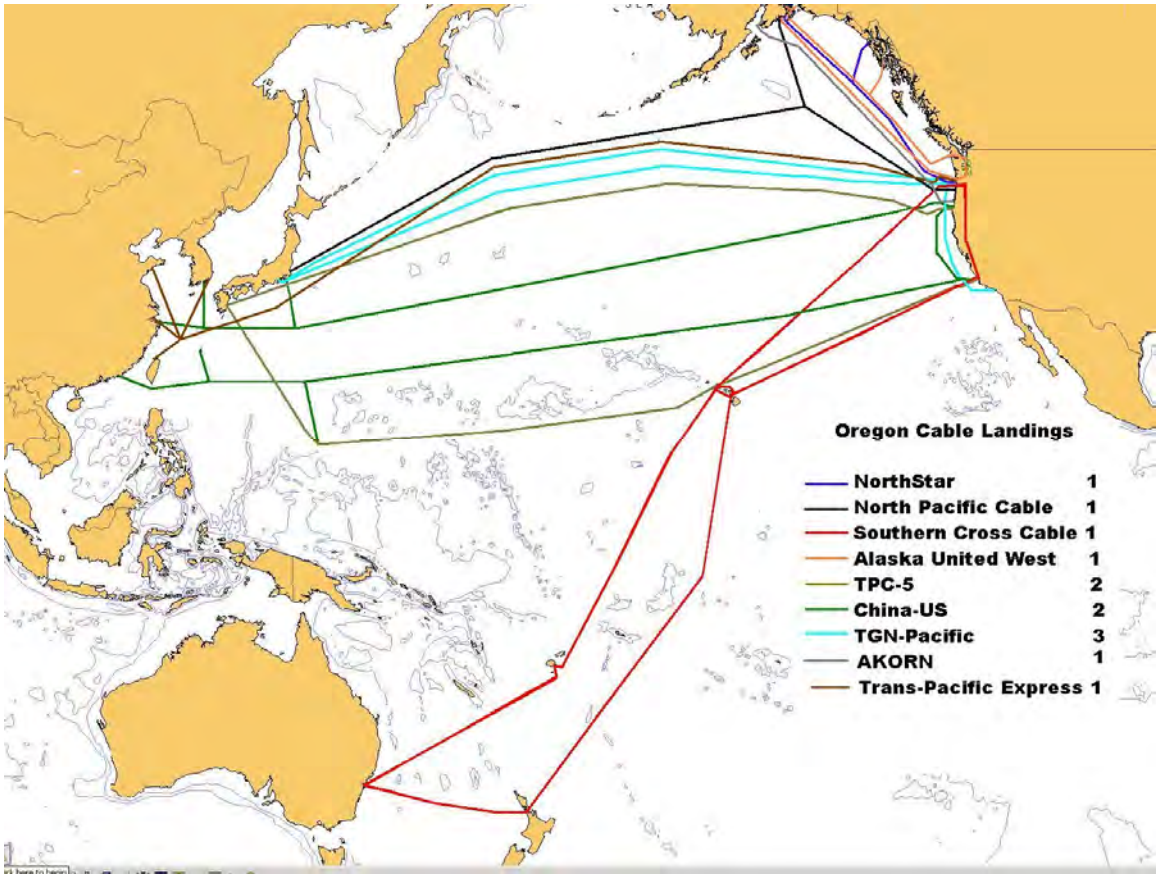
- More people have fiber, and more providers are offering faster speeds
- The need for faster broadband at home continues to grow
- Satisfaction rates are far higher for FTTH than all other types of broadband
- Fiber optic Internet acces is changing lifestyles
- FTTH consumers are far more productive
- FTTH users work from home more often and enjoy a home-value-premium of over $5,000 versus other types of broadband.

The report may be found at www.ftthcouncil.org.

New Frontier fiber-based services
Frontier Communications has introduced a new 10 Gigabit wavelength service to business locations in local markets in 25 states including Oregon. Frontier will deploy fiber to buildings for customers that order its *Frontier Optical Transport Service* and do not already have fiber connectivity.
http://www.telecompetitor.com/frontier-will-install-fiber-support-new-wavelength-service/

Undersea Fiber

Oregon's fiber network infrastructure extends into the Pacific Ocean. There are twelve in-service undersea fiber optic cables coming ashore in Oregon with additional cable projects in the planning stages that will connect to Australia, New Zealand, China, and Japan.



Oregon Cable Landings

Hawaiki Cable Limited secures US landing site in Oregon

Hawaiki, the New Zealand owner and developer of Hawaiki submarine cable system, will land its proposed 14,000 km trans-Pacific cable in Pacific City, Oregon. The company signed contracts with U.S. providers Tillamook Lightwave and CoastCom to deliver infrastructure and connectivity, including a cable landing station, and cable to Hillsboro for interconnection with U.S. carriers. Hawaiki's cable system will link Australia, New Zealand and Hawaii to the U.S. West Coast and is scheduled for completion in late 2015.

New Cross Pacific Cable Project

New Cross Pacific [NCP] Cable System parties announced that a Memorandum of Understanding has been signed between Chunghwa Telecom Co., Ltd (CHT), KT Corporation (KT), China Telecom (CT), China Mobile (CM), China Unicom (CU) and a U.S. based company

for the construction of the New Cross Pacific (NCP) Cable System. Operated by a consortium of telecommunications and technology companies, the NCP shall be built as a high capacity fiber-optic submarine cable system across the Pacific Ocean directly connecting the U.S. and Asia with landings in China, Korea, Taiwan, Japan and the U.S. The NCP system shall be equipped with multiple fiber pairs employing next generation subsea and transmission technologies to satisfy the escalating bandwidth demands from emerging new applications and broadband mobile services. The target ready-for-service date in the fourth quarter of 2015. NCP will be designed to interconnect with other cable systems in the region to maximize the resilience of the trans-Pacific transmission infrastructure. http://subtelforum.com/articles/new-cross-pacific-cable-system-announced/

Faster

A $300 million project called "Faster" plans to lay 5,000 miles of cable from the U.S. West Coast to Japan to interconnect with local cable systems already in place in the U.S. and Japan**.** On the U.S. side, the cable will connect networks in Los Angeles, San Francisco, Portland, and Seattle. http://www.dailymail.co.uk/sciencetech/article-2722776/Google-backs-300-million-cable-project-lay-5-000-miles-superfast-broadband-Pacific-Ocean.html#ixzz3Amisu2Je

TGN-Pacific Cable upgraded

Tata Communications announced the launch of a 100 gigabits per second upgrade along the TGN-Pacific (TGN-P) submarine cable system that connects the U.S. to Japan. With this latest in a series of investments, Tata Communications becomes the only private subsea cable owner that has 100G deployed across major routes around the world on its own infrastructure. The cable comes ashore in Oregon and connects to Hillsboro.
http://www.marketwatch.com/story/tata-communications-brings-100g-connectivity-to-carrier-and-enterprise-customers-from-the-us-to-asia-with-cienas-geomesh-2014-01-22?reflink=MW_news_stmp

Undersea telecommunications cables and their interconnections add valuable telecommunications infrastructure to the state. Undersea fiber cables bring millisecond connectivity between Oregon and the Pacific Rim, Oregon permitting and easement fee revenue, contract work for the fishing fleet, and the potential of long-term jobs to manage and maintain related on-shore operations.

Industry Structure

Oregon is served by a broad mix of franchised telephone companies, cable companies, competitive access providers, fixed and mobile wireless companies, satellite service providers and publicly owned telecommunications networks. The industry continues to display a general trend toward consolidation through acquisitions and mergers. Current proposed acquisitions and mergers include the following.

Comcast and Time Warner

A merger between the nation's largest and second largest cable companies has been proposed and is being considered by the FCC. The proposed deal includes a trade of service territories with Charter Communications which would then become the nation's second largest cable company. If approved, the plan is for all of Charter's service territories in Oregon to be transferred to Comcast in exchange for other Comcast territories in the Mid-West. Given regulatory approval, Comcast expects the $45.2 billion acquisition to be completed in 2015.

AT&T and DirecTV

AT&T announced its plan to acquire DirecTV. Both companies have infrastructure in Oregon. AT&T already markets DirecTV's satellite video service to customers as a supplement to AT&T's own fiber-based U-verse video offering, which is only available to a portion of the company's customers. If the purchase receives regulatory approvals, AT&T and DirecTV expect to merge in 2015.
http://www.telecompetitor.com/att-to-buy-directv-would-expand-broadband-outside-home-turf/

TDS and BendBroadband

In 2014, Telephone and Data Systems Inc. (TDS), a Chicago-based, a Fortune 500 telecommunications company, purchased BendBroadband and its affiliates for $261 million. BendBroadband's employees retained their jobs after the sale, and the company continues to operate as BendBroadband.

BendBroadband provides Internet access, cable television, telephone and other services in Central Oregon. It operates a data center through its affiliate, BendBroadband Vault, and cable advertising and broadcast services through Zolo Media. Both operations were included in the sale to TDS. The company has approximately 280 employees, 79,000 home and business connections, 36,000 video subscribers, 41,000 high-speed broadband subscribers and 22,000 digital voice subscribers.
http://www.bendbulletin.com/localstate/2038685-151/bendbroadband-to-be-sold#

Level3 Communications and tw telecom

Level3 Communications plans to acquire tw telecom. Both companies have infrastructure in Oregon. Level 3 has a global presence and a significant undersea cable network, while tw

telecom has a presence in North American metropolitan areas. The combined companies are expected to improve network quality and coverage and improve its competitiveness in Ethernet services. If approved the acquisition should be completed in 2015.

Other industry proposed mergers, including AT&T and T-Mobile, and Sprint and T-Mobile, failed over the past two years due to resistance by the FCC.

Technology Migration

TDM to IP

The convergence of multiple IP-based services on a single network "creates extraordinary opportunities to improve American life and benefit [American] consumers."[1] At the same time, this convergence "has a significant impact on the legacy Public Switched Telephone Network (PSTN), a system that has provided, and continues to provide, essential services to the American people."[2] The convergence involves replacing traditional telephone network Time Division Multiplexing (TDM) technology with Internet Protocol (IP) technology. And while the TDM to IP transition has begun, the industry is, as a whole, still in the early stages of this transition. Unlike previous network transitions that were driven by regulatory mandates because of a monopoly position, there is no incumbent monopoly in the IP world, and the driving forces behind the transition to an all IP network are consumer demand and technology changes.

End users are changing the way they communicate. Consumers and businesses alike are demanding convergence, mobility and multi-media. Today, "communications" is more than just voice service. It can include a video stream; it can be an image or a text message. And consumers, presented with many service provider choices, are migrating to non-traditional providers for these services. Skype celebrated ten years in service with an announcement that 70 million people used the online service simultaneously to communicate. Skype has 500 million registered users. In a SEC filing last year, AT&T and Verizon stated they had 13.9 and 7.2 million retail consumer access lines, respectively. In other words, Skype had triple the number of users *at one time* as AT&T and Verizon have total "Plain Old Telephone Service" (POTS) voice customers. In Oregon, only approximately 20% of POTS customers are connected to the incumbent wireline network.

Technology change is also driving this transformation. Time Division Multiplexing (TDM) is a multiplexing technology in which two or more signals are transmitted over a single circuit by taking turns in individual time slots created on that circuit. This is the traditional network technology of the legacy PSTN. Despite their continuing utility, TDM networks are increasingly becoming obsolete, with equipment and software for the TDM-based voice services sometimes being discontinued or no longer manufacturer supported. Incumbent Local Exchange Carriers (ILECs), in particular, face the costly and daunting task of migrating from TDM networks and systems that were developed over decades to IP. Complete migration to IP will require

[1] National Broadband Plan at 59.
[2] National Broadband Plan at 59.

replacement of circuit switches with packet switches, extension of IP functionality throughout the network and modification of countless systems. In addition, significant work is necessary and is underway within the industry to develop standards and practices for handling the traffic that will flow over the new IP networks.

This historic network technology transformation has implications for regulation. In establishing the regulatory framework for next-generation IP networks and services, terminolgy and jurisdictional divisions associated with the legacy hub-and-spoke TDM network such as "local" and "long-distance" do not apply in an IP world. IP traffic is "all distance," and is, as a result, free of traditional Local Access and Transport Area (LATA) boundaries or state jurisdictional concepts. States can, and will likely, still play a key role in consumer protection and public safety issues as they arise in an all IP environment. States can facilitate the transition to an all IP network by allowing providers to transition to the IP network by minimizing regulatory barriers. The all-distance structure of an IP network means a fundamental change in regulatory roles and oversight will be needed to foster investment and deployment of IP-based networks and their associated benefits for consumers. Regulation should be guided by three core principles: (1) regulatory obligations should apply in the same manner to all IP providers; (2) no regulation should be applied in an all-IP world unless it is shown to be useful and necessary, based on real world experience; and (3) the FCC should establish flexible guidelines for the transition to IP, rather than one-size-fits-all standards and deadlines. Such a framework is similar to the FCC's regulation of interconnected VoIP services and is particularly critical in high-cost, rural areas, where regulatory costs can significantly impact business cases for transition from TDM to IP. OBAC will follow carefully FCC and OPUC regulatory proceedings in this area.

In January, 2014 the FCC issued an Order to "kick start the process for a diverse set of experiments…that will allow the commission and the public to evaluate how customers are affected by the historic technology transitions that are transforming our nation's voice communications services."[3] Through this proceeding, the FCC invited interested providers to submit voluntary, service-based experiments. The service experiments are to examine "the impacts of replacing existing customer services with IP-based alternatives in discrete geographic areas."[4] The proposals outlining the service experiments were filed before March 2015. Fifteen Rural Broadband Experiments Expressions of Interest were submitted to the FCC for Oregon projects. The FCC will seek comment on each proposal submitted and has committed to a "speedy review" of each proposal. The FCC believes the data generated by these experiments will help guide the FCC as it makes legal and policy choices to encourage the technology transition while at the same time ensuring that the values of the "Network Compact," public safety, universal access, consumer protection, and competition, are preserved.

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[3] Order, Report and Order and Further Notice of Proposed Rulemaking, FCC Order 14-5, *In the Matter of Technology Transitions, AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition, Connect America Fund, Structure and Practices of the Video Relay Service Program, Telecommunications Relay Services and Speech-to-Speech Services for Individuals with hearing and Speech Disabilities, Number Policies for Modern Communications,* Released January 31, 2014, at 3.

[4] Id at p.4, paragraph 5

Copper to Fiber

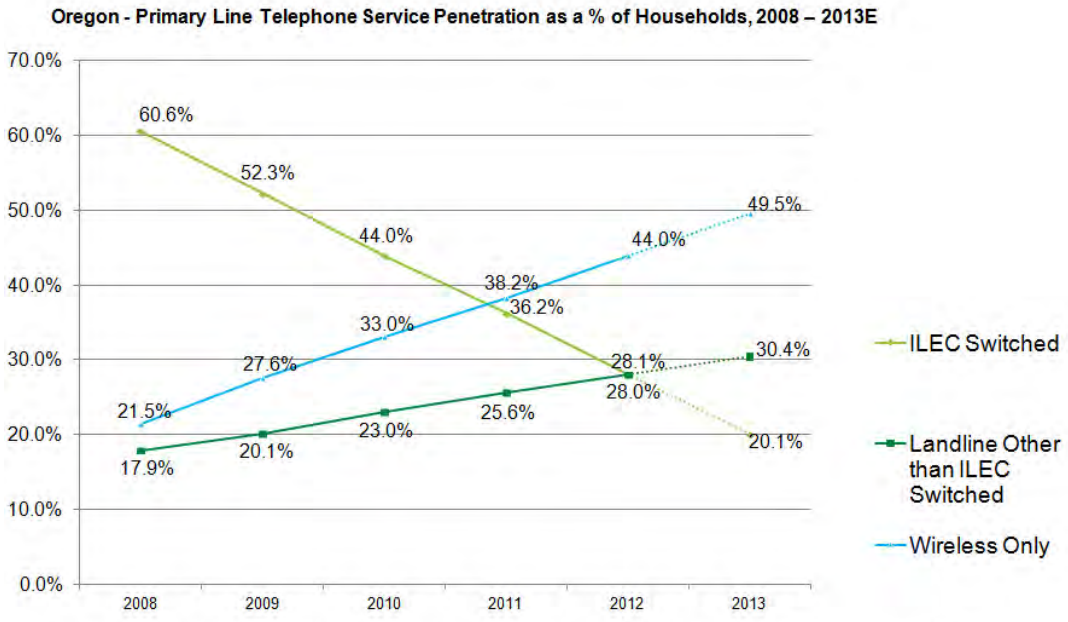
As previously noted, the legacy twisted-pair copper distribution network remains in place as an extensive infrastructure asset of franchised telephone companies. Digital Subscriber Line (DSL) technologies have extended the useful life of these facilities by enabling them to deliver broadband services.

Recently Bell Laboratories, the research and development arm of Alcatel-Lucent, announced a new speed record for the transmission of data over copper lines of 10 Gbps (10,000 Mbps). The experiment was in a lab setting, using the prototype "G.Fast" technology. G.Fast is being finalized as an International Telecommunications Union (ITU) standard, and should start becoming commercially available sometime in 2015. The 10 Gbps over copper experiment used two bonded copper pairs with an expanded frequency range of 500 MHz. The transmission was over a very short distance of 30 meters (approximately 100 feet).

Another result from this Bell Labs experiment is the achievement of symmetrical 1 Gbps transmission over copper lines. Bell Labs also achieved 1 Gbps symmetrical over 70 meters (approximately 230 feet) on a single copper pair in a lab setting. Indications are that copper will continue to play a role in distribution networks in the future enabled and enhanced by new technologies. Replacing copper based customer drops with fiber is currently one of the most expensive components of a Gigabit network deployment. [Telecompetitor, 7/9/14]

Wireline to Wireless

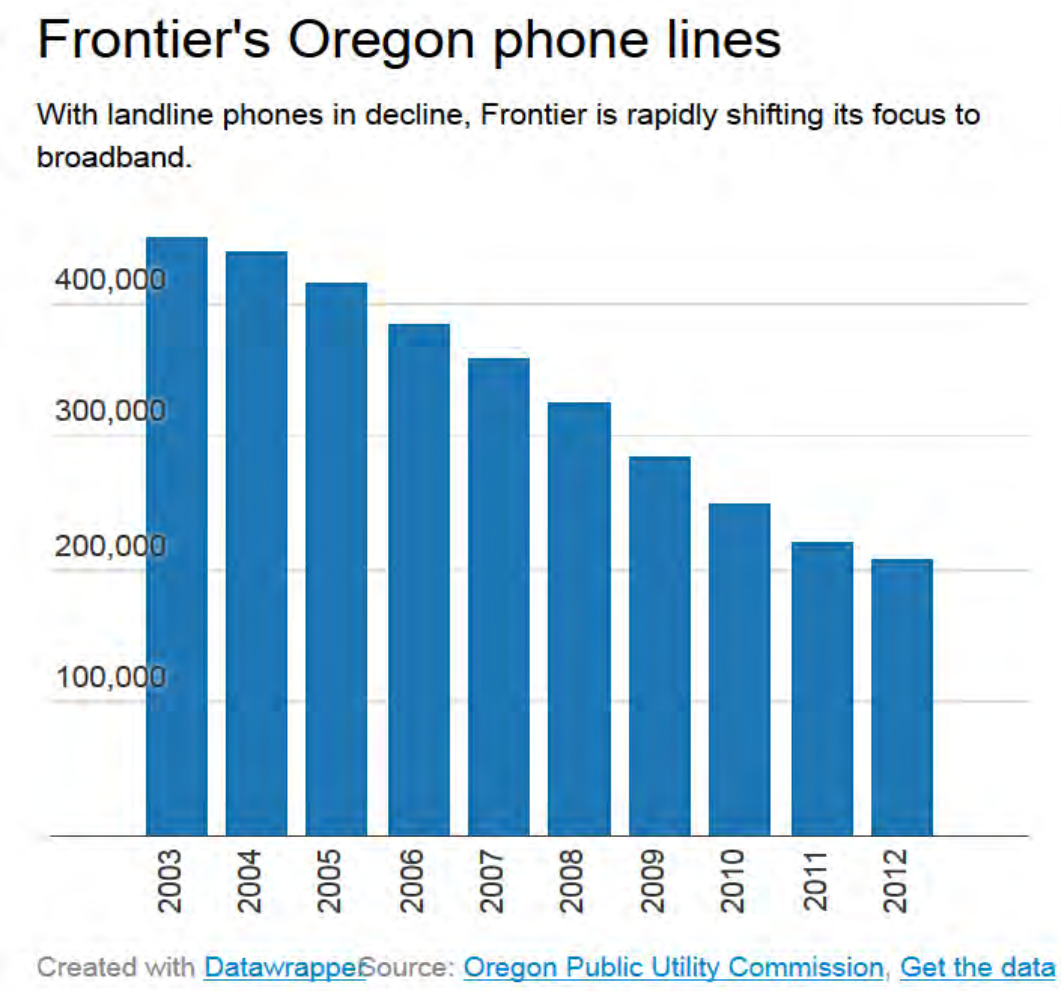
According to a report released by the FCC in November 2013, there were 304 million retail mobile telephony subscriptions, 96 million switched access lines and 41million interconnected VoIP subscriptions.



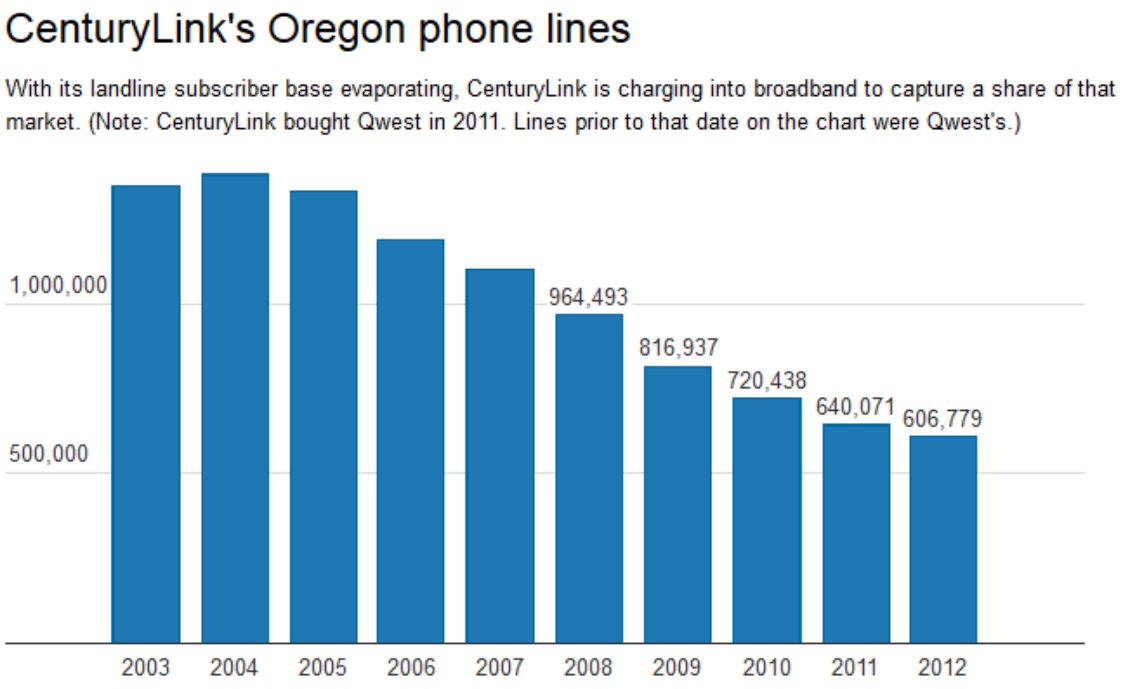
Source: U.S. Census Bureau 1990, 2000 & 2010, FCC Local Competition Report for Jan 2008-June 2012, CDC National Health Statistics Report "Wireless Substitution: State Level Estimates from the National Health Interview Survey 2007-2011 (Adults Aged 18 and Over)

The trend of migrating away from legacy analog voice landline services to digital broadband and wireless technologies delivering voice, video and data services remains strong and is accelerating. The FCC Wireline Competition Bureau issued a report on wireline / landline local broadband access. Currently, nationwide, cable is the market leader with 57 million Internet subscriptions followed by DSL with 32 million and fiber to the premises at 7 million. Broadband subscribers have been migrating away from traditional landline telephone services. Over the past eleven years basic telephone service subscribers have dropped from 190 million to 90 million. The report may be viewed at https://apps.fcc.gov/edocs_public/attachmatch/DOC-327830A1.pdf

This marked trend is evident in Oregon. Frontier Communications is the nation's fourth-largest local phone company, with about 500 employees in Oregon. Frontier's Oregon service territory includes Beaverton, Forest Grove, Hillsboro, Lake Oswego, Tigard, Tualatin, Gresham and many rural communities in central, eastern and coastal Oregon. Frontier has experienced this trend with a dramatic drop in subscriptions from 2003 to 2012.



Similarly, CenturyLink, Oregon's largest telephone company, has also experienced customer migration away from basic landline telephone service over the same period.



www.oregonlive.com/siliconforest/index.ssf/2014/08/centurylink_will_challenge_goo.html

Internet of Things

According to a report from the McKinsey Global Institute, the Internet of Things (IoT) refers to the use of sensors, actuators, and data communications technology built into physical objects – from roadways to pacemakers – that enable those objects to be tracked, coordinated, or controlled across a data network or the Internet. McKinsey estimates that the Internet of Things has the potential to create the economic impact of $2.7 trillion to $6.2 trillion annually by 2025. The largest impacts are expected to be within the healthcare and manufacturing sectors. In the healthcare sector alone, it is estimated that IoT technologies could have an economic impact of $1.1 trillion to $2.5 trillion per year by 2025.

Gartner Research forecasts that the growth in IoT will far exceed that of other connected devices. By 2020, the number of smartphones tablets and PCs in use will reach about 7.3 billion units," said Peter Middleton, research director at Gartner. "In contrast, the IoT will expand at a much faster rate, resulting in a population of about 26 billion units by 2020." In 2014, households had on average 3.6 Internet connected devices; by 2020 it is expected the average household will have 20 connected devices.

By thinking of IoT in waves, wave one was the introduction of networked consumer electronics including TV's, smart phones, tablets, PC's, game consoles, cameras and other consumer household electronics. The second wave will be the proliferation of networked industry applications, such as streaming video, automotive, energy, freight transportation and healthcare. A significant transformation is underway whereby business-to-business and business-to-consumer interactions become much more personalized. Early implementation includes further enhancement in smart cities (lighting, water management, monitoring, public safety and traffic control), smart health (people monitoring, bio sensors, probes and real time health updates that can be shared with health providers) and others related to concepts such as smart planet, smart industry and smart transport. The third wave will be the concept of networked everything and a networked society. "Anything that can benefit from being connected, will be connected" [Ericsson White Paper 2011].

McKinsey's research report, *Disruptive Technologies* May 2013 identified twelve potentially economically disruptive technologies including mobile internet, automation of knowledge work, the internet of things, cloud technology, advanced robotics, autonomous vehicles, next-generation genomics, energy storage, 3d printing, advanced materials, advanced oil and gas exploration, and renewable energy. The report may be found at http://www.mckinsey.com/insights/business_technology/disruptive_technologies.

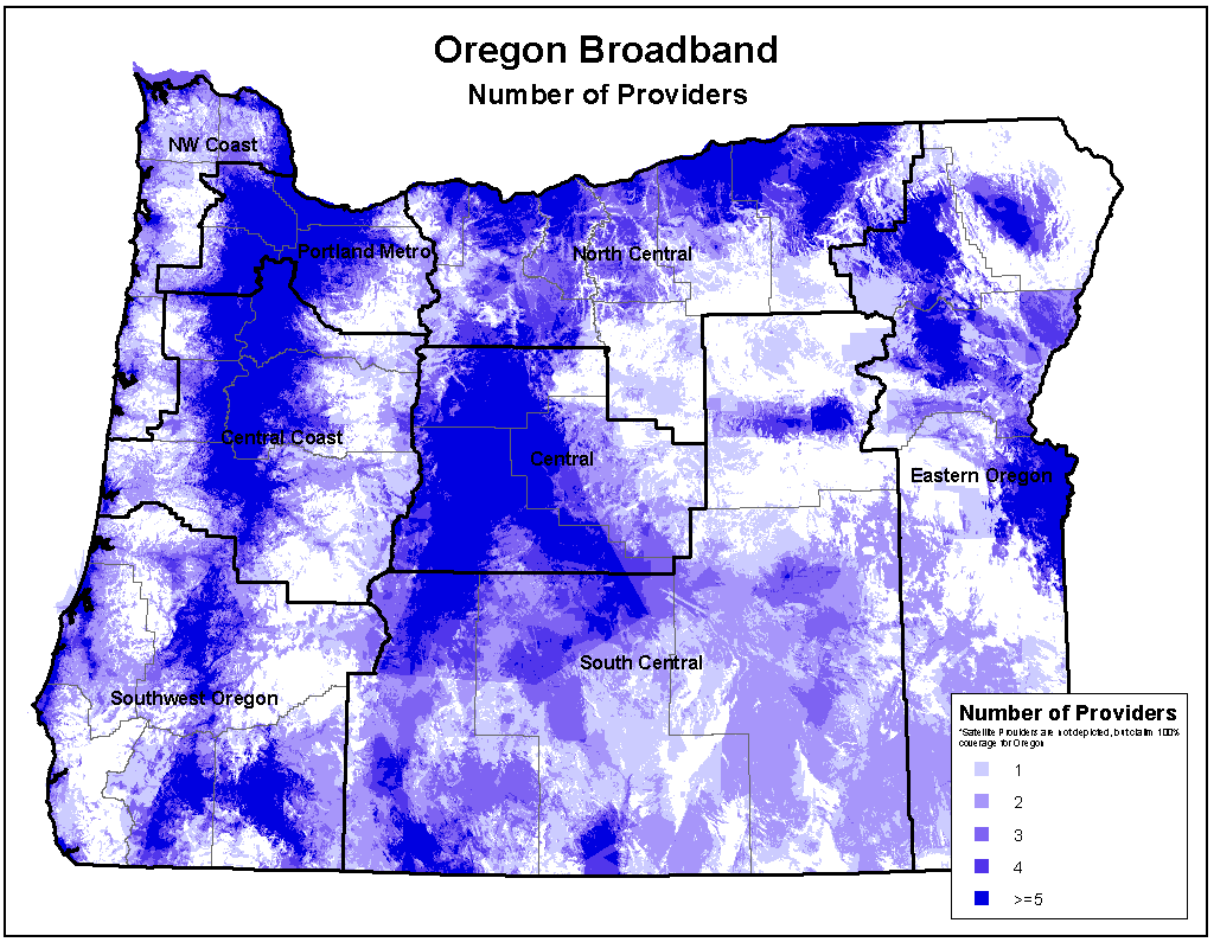
Moving to the Cloud

Another key market trend is the continuing migration of applications to the network, or "Cloud." Users are increasingly hosting their applications on servers in data centers or co-locating their own servers in data centers rather than on their own premises. Cloud based applications can provide greater flexibility, scalability, security, and cost effectiveness.

Oregon's robust telecommunications infrastructure, low cost electricity, moderate climate, favorable seismic profile, and no-sales tax environment have made Oregon an attractive location for data centers including high profile installations such as Amazon.com, Google, Facebook, and Apple.

Broadband Accessibility in Oregon

Broadband services are widely available at competitive prices throughout the state.



This 2014 map was produced on the Oregon Broadband Mapping Project website www.broadband.oregon.gov and shows increases from 2012. Users of the site may produce maps showing service availability, technology, and providers statewide and by region, county, city, tribal lands and specific addresses.

The 2014 Oregon Broadband Survey conducted by the Oregon Business Development Department with the support of OBAC places broadband access in Oregon homes at 82% as compared to 80% nationally, though there are significant variations in rates of adoption across different regions and demographic groups in the state.

The National Telecommunications and Information Administration issued a report on broadband in the U.S. presenting data on broadband availability by speed, by technology, by state, and by county. NTIA reported that rural areas continue to lag behind and metropolitan areas. Nearly 100% of urban residents have access to download speeds of at least 6 Mbps but only 82% of

rural communities have access to these speeds. 88% of urban residents have access to speeds of 25 Mbps, only 41% of rural residents have the same access.

Oregon outperforms the nationwide statistics in the report. Oregon is ranked 9th in the nation for percentage of population that have broadband service available at greater than or equal to 25 Mbps. Oregon is ranked 9th in the nation for percentage of population that have broadband service available at greater than or equal to 50 Mbps. Oregon also ranks highly in access to broadband in its rural communities relative to the rest of the country. The NTIA report may be viewed at http://www.ntia.doc.gov/files/ntia/publications/usbb_avail_report_05102013.pdf.

Broadband Affordability in Oregon

Broadband services are available in Oregon at competitive price points, though prices vary by service area.

Broadband Providers in Oregon

The following is a list of facility-based broadband providers that have supplied data for the Oregon Broadband Map. An asterisk before the Provider Name indicates that they are 'business-only' broadband Internet service providers.

Provider Name	*URL*
Alyrica	http://www.alyrica.net
Applegate Broadband LLC	http://www.applegatebroadband.net/
Ashland Fiber Network	http://www.ashlandfiber.net
AT&T Mobility LLC	http://www.att.com
*Axxis Communications	http://www.axxistel.com
Beaver Creek Telephone Company	http://www.bctelco.com
BendBroadband	http://www.bendbroadband.com
Blue Mountain Cable Co.	http://www.bmtvcable.com
Cableone	http://www.cableone.net
Cal-Ore Communications Inc.	http://www.cot.net
Canby Telcom	http://www.canbytel.com
Cascade Networks, Inc.	http://www.cascadenetworks.net
Cavenet	http://www.cavenet.com/
CenturyLink	http://www.centurylink.com
Charter Communications Inc.	http://www.charter-business.com/fiber-internet.aspx
City of Cascade-Locks	http://www.cascade-locks.or.us
Clear Creek Mutual Telephone Company	http://www.ccmtc.com

CoastCom, Inc	http://www.coastcom.net
Cogent Communications Group	http://www.cogentco.com
Coltontel	http://www.coltontel.com
Comcast	http://www.comcast.com
Communications Access Cooperative Holding Enterprise	http://hrec.coop/internet/index.htm
Community Broadband	http://communitybroadband.com
Comspan Communications Company	http://www.comspancomm.com/en
Cottage Grove WiFi	http://www.cgwifi.net
Country Vision Cable	http://www.countryvisioncable.com/
Crestview Cable	http://www.crestviewcable.net
Cricket Communications, Inc.	http://www.mycricket.com
Datavision Communications	http://www.dvcom.biz/home.html
DC Wireless	http://www.dcwisp.net
Douglas FastNet	http://www.dfn.net
Eagle Telephone Systems, Inc.	http://www.eagletelephone.com
*Earthlink, Inc.	http://www.earthlinkbusiness.com
Eastern Oregon Net, Inc.	http://www.eoni.com
Eastern Oregon Telecom	http://www.eotnet.net
*EasyStreet Online	http://easystreet.com
Elgin TV Association	http://elgin.elgintv.com
Fibersphere	http://fibersphere.net
FireServe	http://www.fireserve.com
*Freewire Broadband LLC	http://www.gofreewire.com
Frontier Communications of Oregon	http://www.frontier.com
FTX Networks LLC	http://wwwftxnetworks.com
Gervais Telephone Company	http://www.gervaistel.com
Gorge Networks	http://new.gorge.net
Helix Telephone Company	http://www.helixtel.com
HughesNet	http://www.hughesnet.com
Hunter Communications, Inc.	http://www.hunterfiber.com
*Infostructure	http://infostructure.net
*Integra Telecom	http://www.integratelecom.com
Ispeed Wireless	http://www.ispeedwireless.com/index.cfm?
J & N Cable Systems, Inc.	http://www.jncable.net
*Level 3 Communications, LLC	http://www.level3.com
*LS Networks	http://www.lsnetworks.net

M2 MachMedia	http://machmedia.net
Megapath Corporation	http://www.megapath.com
MINET	http://www.minetfiber.com
Molalla Communications Company	http://molalla.net
Monitor Cooperative Telephone Company	http://monitorcoop.com
Monroe Telephone	http://www.monroetel.com/
Mount Angel Telephone Company	http://www.mtangel.net
MTE Communications	http://www.ruralnetwork.net
Nehalem Telecommunications Inc.	http://ww2.nehalemtel.net
North-State Telephone Co.	http://www.ortelco.net/nstc/index.html
OneWave Networks	http://www.onewavenetworks.com/boise/index.html
OnlineNW	http://www.onlinenw.com
*ORCA Communications	http://www.orcacomm.com
Oregon Telephone Corporation	http://www.ortelco.net
OregonFast.net	http://www.oregonfast.net
Oregon-Idaho Utilities, Inc.	http://www.oiutelecom.net
Outreach Internet	http://www.outreachinternet.com/
PEAK Internet	http://www.casco.net/communications/
Pendleton Fiber Company	http://wtechlink.com
Peoples Telephone Company	http://www.sctcweb.com/PTC/index.php
Pine Telephone Systems, Inc.	http://www.pinetel.com
Pioneer Telephone Cooperative	http://www.pioneer.net
PocketiNet Communications Inc	http://www.pocketinet.com
Prinetime Internet Solutions, LLC	http://www.prinetime.com
QualityLife Intergovernmental Agency	http://www.qlife.net/
*Quantum Communications	http://www.quantum-networks.net/
Reliance Connects	http://www.relianceconnects.com/
Roome Telecommunications Inc.	http://www.rtinet.com/
Rural Technology Group, LLC	http://www.ruraltechnologygroup.com
Safelink Internet Services	http://www.safelink.net
SandyNet	http://www.ci.sandy.or.us/
SawNet	http://www.saw.net/
Scio Mutual Telephone	http://www.smt-net.com
SCS Communications	http://www.sctcweb.com/SCS/index.php
Silver Star Telecom LLC	http://www.silverstartelecom.com
Siuslaw Broadband	http://siuslawbroadband.com

Skycasters	http://www.skycasters.com
Snake River PCS	http://www.snakeriverpcs.com/
SpeedyQuick Networks	http://speedyquick.net
Sprint	http://www.sprint.com
St Paul Telephone	http://www.stpaultel.com/
StarBand Communications	http://www.starband.com/
Stayton Cooperative Telephone Company	http://www.sctcweb.com/SCTC/index.php
Stephouse Networks	http://www.stephouse.net/
TDS Telecom	http://www.tdstelecom.com/
T-Mobile USA, Inc.	http://www.t-mobile.com
Tnet Broadband	http://tnet.biz/index.php
*TW Telecom of Oregon LLC	http://www.twtelecom.com/
United States Cellular Corporation	http://www.uscellular.com
UnwiredWest LLC	http://www.unwiredwest.com
Upward Access	http://www.upwardaccess.com/
Verizon Wireless	http://www.verizonwireless.com/b2c/index.html
ViaSat Communications, Inc.	http://www.viasat.com
Wallowa Valley Networks	http://www.wallowavalley.net
Warm Springs Telecommunications Co.	http://www.warmspringstelecom.com
Wave Broadband	http://www.wavebroadband.com
Webformix Company	http://www.webformix.com/
Whiz To Coho, Inc.	http://whiz.to/
Wtechlink	http://wtechlink.com/
Yellowknife Wireless	http://www.ykwc.com
Zayo Group LLC	http://www.zayo.com

* Serves Business customers only.

A survey of facilities-based broadband service providers serving Oregon customers including broadband transmission rates and monthly service costs follows. Information was collected from service provider websites.

DSL Service Provider	Monthly Rate
Canby Telecom [www.canbytel.com] 1 Mbps upstream, 5 Mbps downstream (faster speeds available)	$39.95
CenturyLink [www.centurylink.com] Up to 12 Mbps downstream (faster speeds including 1Gbps available)	$29.95
Douglas FastNet [www.dfn.net] 1.5 Mbps upstream, 5 Mbps downstream DSL (speeds up to 40 Mbps available)	$39.99
Eagle Telephone System [www.eagletelephone.com] Up to 10 Mbps downstream	$54.51
Eastern Oregon Telecom [eotnet.com] 1 Mbps upstream, 1.5 Mbps downstream (speeds up to 20 Mbps available)	$34.90
Frontier Communications High Speed Internet [www.frontier.com] Up to 6 Mbps downstream (faster speeds available)	$34.99
Helix Telephone Company [www.helixtel.com] 3 Mbps downstream (faster speeds are available)	$32.00
Molalla Communications Company [www.mololla.com] 512 Kbps upstream, 3 Mbps downstream (faster speeds available)	$29.95
Monroe Telephone Company [www.monroetel.com] 512 Kbps upstream, 1.5 Mbps downstream (faster speeds available)	$34.95
Mt. Angel Telephone [www.mtangel.net] 1 Mbps upstream, 5 Mbps downstream (faster speeds available)	$39.95
Nehalem Telecommunications [www.nehalemtel.com] 384 Kbps upstream, 1 Mbps downstream (faster speeds available)	$29.95
Oregon Telephone Corporation [www.ortelco.net] Up to 512 Kbps downstream (faster speeds available)	$29.95
People's Telephone Company [http://ptc-web.com] 512 Kbps upstream, 1.5 Mbps downstream	$29.95
Pine Telephone Company [www.pinetel.com] Prices not posted 512 Kbps upstream, 1.5 Mbps downstream	

Pioneer Telephone Company [www.pioneertelephonecoop.com] Up to 3 Mbps downstream (faster speeds available)	$41.95
Scio Mutual Telephone [www.smt-net.com] 1 Mbps upstream, 6 Mbps downstream (faster speeds available)	$48.95
St Paul Cooperative Telephone Association [www.stpaultel.com] Up to 6 Mbps downstream Prices not posted	
Stayton Cooperative Telephone Company [www.sctcweb.com] 512 Kbps upstream, 1.5 Mbps downstream	$29.95
TDS Telecom [www.tdstelecom.com] (Business) 512 Kbps upstream, 1.5 Mbps downstream (faster speeds available)	$39.00

Cable Modem Service Provider	Monthly Rate
Bend Broadband [www.bendbroadband.com] 1.5 Mbps upstream, 15 Mbps downstream (faster speeds available)	$34.99
Charter Communications [www.charter.com] Up to 60 Mbps (faster speeds available)	$29.99
Comcast [www.comcast.com] Up to 25 Mbps (faster speeds available)	$29.99
Crestview Cable Communications [www.crestviewcable.com] 512 Kbps upstream, 1.5 Mbps downstream (faster speeds available)	$27.95
Wave Broadband [www.wavebroadband.com] 1 Mbps upstream, 5 Mbps downstream (faster speeds available)	$39.95

Mobile Wireless Internet Access (3G / 4G)	Monthly Rate
AT&T Wireless [www.ATTwireless.com] AT&T Beam Mobile Internet access (Multiple devices available)	$19.99
Verizon Wireless [www.verizonwireless.com] More Everything Plan 4G LTE Up to 5 Mbps upstream, Up to 12 Mbps downstream	$45.00
Sprint / Nextel [www.sprint.com] Sprint LivePro	$18.75

3G up to 2 Mbps downstream / 4G available in selected markets

Fixed Wireless Internet Access	Monthly Rate
Douglas Fastnet [www.dfn.net] 5 Mbps downstream (speeds up to 15 Mbps downstream available)	$39.99
Eastern Oregon Net, Inc. [www.eoni.com] 256 Kbps upstream, 2 Mbps downstream service (faster speeds available).	$29.95
Eastern Oregon Telecom [www.eotnet.net] 5 Mbps downstream (faster speeds available)	$49.90
FireServe Wireless Broadband [www.fireserve.com] Up to 20 Mbps downstream (faster speeds available)	$20.00
Freewire Broadband [www.freewirebroadband.com] (business) Prices not posted. Symmetrical Ethernet.	
Goose Lake Computing [www.gooselake.com] Up to 4.5 Mbps downstream service	$20.00
GorgeNet [www.gorge.net] Up to 5 Mbps downstream (Business) (faster speeds available)	$54.95
Oregon FAST.net [www.oregonfast.net] 5 to 10 Mbps downstream	$39.99
Rural Technology Group [www.ruraltechnologygroup.com] 2 Mbps Upstream, 2 Mbps Downstream (faster speeds available)	$29.95
SandyNet [www.sandynet.org] Up to 100 Mbps downstream In-city FTTH	$39.95
SawNet [www.saw.net] 1 Mbps upstream, 3 Mbps downstream (faster speeds available)	$35.00

Municipal / Consortia / Public-Private Partnership Providers	Monthly Rate
Ashland Fiber Network [www.ashlandfiber.net] 1 Mbps upstream, 6 Mbps downstream “AFN Choice” (faster speeds available)	$35.00
Eastern Oregon Telecom [www.eotnet.net] 1.4 Mbps upstream, 15 Mbps downstream (Speeds up to 20 Mbps available) (Faster speeds available)	$39.90

MINET (Monmouth-Independence Network) [www.minetfiber.com]
10 Mbps upstream, 20 Mbps downstream $41.00
(Faster speeds available)

Q-Life [qlife.net] Q-Life is a middle mile transport provider with independent ISPs providing end-user services. Prices not posted.

Facilities based Competitive Access Providers

CoastCom [www.coastcom.net]
Internet / Metro Ethernet Services / Prices not posted

Douglas FastNet [www.dfn.net]
20 Mbps downstream, 10 Mbps upstream (speeds up to 100 Mbps downstream,
20 Mbps upstream available via fiber optics) $49.99

Eastern Oregon Telecom [www.eotnet.com]
1 Mbps upstream, 1.5 Mbps downstream DSL (speeds up to 20 Mbps available) $34.90
10 Mbps symmetrical business class service (faster speeds available) $200.00

SandyNet [www.sandynetfiber.com]
1 Gbps synchronous $69.95

Other Competitive Providers	Monthly Rate
Cogent Communications [www.cogentco.com]	
DIA, IP Transit, Ethernet, Colocation services	Prices not posted
FTX Networks [ftxnetworks.com]	
Fiber Optic based services	Prices not posted
Integra Telecom [www.integratelecom.com]	
Data Networking and Internet, Colocation	Prices not posted

Western Independent Networks [www.win-networks.com] Prices not posted
Point-to-Point Special Access / Ethernet Transport / Internet Backbone Access

Satellite Internet Access	Monthly Rate
HughesNet [www.hughesnet.com]	$49.99
1 Mbps upstream, 5 Mbps downstream (faster speeds available)	

ViaSat - WildBlue [www.wildblue.com] $49.99
3 Mbps upstream, 12 Mbps downstream (faster speeds available)

Starband [www.starband.com] $99.99
Up to 1.5 Mbps downstream

SkyCasters [www.skycasters.com] $149.00
768 Kbps upstream, 5 Mbps downstream

The Monthly Rates listed above are mostly for base level services. It should be noted that bundled services and ongoing promotional discounted pricing is also widely available from service providers.

Though prices for broadband services in Oregon are competitive with other states, cost continues to be a barrier to adoption for many Oregonians.

Special Pricing Programs
Several providers have participated in offering special pricing to address the cost barrier for broadband adoption in disadvantaged segments of the population.

The Connect2Compete program offers affordable Internet and devices to K-12 students and families that qualify for benefits under the National School Lunch Program. Eligible customers receive broadband Internet access services for as low as $9.95 per month (plus tax). Examples of these special programs include the following.

BendBroadband
BendBroadband partnered with Boys & Girls Clubs of Central Oregon to implement a digital literacy outreach program for the 2012-2013 school year modeled on Connect2Compete. Eligible families were able to receive high speed Internet for $9.95 for 2 years together with a free modem and professional installation. Families were also able to purchase a refurbished computer for $150.

CenturyLink
CenturyLink's Internet Basics Program provides 1.5 Mbps Internet access to qualifying families for $9.95 (plus tax) per month for twelve months. Qualifying families may also purchase a computer for $150 plus shipping and handling at initial enrollment and receive free Internet training in person or in print. More information is available at http://www.centurylink.com/home/internetbasics/.

Comcast
Comcast's Internet Essentials program offers broadband Internet service to qualifying families for $9.95 a month + tax with no activation fees and no equipment rental fees. An optional computer is available at initial enrollment for just $149.99 + tax. The program also offers access

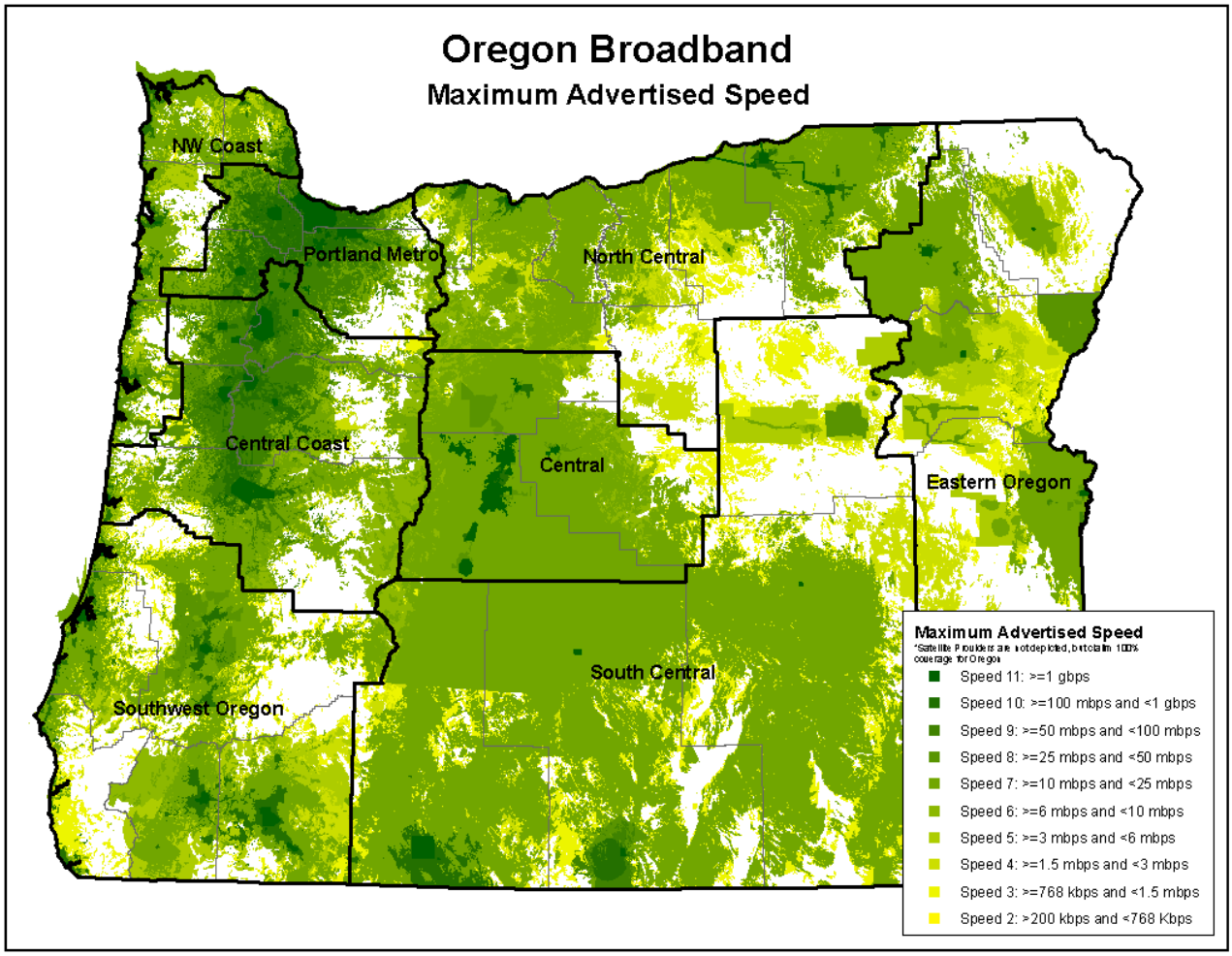
to free Internet training – online, in print and in person. More information is available at www.internetessentials.com.

Frontier Communications

Frontier has partnered with Wipro LTD to develop a program to educate seasonal users, students, travelers, lower income and potentially credit-challenged customers about the convenience and flexibility of pre-paid broadband services to improve broadband adoption. Frontier and Wipro jointly won the Global Telecoms Business Innovation Award 2014 in the 'Business Service Innovation' category for their Wired Prepaid Broadband Partnership Project. http://investor.frontier.com/releasedetail.cfm?ReleaseID=852071

Broadband Performance

Oregon benefits from over one-hundred facilities based service providers offering services competitive in performance with service available in other states.



This 2014 speed map was produced on the Oregon Broadband Mapping Project website www.broadband.oregon.gov and shows marked improvements over 2012. Users may produce maps showing service availability, technology, and providers statewide and by region, county, city, tribal lands, and for specific addresses.

Akamai, a provider of cloud services and tracker of Internet performance, recently reported that the average U.S. broadband speed reached 11.4 Mbps in the second quarter of 2014, a 39% increase over the same period in 2013. The ten states with the highest average connection speeds are Delaware, Virginia, the District of Columbia, Massachusetts, Connecticut, Rhode Island, New Hampshire, Washington, Utah and Oregon. All states in the top 10 had average broadband connection speeds of at least 12.8 Mbps www.akamai.com.

The FCC's Office of Engineering and Technology and Consumer and Governmental Affairs Bureau in 2014 produced a *Report on Consumer Wireline Broadband Performance in the U.S.* The report stated that "most broadband providers continue to improve service performance by delivering actual speeds that meet or exceed advertised speeds during the past year, but some providers showed significant room for improvement, particularly with respect to consistency of speeds."

The FCC reported that

- ISPs continue to deliver the combined upload/download speeds they advertise, but a new metric this year – consistency of speeds – shows there is still work to be done.
- Download speeds performance varies by service tier, with some ISPs consistently delivering less than 80 percent of advertised speeds.
- Fiber and Cable technologies continue to evolve to higher speed offerings, but DSL is beginning to lag behind.
- Consumers continue to migrate to higher speed tiers.
- Upload speeds vary sharply by provider

The full report may be viewed at http://data.fcc.gov/download/measuring-broadband-america/2014/2014-Fixed-Measuring-Broadband-America-Report.pdf

Broadband Technology Adoption and Utilization

The Pew Internet & American Life Project has reported that home broadband adoption has moved significantly higher in the U.S. rising from just 3% in the year 2000 to 70% as of May 2013. Oregon's current broadband adoption rate is 82%.

> "Broadband is no longer a luxury, but is essential in today's society to finding a job, getting an education, receiving quality health care, and staying connected with family and community,"
>
> -Acting FCC Chair Mignon Clyburn (2013)

Telehealth

Telemedicine, the interactive delivery of health care over distance using advances in telecommunication technology (i.e. video-conferencing equipment), is an evolving model for care delivery that increases access, improve outcomes, and reduces costs. By improving access, both geographically and temporally, telemedicine is a potentially transformative use of technology, allowing earlier involvement of specialists in acute, life-threatening situations, as well as for many other in-person health interactions that while not urgent, are not efficiently occurring, impeded by the current delivery system. Access to medically underserved areas, both rural and urban, is improved, with resultant improved outcomes and cost savings from reduced patient transports. The term telehealth is used to more broadly include all use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration, in other words not restricted to clinical care alone.

Oregon is viewed as a leader in telehealth / telemedicine due to progressive programs employed by many of its health care service providers and a supportive state-level public policy. Telemedicine activities in the state have been detailed in previous versions of this report in 2010 and 2012. Current clinical activity continues to grow among all the major health systems. Instead of again creating an encyclopedic list of telemedicine, we will report on significant policy issues affecting telemedicine and statewide efforts in the field.

In 2007, the Oregon Legislature passed a Senate Joint Resolution introduced by the Oregon Telecommunications Coordinating Council to begin to build the foundation needed to support the long-term development, adoption and utilization of telemedicine in Oregon. The state legislators,

> Declare that it is the policy of the State of Oregon to promote and facilitate activities by Oregon's health care and education communities and their telecommunications providers to develop a network model that provides standards for interoperability, establishes a peering point for all health care and education telecommunications in Oregon and establishes peering agreements among health care and education networks that contain payment structures (SJR 20, 2007).

The Oregon Health Network, with both federal and state funding, made a significant contribution to this objective by providing a functional telecommunications infrastructure to support health care applications statewide. Despite that infrastructure, significant barriers to the expansion of telemedicine for health care delivery persist including the reimbursement of services by health benefit plans and the credentialing of physicians to remotely deliver clinical services. In recent years, Oregon has moved to overcome these two barriers and promote the adoption of telemedicine through public policy in statute.

In 2009, Governor Ted Kulongoski signed Senate Bill 24 into law, which became effective in 2010. Broadly stated, it requires health benefit plans to provide coverage of medically necessary health services provided through telemedicine if the health service is otherwise covered by plan. When SB 24 was passed telemedicine occurred primarily between health care institutions such as hospitals and clinics. With the advent of affordable mobile devices and software applications, a patient population that is demanding that more health care be delivered to them where they live, work and go to school, and the efforts via the Affordable Care Act to curb rapidly rising health care costs, the use of telemedicine to provide services is expanding beyond the institutional walls and to new non-traditional health care venues such as patient homes, schools and workplaces. SB 24 did not make specific provision for that transition and needed to undergo review and changes. SB 1560 was a way to extend reimbursement to those services provided to patients in non-institutional settings. Due to concerns expressed by Oregon Association of Hospitals and Health Systems and private insurers, Senator Laurie Monnes Anderson directed the Telehealth Alliance of Oregon (TAO) to create and coordinate a workgroup (the Telemedicine Reimbursement Expansion Work Group) on the issues and return with a legislative concept for the 2015 session.

In the 2013 legislative session, Senate Bills 569 and 604 were passed and signed into law by Governor John Kitzhaber.

> SB 569
> Requires Oregon Health Authority to adopt uniform credentialing and privileging standards for providers of telemedicine services. Authorizes hospital to accept credentials of telemedicine providers either by agreement with distant-site hospital or by providers meeting credentialing and privileging standards established by authority.
>
> SB604
> Requires Oregon Medical Board to establish database for purpose of providing to credentialing organizations information that is necessary to credential persons regulated by board.

These laws will help streamline and make more manageable the processes for credentialing physicians and reimbursing physicians for the services that they provide in Oregon. This legislation was made possible by the collaborative and participative efforts of all the affected parties to address concerns and enable the broad support necessary for passage. The OHA and OMB are currently formulating the actual policies.

The Oregon Health Authority (OHA) has also requested that TAO conduct a telehealth inventory for Oregon. Three deliverables that TAO will provide include:

1. A policy analysis of telehealth that informs OHA, Coordinated Care Organizations (CCOs) and health plans about reimbursement, licensure, credentialing and privileging, HIPAA/HITECH privacy and security requirements for telemedicine, on-line prescribing, practice standards, etc.;
2. An inventory of providers offering telehealth services that are available to Oregonians (potentially providing the information publicly on a website); and
3. A gaps and needs assessment for telehealth.

Two prominent national organizations released telemedicine policies this past year, reflecting the growth of and need for guidelines for telehealth. In April 2014, the Federation of State Medical Boards (FSMB) approved updated guidelines to help ensure the safety and quality of medicine when it is practiced using telemedicine http://www.fsmb.org/Media/Default/PDF/FSMB/Advocacy/FSMB_Telemedicine_Policy.pdf. In June 2014, the American Medical Association adopted a list of guiding principles for ensuring the appropriate coverage of and payment for telemedicine services http://www.ama-assn.org/ama/pub/news/news/2014/2014-06-11-policy-coverage-reimbursement-for-telemedicine.page. Both organizations addressed difficult issues including licensure requirements (both state that physicians must be licensed in the state where the patient is located) and whether a previous face-to-face relationship needs to exist prior to care via telemedicine (both allow that relationship to be established either in person or over video provided that the standard of care is met). FSMB has recently drafted model legislation for state legislatures and medical boards to consider, in order to create an Interstate Medical Licensure Compact that would speed the process of issuing licenses for physicians who wish to practice in multiple states.

In another exciting development, the Telemedicine Program at Oregon Health & Science University (OHSU) has embraced a new initiative to improve remote access to specialty care. Developed in New Mexico, Project ECHO (Extension for Community Healthcare Outcomes) creates knowledge-sharing networks, led by expert teams who use multi-point videoconferencing to conduct virtual clinics with community providers. In partnership with HealthShare (the Portland Metro Coordinated Care Organization), OHSU has started Oregon's first Project ECHO replication site, focused on Psychiatric Medication Management. By educating primary care doctors, nurses, and other clinicians, the program increases workforce capacity and provides best-practice specialty care to patients in their own communities. This will be an important strategy for the state moving forward in the population health paradigm. As always, how to fund this work in the future remains an important issue.

Health Information Technology

The Oregon Health Authority (OHA) includes most of the state's health care programs, including Public Health, the Oregon Health Plan, Healthy Kids, employee benefits and public-private partnerships, and has finalized a plan to advance Health Information Technology (HIT) and Health Information Exchange (HIE) in the state. The completed Business Plan Framework is a significant milestone in the State's ongoing approach for a transformed health system that achieves better care, better health and lower costs for Oregonians. Oregon's Business Plan

Framework for HIT and HIE (2014-2017) is available on the Office of Health IT (OHIT) website, www.healthit.oregon.gov.

Oregon's Health IT Oversight Council (HITOC)

The Health Information Technology Oversight Council (HITOC) is a statutory body of Governor appointed, Senate confirmed citizens, tasked with setting goals and developing a strategic health information technology plan for the state, as well as monitoring progress in achieving those goals and providing oversight for the implementation of the plan www.oregon.gov/oha/ohpr/hitoc.

The HITOC is currently coordinating Oregon's public and private statewide efforts in electronic health records adoption and the eventual development of a statewide system for electronic health information exchange. The HITOC will help Oregon meet federal requirements so that providers may be eligible for millions of federal health information technology stimulus dollars.

HTIOC recommendations to define the State's role for Health IT:

- Coordinating and supporting community and organizational efforts
- Establishing compatibility, interoperability, privacy and security standards for participants in new state-level services
- Providing technologies for transformation to enhance state-level information sharing

The completed stakeholder process has also led to a vision for Oregon of a transformed health system where the care Oregonians receive is optimized by HIT. HIT-optimized health care is more than the replacement of paper with electronic or mobile technology. It includes changes in workflow to assure providers fully benefit from timely access to clinical and other data. Using health information exchanges allows hospitals, clinics and individual providers to share the right health-related information among all members of care teams to ensure the best possible care for Oregonians and their families.

The State has already seen early successes in advancing HIT-optimized health care:

- All of the sixteen CCOs have agreed to OHA's plan to use $3 million in transformation funding to secure federal matching funds for new HIT services. These funds will be used to support OHA's vision of a whole state approach for achieving HIT-optimized health care. HIT infrastructure will connect and support community and organizational HIT and HIE efforts where they exist, fill gaps where these efforts do not exist, and ensure all providers on a care team have a means to participate in basic sharing of information needed to coordinate care.

- OHA has partnered with the Oregon Health Leadership Council to obtain buy-in from all 59 hospitals in the state to implement the Emergency Department Information Exchange (EDIE). The EDIE project will provide emergency departments with key care guidelines for patients who have high utilization of emergency department services, with the goal of reducing unnecessary hospital services and improving outcomes. This service has successfully reduced ED utilization and associated costs in Washington State.

- The State Legislature passed Senate Bill 604 in 2013, which requires OHA to establish a program and common database for providing necessary credentialing information on all health care practitioners in the state to credentialing organizations. Credentialing organizations currently credential health care practitioners independently, resulting in a duplication of efforts and a burdensome process for practitioners. Stakeholders have been engaged to assist the OHA in the implementation of this program to ensure an efficient and effective solution will be operational by January 2016.

Oregon Health Network (OHN) / OCHIN

Reliable and high-quality network connectivity plays a fundamental and ongoing role in the support and expansion of the health information technologies and applications required for healthcare and healthcare education. The Oregon Health Network has successfully given healthcare providers and healthcare educators access to a reliable, managed, collaborative and subsidized network. The Oregon Health Network has afforded health care providers and healthcare educators a consistent source of funding for broadband services and infrastructure for the past six years. Most recently, OHN has secured continued funding for its current and new members through June of 2017 through the FCC's Healthcare Connect Fund http://www.fcc.gov/encyclopedia/rural-health-care.

Oregon is considered by the FCC to be one of the most successful of the original 69 Rural Health Care Pilot Project (RHCPP) approved projects. This is due to a number of considerations, including awarded funding, number of locations, geographic coverage, and working relationship with the FCC. The original Rural Health Care Pilot Program (RHCPP) ended on May 21, 2014, with the majority of the OHN project funding expended; 231 hospitals, community colleges, clinics and data centers on the network; and connections in nearly every county in Oregon. There are also six hospitals and clinics not receiving federal funding who have joined the network because of the quality and connections to other healthcare organizations. Hospitals and clinics have implemented telemedicine programs, EHRs, and for some simply email, enabled by the network. Of the $20.182 million dollar original FCC award, OHN administered subsidies of $19.051 million that flowed to Oregon telecommunications service providers to install and provide broadband services to its members.

Funding commitments for OHN members who participated in the RHCPP are being issued for continued funding through the Healthcare Connect Fund (HCF) program. This FCC funding is committed through June of 2017. The difference in the HCF program versus the old RHCPP program is the participant's required contribution. A 15% contribution match was required in RHCPP, whereas the HCF program requires a 35% contribution match from users. Over 95% of OHN's original membership (12 community colleges and one clinic have not moved forward due to lack of grant funding to obtain their 35% contribution) have successfully converted to the HCF, and there are over 70 new sites that are currently going out to bid, and expanding the network to four new states. This continued growth is due to the network quality of service needed by healthcare organizations, and OHN's ability to deliver that level of service.

The RHCPP through Oregon Health Network significantly improved the telecommunications infrastructure on the Oregon South Coast. An FCC approved fiber build to extend OHN to the

Sutter Coast Hospital in Northern California established the fiber backbone network infrastructure needed for a ring architecture and alternate routing for communities on the Oregon South Coast, as well as the Northern California Coast.

OHN was acquired by OCHIN in 2013 and this year the two organizations were be combined into a single entity to reduce the financial and administrative burden that comes with maintaining two, separate legal structures. As of September 1, 2014, the OHN name and legal entity ended, and the network now operates as OCHIN www.ochin.org.

Telehealth Summary

In summary, our state and nation need new and effective strategies to deliver health care to people where they live, not only for the benefit of individual patients, but also for the "economic health" and viability of their communities. Available quality health care is an important component of the quality of life for any community of any size. Telehealth and telemedicine are valuable tools for providing access to quality health care, and need to be an integral part of any new health care model.

Notable dates in the near future include the first ever Telehealth Day at the State Capitol on February 4, 2015, followed by the Telehealth Alliance of Oregon's Annual Meeting and Summit on February 5 and 6, 2015, also in Salem.

Energy Management

Broadband is helping Oregon utilities move to a smarter electrical grid where power outages are responded to and repaired more quickly, customers are empowered with information to help them understand and manage their energy use and stay connected to their utility in case of emergencies, saving energy is easier and in some cases automatic, and the timing of energy use is being managed to match supply.

Advanced metering infrastructure (AMI) is an integrated system of smart utility meters, communication networks, and data management systems that enables two-way communication between utilities and customers. Smart meters are electronic devices that record consumption of electric energy in intervals of an hour or less and communicate that information back to the utility for monitoring and billing purposes. Smart meters enable two-way communication between the meter and the central system. Today, 50% of the electric meters in Oregon are smart meters.

Responsiveness and Reliability

Today when power outages occur, Lane Electric Cooperative (Lane Electric) uses a variety of technologies to communicate with their members and reduce outage times. In the past however, technology was less sophisticated. Personnel reported to the office and slowly gathered information via telephone, and crews were dispatched to affected areas to begin making repairs. Upon restoral, telephone calls were made to members confirming their power had been restored,

regardless of the hour. The process worked but it was labor intensive and slow. Things are very different today.

With the proliferation of computers, smart devices, the Internet, advanced metering systems, and social media, information is not only available, it is expected. Lane Electric was one of the first co-ops on the west coast to fully deploy an AMI system, using smart meters. Initially, the AMI system allowed the co-op to read and collect meter data remotely, verify power outages, and address billing concerns accurately and in a timely manner. As technology matured, prepaid billing, energy monitoring, outage management, and Smart-Hub became available.

Since 2006, Lane Electric's web site has been linked to the AMI system, providing real-time updates during storm and weather events allowing our members to track the progress of the co-op's restoral efforts. Recently, social media has been added to the mix. Twitter and Facebook are regularly used to provide updates and notifications on a variety of subjects. Hyperlinks take users directly to their web site where real-time information is available. Upon arrival to the Outage page, members have access to an Outage Map identifying affected areas by magnitude, progress reports, step-by-step restoral processes, and ways to be better prepared for multi-day outage events. The map identifies areas by zip code, color, and the number of members affected in each area. Affected areas and numbers ebb and flow based on a real-time basis with information embedded in the co-op's outage management system.

Portland General Electric (PGE) has installed smart meters for all of its utility customers. PGE focuses on using the right tool for the job in terms of communicating information from one point to another in the most cost effective way possible for customers. In some cases broadband is used while in other cases PGE has found lower bandwidth or radio communications more appropriate.

PGE's smart meters utilize a narrowband frequency licensed by the FCC to transmit data to radio towers. At radio towers 10,000 to 100,000 smart meter signals are aggregated and then broadband is used to transmit information back to PGE's home office. In some cases the broadband is privately owned by PGE while in other cases PGE contracts with communications providers to obtain dedicated point-to-point circuits.

PGE uses broadband to help manage its energy distribution systems. Substations communicate with PGE's main office through broadband, often via a contract for dedicated bandwidth from telecom providers. PGE is currently upgrading its outage management system to take advantage of smart meter data, which will help PGE pinpoint and respond to outages more quickly.

Central Lincoln People's Utility District (Central Lincoln PUD) has also installed AMI meters connected to a fiber network. Like PGE and Lane Electric, Central Lincoln PUD customers are benefiting from AMI through reduced truck rolls for meter reading and reduced truck rolls for connecting and disconnecting customers, due to the ability of AMI meters to connect and disconnect customers remotely. Reduced truck rolls save utility customers money each month on electric bills.

Low Income Bill Payment Options

The economic downturn hit Midstate Electric Cooperative's (MEC) rural service territory hard. Within the struggling service area, members were having a hard time paying their bills. They found themselves with delinquent balances and subsequent security deposits and fees due to the delinquencies.

MEC found an alternative option for their members in prepaid metering. By installing an AMI system, they were able to offer prepay services. With prepaid metering MEC is able to make electric service affordable for everyone. Due to the member keeping a credit balance, there is no need to charge a deposit. Existing members' deposits are refunded back to them ($168,765 has been refunded since the program began). Members can start service for as little as $65. The only requirement is to maintain a credit balance thereafter. There are no billing due dates—giving the budget-conscious member the option to make frequent smaller payments rather than struggling to pay a larger bill once a month.

Energy assistance agencies have come on board upon seeing the benefit the program has for low-income families. In normal circumstances, a family disconnected for nonpayment on traditional billing would be required to pay the past due balance, plus reconnect/disconnect fees and an added security deposit. This could amount to hundreds of dollars. On prepay, the service can be reconnected for as little as a $10 credit toward future power. This allows the agency to assist more families in the community.

Landlords are also utilizing the benefits of prepay. Prior to prepay, a landlord that chose to keep the service in their name—but relied on their tenant to pay the bill—risked having their credit compromised. If the landlord puts the account on prepay, it places the responsibility on their tenants to keep a credit balance in order to receive power, thus decreasing the risk to the landlord.

Overall, the community has appreciated the benefits of no deposits, no late fees, easier budgeting, and timely information about their energy use. This has led to increased member satisfaction, which is the top priority for MEC.

Customer Information

Today, Lane Electric's members can monitor daily consumption, view and pay their bills, receive alerts, read news, and learn about new programs and services. They also can follow power outage progress, report outages, request or discontinue electric service, and update personal information quickly and easily on Lane Electric's web site. Continual updates are provided on the web site throughout the restoral process. Lane Electric has incorporated social media, Facebook and Twitter, into their communication tool mix to reach more of their members.

On the morning of February 7, 2014, a weather alert was posted on Lane Electric's web site, Facebook, and Twitter. When the storm hit, members and Lane Electric's media partners were notified with an initial briefing as to the extent of the outages and encouraged to follow the web

site updates and social media postings. Followers and Friends alike received regular updates as to Lane Electric's progress. Activity on Lane Electric's website during the storm jumped from an average of 300-400 hits per day to just over 4,700 hits per day on outage related pages alone. There were over 40,000 page views and new visits were up over 40%. Radio and television stations and newspapers monitored progress via the co-op's web site and kept their audiences current with the co-op's restoral efforts.

Because of its smart meters, PGE is able to supply customers with useful information about energy consumption and help them use energy more efficiently. Customers can log on to PGE's website and see daily and hourly energy use charts. PGE also provides links to Energy Trust of Oregon's website, where customers can go to learn about energy saving programs and incentives. PGE notes that customers that are checking their energy usage via PGE's website are reducing their annual energy consumption faster than customers who are not monitoring their usage online. [5]

Saving Energy

In addition to saving energy through increased access to customer energy use information, Central Lincoln PUD provides an excellent example of how broadband is enabling energy savings. Central Lincoln PUD has fiber network to almost all of its substations, which allows it to send and receive large amounts of data.

Traditionally, Central Lincoln PUD had to ramp up voltage levels at substations so it could be sure to meet voltage level standards for those customers at the end of the line. This meant that customers near substations might have experienced higher voltage than necessary causing some equipment in the home or business to use more energy. Adjusting the voltage to a lower level within the acceptable range leads to energy savings for the utility and customer. Central Lincoln PUD completed a conservation voltage reduction (CVR) pilot with 1,400 out of their 38,000 customers. In the CVR pilot, broadband allowed the utility to monitor voltage data every five minutes from homes and businesses so voltage levels could be optimized and energy saved. Central Lincoln PUD's pilot demonstrated that through CVR most customers can save 2-3% of their energy usage. Central Lincoln PUD estimated that by 2025, a fully implemented CVR project would provide a net service territory financial benefit of $8 million.[6]

Likewise, the AMI installed by MEC allowed MEC's members to log into their accounts and receive greater insight about how their lifestyle choices affect their consumption. Statistics show that people who monitor their energy use on a regular basis tend to use less energy. MEC found this to be true when they ran a conservation analysis and learned that, on average, prepay members had reduced their consumption by 17 %. By empowering the members with information, they can take a more proactive role in their energy use, thereby lowering their monthly bill.

[5] PGE 2014 Smart Grid Report, Page 14

[6] Estimated $12.3 million in bill reduction due to CVR. The Company needs to recoup $4.3 in lost revenue. Net savings to the service territory is $8.2 million

Load Control

The smart grid is a dynamic grid that can better match energy supply with energy demand using load control. This enables better integration of intermittent renewable resources such as wind. Digital communications and broadband are needed to provide that load control. Dynamically balancing supply and demand helps mitigate the need for transmission upgrades and the development of more fossil fuel generation for load following to match renewables.

PGE has developed and is developing projects that provide load control. PGE's Energy Partner[SM] Automated Demand Response Pilot uses automated controls to enable participating large customers to reduce their energy usage within as little as 10 minutes in response to a signal provided by PGE. PGE contracts with a third party to deliver this program and the savings are guaranteed. Energy savings are primarily provided through reductions in lighting, heating, ventilation, and air conditioning.

PGE has also offered a critical peak pricing pilot where in times of peak demand, a signal is sent to enrolled customers indicating that a peak event is occurring and through the event energy rates will be higher. These increased rates during peak events and slightly lower rates during normal use times incentivizes customers to voluntarily reduce their usage.

PGE is developing an innovative home water heater based demand response project that would use customers' own Wi-Fi networks enabled through existing broadband-based internet service providers to dynamically balance energy supply and demand. Customers will sign up to allow PGE to tap into their home water heaters and ramp them up or down when needed, thereby matching supply and demand through small adjustments to the appliances of multiple residential customers. This project would use simple FM radio network to communicate with the water heaters and then use the customer's Wi-Fi system to send information back to PGE. In this way, PGE gets the benefit of existing broadband networks without the expense of installing their own dedicated fiber.

Energy Summary

Broadband in Oregon is enabling Oregon's electric utilities to move toward a smarter electric grid that operates more reliably, efficiently, and dynamically. Today, 50% of the electric meters in Oregon are smart meters through the deployment of electric utility AMI systems. Oregon ratepayers are the beneficiaries.

Education

In February of 2013, OBAC convened a summit of educators representing K-12 school districts, Education Service Districts, and the Department of Education. The intent of the summit was to discuss the emerging technology requirements, the current state of readiness, and the technical and financial challenges in this area facing Oregon's school districts, and to identify actions and next steps to be taken to address issues, close gaps, and enable Oregon's K-12 schools to meet these requirements.

OBAC believes that information technology and broadband network access are fast becoming essential infrastructure for Oregon's schools, and that the broadband network connectivity available in Oregon's schools will impact

- Staff and student access to digital course content materials and information
- Staff and student access to web/cloud based educational resources
- Staff and student access to *Smarter Balanced* student assessment applications
- Staff and student ability to meet *Common Core Standards*
- Staff and student digital literacy required for college and career success
- Staff access to administration and reporting applications
- Staff ability to distribute information and communicate with parents and other stakeholders
- Staff access to professional development resources
- School's ability to successfully implement the Smarter Balanced Assessment system

OBAC believes that all these capabilities, or lack of them, will directly impact education delivery, student learning and student achievement. Strategies for Oregon schools need to be developed so that Oregon students gain the digital literacy needed for Smarter Balanced student assessment success and for college and career success in a digital world.

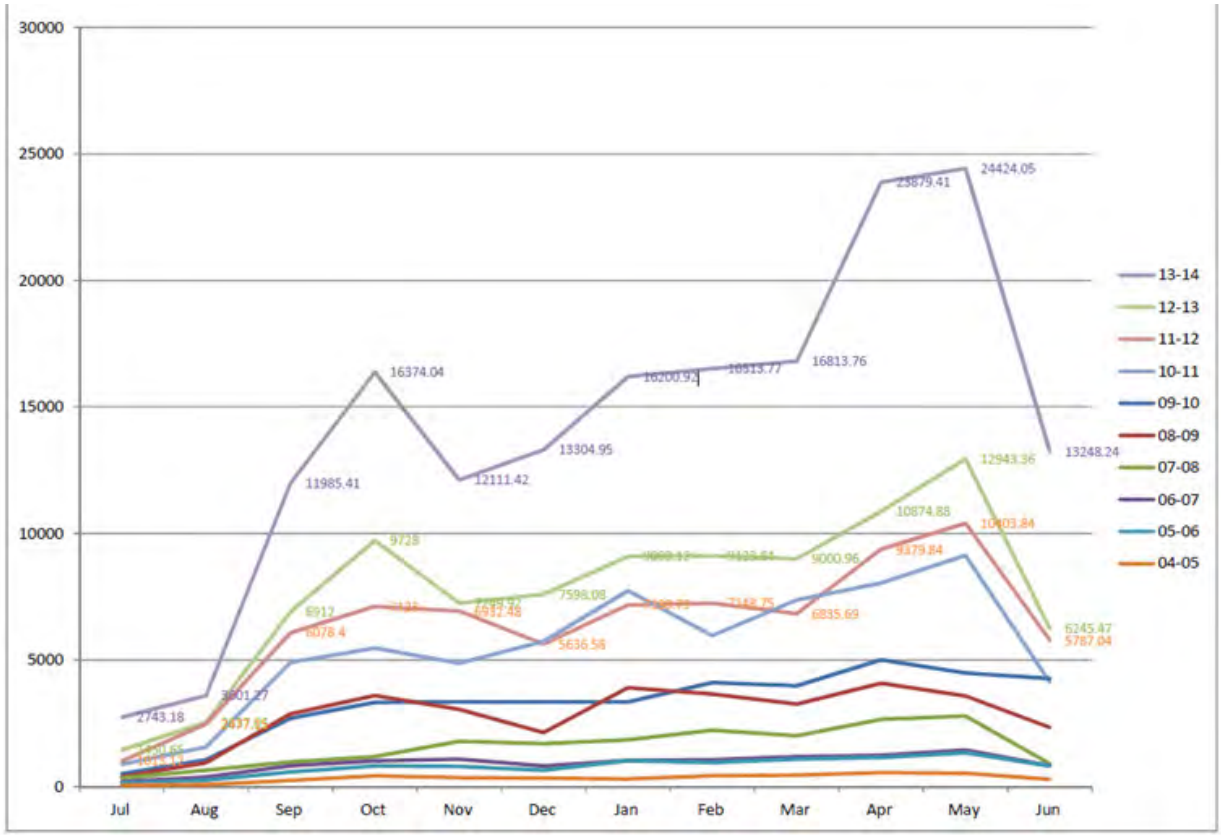
Broadband in Education

A confluence of new requirements and technological demands are placing high quality broadband access at the center of Oregon's educational needs. No longer is broadband access for schools optional; it has become a utility as important as running water, electricity and gas. Drivers of increased need for quality broadband access in Oregon's schools include, but are not limited to:

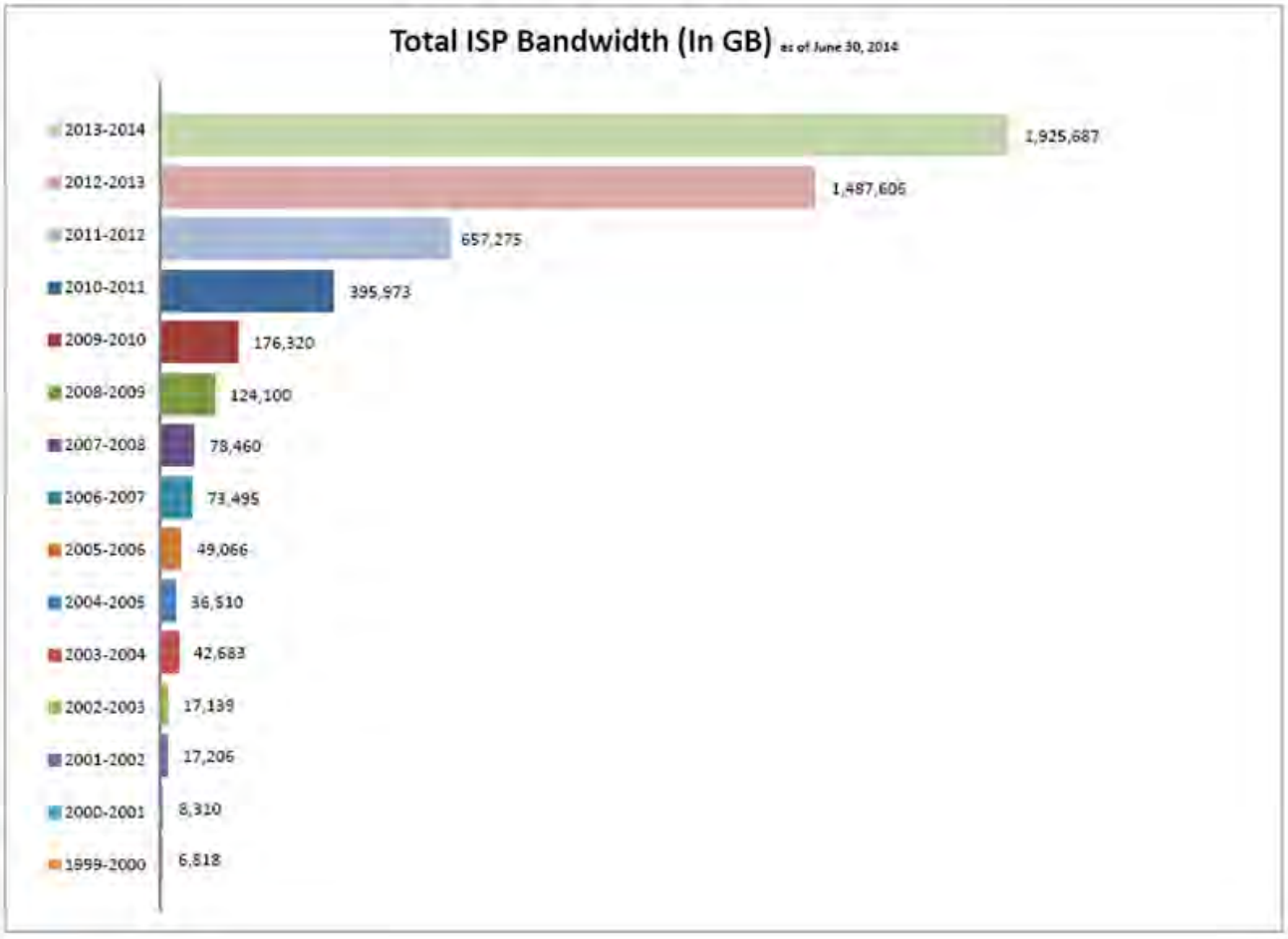
- Oregon's 40-40-20 goal of having all students graduate from high school by 2025 means embracing a wider range of options for student success including online classes, hybrid classes, classes offered outside of the regular 7:30-3:30 school day, and classes offered to students in disparate parts of the state.
- Adoption and implementation of Common Core State Standards is fueling the desire of schools and districts to share materials, implementation strategies and courseware.
- Deployment of the Smarter Balanced Assessment in 2014-15 nationwide and in Oregon requires that Oregon schools meet minimum bandwidth requirements just for the administration of the test. Tests must be able to be administered online while other essential school services consuming broadband continue to function.
- Essential school services including HVAC, lunch payment processing, attendance, phone services, and data collections are all integrated with broadband services.
- Education is moving online enabling teacher and student access to a broad range of resources.

- Education is moving outside the traditional school day. Online resources allow for student attendance and engagement 24x7.
- Teacher professional development is moving online. High fuel costs, reduced funding, and shortened teacher contracts have all resulted in a need to find a more cost-effective, easily accessible ways to provide professional development to Oregon's teachers.
- Federal and state data collection requirements continue to increase. The transmission of many terabytes of data each year requires substantial broadband resources.

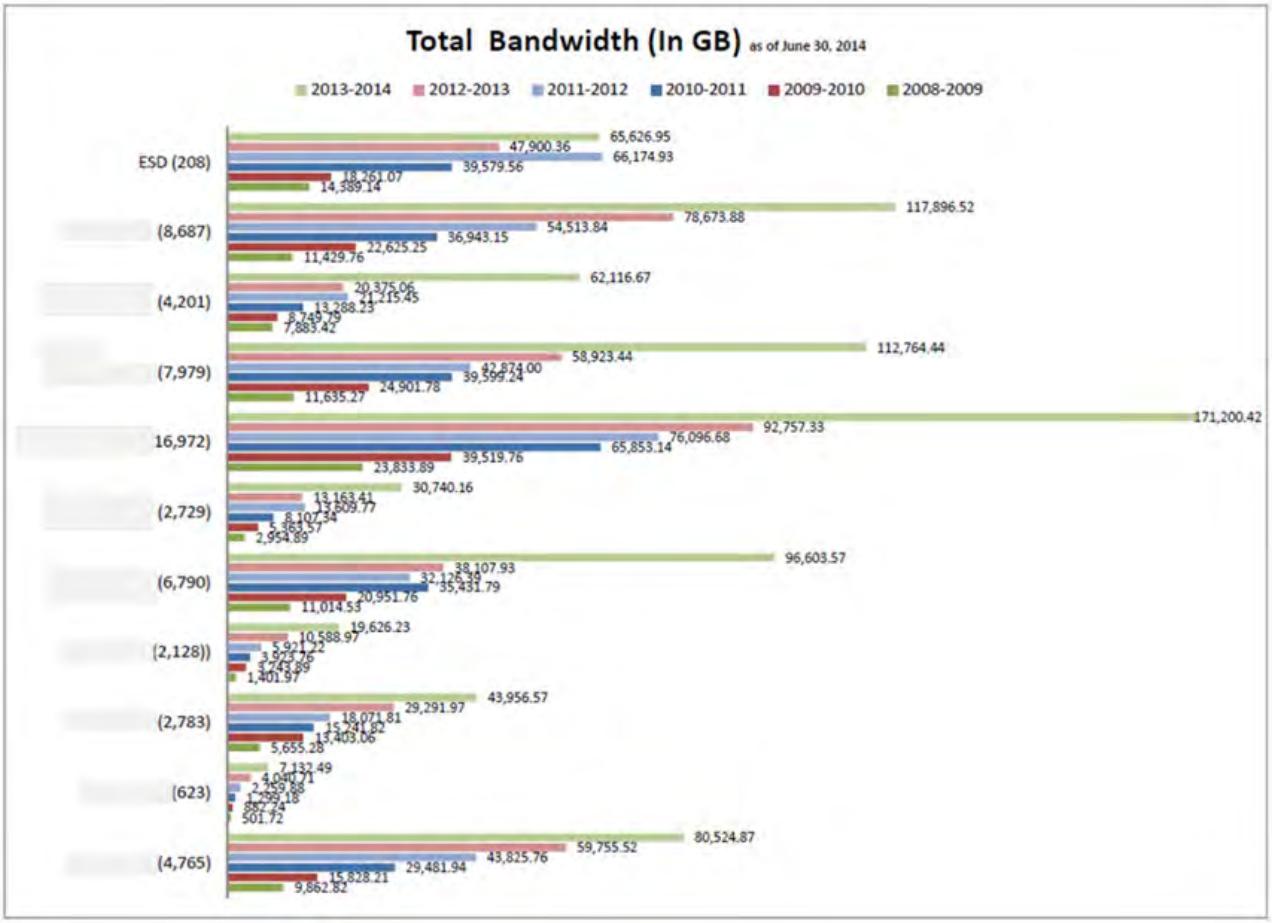
The increased need for broadband is evident in the following data provided by one of Oregon's Education Service Districts (ESD). Between 2012 and 2013 increases in broadband usage nearly doubled in every school district served by the ESD. Figure 1.1 below, illustrates the peak broadband usage times during a school year as well as an increase in broadband usage over a 10 year period. Testing periods in the months of September/October and April/May are evident. The greatest increase is seen in 2013-14 when the school increased one-to-one access and allowed for bringing your own device (BYOD).



Example of a Single School's history of usage (in Mbps) over the course of the school year from 2004-2005 to 2013-2014.



This graph illustrates the increase in ISP bandwidth across the ESD from 1999-2000 to 2013-2014. Initially, we see low Internet Service Provider (ISP) broadband. An increase is seen during the first years on online assessments in Oregon. In the last four years, ISP bandwidth has almost doubled annually.



Total Bandwidth per School across an Education Service District

The FCC is aware of the increased need for broadband across our nation's schools. In 2014, the FCC initiated program modernization to update and streamline the Schools and Libraries Universal Service Support Program (more commonly known as the E-rate Program) and is adding significant funding for Wi-Fi networks in elementary schools, secondary schools and libraries across America.

As part of the modernization effort, the FCC has adopted the State Educational Technology Directors Association's (SETDA) target recommendation of a minimum standard for Internet access in schools of at least 100 Megabits per second (Mbps) per 1,000 students and staff (users) in the short term and 1 Gigabits per second (Gbps) Internet access per 1,000 users in the longer term. The longer term target reflects schools' bandwidth needs as the adoption of digital learning resources and strategies and one-to one devices become common in our schools. Additionally, the FCC will be removing financial services support for outdated services such as

voice lines and non-broadband services. (http://www.fcc.gov/page/summary-e-rate-modernization-order). For Oregon schools, this means an increased expectation of being able to access and utilize broadband services regardless of physical location.

Broadband access in Oregon schools is already extensively funded by the E-Rate program. E-Rate eligibility is determined by a school or district's percentage of students qualifying for Free and Reduced cost lunches through the National School Lunch Program. In 2013, schools and districts around the nation that applied for E-Rate funds received over $15 million in funding for broadband. This represented an average 75% reduction in the direct cost to schools and districts for broadband services.

Changes in the rules for determining rural status outlined in the E-Rate Modernization order may make it more difficult for some of Oregon's rural schools to qualify for the E-Rate discounts necessary to update their infrastructure to support the increasing demand for broadband. We have to ask ourselves as a state, what we will do to provide equitable broadband access to all students in Oregon. Some of our schools are still running schedules to only allow testing in one school at a time during the testing window. No other access to the Internet is allowed during testing. In other schools, the snow must be shoveled off the satellite dish in order for the phone service or other broadband access to take place. Some of our rural schools are paying high prices to maintain old technologies because the funding to update is not available. In some areas, there is only one Internet Service Provider (ISP) therefore no competition to lower costs.

Oregon must plan for equitable access to broadband for all of its students. That access needs to include affordable home access to the Internet so that students have the opportunity to access online learning, blended learning and collaborative processes for learning. Oregon's students should not be limited to broadband access only during school hours. They should have access to the world of resources that is now available through the Internet at all times. Teachers also need access to the Internet for developing opportunities for their students to use digital resources for learning, collaboration on best practices, developing modern learning pedagogy, and for their own online learning.

Science, Technology, Engineering and Mathematics (STEM), Common Core State Standards implementation, the Educator Effectiveness Portal outlined in HB 3233, effective use of data systems, and meeting Oregon's 40-40-20 goal all depend on how well our state provides students options and opportunities. Student and teacher access to the Internet that is provided through a statewide system that provides robust access to broadband no matter where you live, is key to Oregon's academic and economic success.

E-Government

State of Oregon – Setting the new E-Government Baseline

In 2011, the Oregon Legislature created the Electronic-government Portal Advisory Board (EPAB), which marked the beginning of a new level of governance and guidance to assist the state of Oregon www.oregon.gov in providing services over the Internet. Since then, the board has overseen the following advances:

- The transition of 202 websites, electronic commerce and web applications from various conditions to a modern technology platform, serving as a springboard for future advances in service delivery;
- The transition from various funding mechanisms to a self-funded program that is funded only as services are used via a new state contract with NICUSA;
- The conduct of biennial surveys to determine Oregonians' views about the Internet based services that the state is providing as a way to measure progress;
- The creation of prioritization criteria that are applied to the completed e-government projects;
- Provision of advice on convenience fees for a proposed service;
- Advocacy that agency website redesigns require usability testing with Oregon residents who actually will have to use the website and support for changing designs based on their feedback; and
- Support for the use of an open data portal (data.oregon.gov) to facilitate transparency into the workings of Oregon's government.

After spending the majority of 2012 transitioning 139 websites, 23 custom applications, 2 web portals, and 29 online payment stores to new technology and hosting, 2013 brought new services and enhancements to Oregon agencies. Examples of the new value provided include:

- Mobile optimized payment checkout pages
- ACH batch file payment processing
- Secure Interactive Voice Response payment capability
- Secure card reader payment capability
- New payment administration and reporting capabilities for agencies
- Modernized Enterprise Web Content Management System
- State of the art private cloud hosting technology
- The capacity for redundant disaster recovery and fail over services across two AT&T Tier 4 datacenters
- Annual independent security audits
- Staff skilled in conducting website usability testing and design
- Online service desk portal for agencies
- Marketing services to promote the use of government online services

Examples of existing capabilities that were enhanced and continued include:

- Enterprise Payment Processing certified as Level 1 Compliant by the Payment Card Industry
- Oregon GovSpace, the Enterprise Collaboration Platform for the state and its partners
- Public Open Data Platform - Data.Oregon.gov
- Network and application security standards expertise
- E-Government services subject matter experts with over 20 years' experience

2013 Usage Statistics

- Website Visits - Over 60 million
- Web Pages Loaded - Over 216 million
- Payments Collected - Over $1.93 billion
- Payment Transactions - Over 2.37 million

Awards Received

- 2014 National Association of State Chief Information Officers (NASCIO) State Recognition Award for Open Government – The Centralized Public Meeting Manager leverages the open data portal to provide one calendar for all state meetings that is socially shareable and searchable.

- 2014 Best of the Web–The Center for Digital Government Recognized Oregon.gov as one of the ten best state portals. This is the first time Oregon has been recognized in Best of the Web. Oregon's one-stop business portal, Business Xpress, brings together state online services, forms and information making them quickly and easily accessible from a single portal. Sponsored by the Secretary of State, it was recognized for its innovation three times.

- 2013 Environmental States Innovation Award – DEQ used Oregon.gov & Data.oregon.gov to engage public comment on the Boardman Coal Plant

- 2013 Computerworld Honors Laureate for its excellent application of technology to meet business needs

- 2013 Digital Government Achievement Award in the Government-to-Business category from the Center for Digital Government

- 2013 Oregon State CIO Awards – Gold Award Winner

Oregon E-Government Program

- 2014 began with 9 new projects underway and 37 upcoming projects to be scheduled. The flexible funding options and broad range of services offered by the ETS E-Government Program has sparked enthusiastic demand from agencies. Some of them are highlighted below

- New Oregon.gov State Portal - The state web portal received a complete makeover. Leveraging lessons learned from extensive usability testing with Oregonians, the portal is easy-to-use on any device. The site focuses on helping Oregonians get where they need to go, faster.

- Oregon State Marine Board Licensing System – This application provides a full suite of online services for boat titling and registration, permits and boater education for over 550,000 customers.

- Vehicle Inspection Program (VIP) Payment Processing – This Electronic payment system will streamline customer credit and debit card payments in the Department of Environmental Quality VIP Clean Air Stations and Self-Service Kiosks.

- OSU Hatfield Marine Science Center – Electronic payments are available through a touch screen kiosk interface that enables visitors to the center to make a donation using a credit card.

- Online License Renewal – The Board of Tax Practitioners and Board of Chiropractic Examiners launch online license renewal systems that allow their license holders to complete their filing online as well as pay applicable license renewal fees with a credit or debit card online.

- Donations for Veterans' Affairs - The Department of Veterans' Affairs launched a new online donation system to receive donations for four programs: Veterans Homes, Support, Suicide Prevention/Outreach and Women Veterans Funds.

Newly Featured Services

- New Website Redesign Leverages Usability Testing - The Secretary of State launched a newly redesigned website using a mobile-first content strategy to simplify the website content, reducing the total number of webpages by 80%. Extensive usability testing with Oregonians enabled the agency to rework and streamline content to better serve their customers. The new website works with ease on any device, including smart phones and tablets by utilizing the latest responsive design approaches.

- New Mobile First Medical Board Website - In October, the Oregon Medical Board launched a newly redesigned website at http://oregon.gov/omb. Also relying on using a

mobile-first content strategy, the Medical Board reduced the total number of webpages by 50%. This website is the first to launch in the new agency look and feel, blazing the trail for numerous other agency website redesigns in the coming year.

- Department of Revenue Electronic Tax Payment System - Launched in February 2013, the Electronic Tax Payment System collects corporate and combined payroll tax payments from businesses through a web interface or through an Interactive Voice Response (IVR) system. The application replaced a legacy system and provides new functionality for both the business customers and the agency.

- Form Builder - A new web-based service that enables all agencies to create basic web forms for their websites through an easy to use drag-and-drop interface. This no cost feature gives agencies the flexibility to add new online forms that can be updated anytime by agency content editors without having to rely on technical staff.

Other Additions

- Online Mobile Payments Capability
- Human Services/Heath Authority Mobile Enabled payments.
- CVIEW Data Exchange - Commercial Vehicle Information Exchange system for ODOT
- Oregon Agriculture, Medical Board, DCBS Insurance Website Redesigns
- New Oregon Education Investment Board (OEIB) Website
- Marine Board Boat Registration Renewal Store - Permit option
- Added "Cancel Order" functionality for Secretary of State online store
- DCBS Financial Division Payments - online payments used by DCBS staff
- Added Discover and American Express card payment types
- Twitter API Integration upgrade for the Governor's website
- Implemented first annual independently conducted security audits on all systems

<u>E-Government Service to Agencies</u>

The E-Government Program Service Desk provides technical support and training for program websites, applications and E-Commerce stores and other services. In 2013, service response times improved to meeting or exceeding service level agreement times for responses 100% of the time that trend is continuing in 2014 The E-Government Service Desk focused on reducing overall time to resolution and improving communication through the lifecycle of a trouble ticket. Also, the Service Desk averaged 50 new and 50 resolved tickets per week, carrying an average of 20 open tickets on any given day. These metrics are openly shared with agencies through the Oregon GovSpace “E-GOV” collaboration portal.

<u>New Training Programs</u>

An important aspect of support is providing useful training to equip agencies with the knowledge to use E-Government services. A new training program was implemented that trained nearly 400

agency staff through 18 webinars and 8 classroom training sessions. The Service Desk team continues to build on the existing library of 41 how-to documents and 22 video tutorials providing on-demand self-help for agencies. Training information and resources can be found by searching for the "E-Gov Training" place on Oregon GovSpace.

Communications

A priority was improving communications to include timely and consistent maintenance notices, incident notifications, and live webinars for a widespread incident, monthly reporting and weekly meetings between the E-Government Travel Service staff and National Information Consortium (NICUSA) managers. Topics for presentations and discussions are determined by attendees through a survey sent out after each meeting.

Continual Service Improvement

At the end of each E-Government Program project, project lessons learned sessions are held. The lessons learned from these feedback sessions are used to identify improvement areas that can be implemented going forward. Executive sponsors of projects are askded to provide feedback on their level of satisfaction with the service provided. Sponsors are asked to score their level of satisfaction on a scale of 1-5 where 5 is excellent. The average level of satisfaction with the new E-Government Program projects delivered is 4.6

In the past year members of the E-Government Program, working for both ETS and NICUSA became ITIL v3 certified. ITIL is a globally recognized collection of best practices for managing information technology (IT) services to provide better service to the customer. The team continues to implement ITIL concepts to help improve service delivery, change management role and release practices, and continual process and service improvements.

Measuring E-Government Success

With the establishment of ETS E-Government Program's new delivery model success measures were established on the advice of the multi-agency Transition Team and were reviewed by their Directors or Deputy Directors

Public Measures

The E-Government Program selected DHM Research to assist in determining how to receive feedback from Oregonians how they use the internet to interact with government and their awareness of the services provided. This survey is conducted every 2 years. It is a key first step in learning how we can implement better ways to listen to the residents of Oregon. The internet gives us new opportunities dynamic conversations. This is the first step and the EBAP will guide the evolution and improvement of these measures. The survey results are attached to the end of the EPAB Annual report located at http://www.oregon.gov/epab

Online Services (1,829 provided)

An online service is defined as one where a resident can interact with the service online and complete the service online. Examples would be submitting an application, verifying a professional certification or renewing a license. Using this criteria provided by the Center for Digital Government, a single application could offer all three services. It does not include downloading a PDF form to a PC where it must be completed off-line.

Oregon's measures of online services are significant and are continually being enhanced. There currently is no requirement for an agency to report the services they deploy, though many do. The Secretary of State supported License Permits and Registrations system has over 1,000 applications identified using the criteria above. When the newly redesigned state portal is launched in this year, it will include interactive search capability for online services. We plan to populate this search with submissions from Oregon agencies so their online services will be easier for the public to find. This will also make it easier to identify new online services. Future reports will measure the growth in online services

- License, Permits and Registrations (LicenseInfo.oregon.gov) Online Services: 1,025
- Other Oregon.gov Non Licensing Online Services: (http://www.oregon.gov/Pages/OL_services.aspx): 113
- Data services provided through data.oregon.gov: 658
  (for example looking up Active Trademark Registrations, Consumer Complaints, Agency Expenditures, etc. are all available through the enterprise open data platform)
- E-Government Provided Online Services not already reported: 33

Oregon Counties

The E-Government landscape with Oregon counties hasn't changed much since the last report of the Oregon Broadband Advisory Council. Fiscal challenges continue to restrict robust E-Government development at the county level, although technological advances have increased many counties abilities to provide more on-line services for their residents and taxpayers. Most of Oregon's 36 county governments have embraced the Internet as a means to communicate with their constituents about county services and activities.

Thirty four Oregon counties have individual websites offering a variety of E-Government functions from paying property taxes on-line, to finding out how to license a dog or get a permit for building a new house. Many counties offer information about jail inmate incarceration and release, and access to human services programs such as drug and alcohol treatment. County websites are where election results are posted and information about candidates and ballot measures are listed. Residents in most Oregon counties can find information about applying for a concealed handgun license on their county's website.

Most Oregon counties offer access to the myriad of forms needed by homeowners and contractors when construction or remodeling is undertaken. On-line access to environmental forms is common. In some counties, those forms can be filled out and returned electronically.

There is access to the GIS maps realtors and contractors rely on. Several counties continue to report a decided decrease in foot traffic at county offices from realtors and contractors who need those maps and a decided increase in traffic to their websites for that information.

Several counties offer mobile apps for various county functions. Several offer streaming audio and video for public meetings, most notably boards of commissioners and county courts. Some of the larger population counties offer streaming video of planning commission meetings along with other informational video productions.

Public records are still a big part of Oregon county websites in 2014. Minutes and agendas of meetings are archived along with news releases, department informational white papers, ordinances, codes and proclamations. In several counties, active citizen interest in public records has led to an increase in public records requests, which in some counties, cannot be done on-line, but rather has to be done in-house at some expense and time.

In those counties that have a transient lodging tax, information about how that revenue is collected is usually found on the county website along with the prerequisite forms.
In those counties with websites and parks, information about where those facilities are located and hours of operation are usually found on the county website. In some cases, there is information about permits or fees and the ability to apply for the permit or pay the fee on-line.
Employment information is offered on virtually every county website. In addition to job openings in county government, many county websites offer links to other employers seeking applicants.

County clerks offer many services in addition to the elections function. They issues marriage licenses and domestic partnerships and serve as a clearinghouse for passports. It is crucial that citizens and residents have clear information about where to obtain those important documents and when the clerk's office is open. Many county websites serve that need well.

However, not all Oregon counties are functioning at a high level on-line. Two counties share websites with local chambers of commerce. Four counties do not offer property tax payments on-line. In some cases, county officials are reluctant to incur the expense of on-line property tax payments or ask their taxpayers to incur the expense involved. In most cases, payment of property taxes has a fee of 2.5% of the total or a flat fee for an electronic check. The payments are fairly consistent across the state for those counties that offer the service. A handful of Oregon counties offer the opportunity to pay court fines and traffic fines on-line.

In 2014, most Oregon counties are embracing on-line E-Government services. As technology evolves, most Oregon counties see an opportunity to continue to address the needs of residents and taxpayers on-line. For those counties who haven't been able to function at a high level with E-Government services or the use of websites and utilization of broadband services, it is simply a matter of economics. During the recent economic downturn and the downsizing of federal forest payments, strapped counties put E-Government services on a wish list, despite the knowledge that such services are in the long run, more efficient and cost effective.

Oregon's diverse terrain offers challenges to the delivery of E-government services. In several remote areas of the state, access to the internet is either non-existent or extremely slow. This challenge is best met by the private sector offering more and better service to rural residents.

Elected Oregon county commissioners and county judges and other elected county officials understand and appreciate the need for electronic communication with their constituents and the need for E-government services. Oregon residents and taxpayers expect the best from their county governments and using technology is a valuable tool to provide vital public services.

All of Oregon's thirty-six Counties now have a website ranging from basic static pages to highly-developed sites that provide transactional services. A URL directory is included as Appendix B.

Oregon Cities

Cities in Oregon continue to expand their use of the Internet in the delivery of government services and information to their citizens. 218 of Oregon's 242 incorporated cities have websites offering citizens information and services. Increasingly citizens are able to utilize the Internet to directly engage their city government, in terms of general communication, participation in governance and signing up for services on-line.

The more fortunate cities have been able to invest in significant new service provision technologies, while frustration on the part of smaller cities continues as available budget dollars are a barrier to broadband expansion.

The following is a brief update from two of Oregon's more active cities in E-Government technology deployment:

City of Springfield

Springfield is Oregon's ninth largest city, with a population of 60,000.The City of Springfield currently offers a multitude of services online in support of the development community and public. Several of these services are offered through a partnership with the State of Oregon and their ePermitting system. These services provide contractors the ability to apply for building permits, schedule inspections, check the status of permits and pay fees on-line without having to call or physically come to City Hall. This access also provides the public the ability to research current and past building permits in the City of Springfield on-line. The information available to the public through these system's include information on the Owner, Contractor, Fees Paid, Permit Status, Inspection dates and Inspection results. All of the information available is easily retrieved with a limited amount of information, such as site address, project name or Map Tax Lot Number. These services can also be utilized for broad queries based on types of permits or date ranges.

Another on-line resource the City of Springfield has developed is public on-line access to all of the Building address files, which contain permit applications, fee records, and code information.

Also available with the system is access to all of the City's Planning application files, as well as City Council and Planning Commission Agendas, Meeting Packets and Minutes. The Laser Fiche system can be conveniently accessed through links on the City's web page.

The City has moved a substantial portion of its procurement activity to an online function. The City of Springfield utilizes email and the City webpage exclusively for solicitation of informal and formal quotes for capital construction, for all large procurements and some intermediate procurements. The Instruction to potential bidders, along with plans and specifications, are posted to the webpage, and an email is sent out via mailing list to potential contractors. The email contains notification of the solicitation and a link to where pertinent information about the solicitation can be reviewed and downloaded. In addition, we have moved to hosting the abridged documents for formal sealed capital construction bids on the City webpage. We also post all addenda and clarifications to any solicitation on the webpage, moving away from use of fax and standard mail.

The City of Springfield Development and Public Works Technical Services Division recently made available Springfield GIS data to the public. The result is, MapSpring, available at http://webgis2.metroplanning.com:8080/mapspring/mapspring.html.

MapSpring allows the public to query Springfield GIS data in a familiar web browser interface as they are already familiar with in Google Maps or Bing Maps. The application's intent is to better serve the citizens of Springfield by providing easier access to GIS data and other Springfield Development and Public Works information.

MapSpring provides a wealth of information commonly requested by the public including roadways, sewer and storm infrastructure, council wards, zoning, parks and special districts. It also includes basic tax lot and address information, natural resource features such as flood and wetlands information, major landmarks and almost a 20-year span of aerial photos. Furthermore, the public can search for a location by address, view related tax lot information, identify surrounding addresses and easily access County Assessor's Maps for a desired location. The application also includes on-line help, technical contacts and Frequently Asked Questions for efficient use of the application.

MapSpring was built with Open Source Software to demonstrate that Open Source is a viable alternative to vendor supplied software systems. Commercial software can cost tens of thousands of dollars to purchase plus tens of thousands of dollars per year in maintenance agreements, costs incurred before any application development can begin. Alternatively, Open Source Software is free to the public and the development cost for this application supported small local business.

City of Eugene

The City of Eugene's Community Broadband Adoption Strategic Plan may be found at: http://www.oregonbroadbandplanning.org/Engaged-Communities/Community-Plans/G1plans/EugenePlan.pdf

The City of Eugene continues to offer the community enhanced access to information and services through broadband channels by adding web applications. During the past year, the major focus of web development has been on replacing obsolete and antiquated public safety systems.

Since 1966, the epicenter of the region's law enforcement information technology has been the IBM mainframe-based Area Information Records System (AIRS). In its heyday, AIRS was a cutting edge system, allowing shared access to person-based law enforcement information that was a model for much of the rest of the nation. Like other mainframe-based systems, AIRS became outdated and was at the end of its usable lifecycle.

Over the past several years, a competitive industry of law enforcement systems has thrived, offering affordable commercial solutions with features that far exceed AIRS or any other in-house built systems. After a lengthy selection process, involving many employees from Police, Fire, ISD and Springfield, the cities chose SunGard OSSI as the next law enforcement Records Management System (RMS) and Computer-Aided Dispatch (CAD).

SunGard is more than police records and dispatch. It's an enterprise-wide system that transformed public safety services into a virtually paperless operation. In addition to office efficiencies, the new system provides data and tools that support Eugene Police Department's crime reduction strategies.

Highlights of the new system include:

- A state-of-the-art CAD system
- Map-based Automatic Vehicle Location (AVL) for Police and Fire vehicles
- Paperless police reports and citations
- Map-based crime analysis module with predictive policing
- Integrated investigative case management
- Police-to-Citizen portal for reports and information
- Tight integration with many systems for evidence, pawned property, court and multi-agency reporting

The first phase allowing AIRS-independent operation was completed December, 2013. Additionally, the Eugene Planning Department kicked off a 3-year pilot project in response to under-represented youth in computer science. Digital Dojo's is a Eugene/Springfield - Lane Community College - School Districts initiative funded in the summer of 2014 by the City of Eugene Telecommunications Program. Planning and Community Development staff based the pilot program on a white paper submitted to the Future Directions in Computing Education Summit (2014) and research by Dr. Joanna Goode, professor at the University of Oregon in the College of Education. "In Oregon in 2013 only two Native Americans, two Black and three Latino students took the AP Computer Science exam, and none of these students of color were girls. We have vast inequities developing with the access students have to learning CS.

Successful students have exposure by attending computer camps, robotics clubs and other adult structured experiences." (From Joanna Goode's address at the 2104 Computer Science Education Launch at Lane Community College).

The pilot project "Digital Dojos" addresses both of these issues. The Dojo creates a dynamic learning environment that draws industry into its creation and operation, employs computer science faculty, and focuses on underrepresented high school students. It employs an innovative combination of structured education, work-based projects, and collaborative methods, all in one strategic locale downtown. The result? A thriving, educational space that builds skills, knowledge, and confidence in the underrepresented youth involved, leading them into the high-demand, high-wage occupations of the computer science industry (to the benefit of the industry as a whole).

Oregon Tribes

There are nine federally recognized Tribes within the State of Oregon. All of the Oregon Tribes have websites that provide information about governmental services. Typical information includes tribal law and code, plans, forms, permits, public meeting notices, agendas, meeting minutes, and job announcements. Most of the websites provide maps with information like land boundaries, roads and service locations, directions, etc. One website offers extensive streaming video of public meetings.

Few of the websites provide opportunities for interaction with the exception of providing e-mail contacts for elected officials and administrative departments. A few tribes offer informal discussion forums on social networking sites like Facebook, Twitter and Google +.

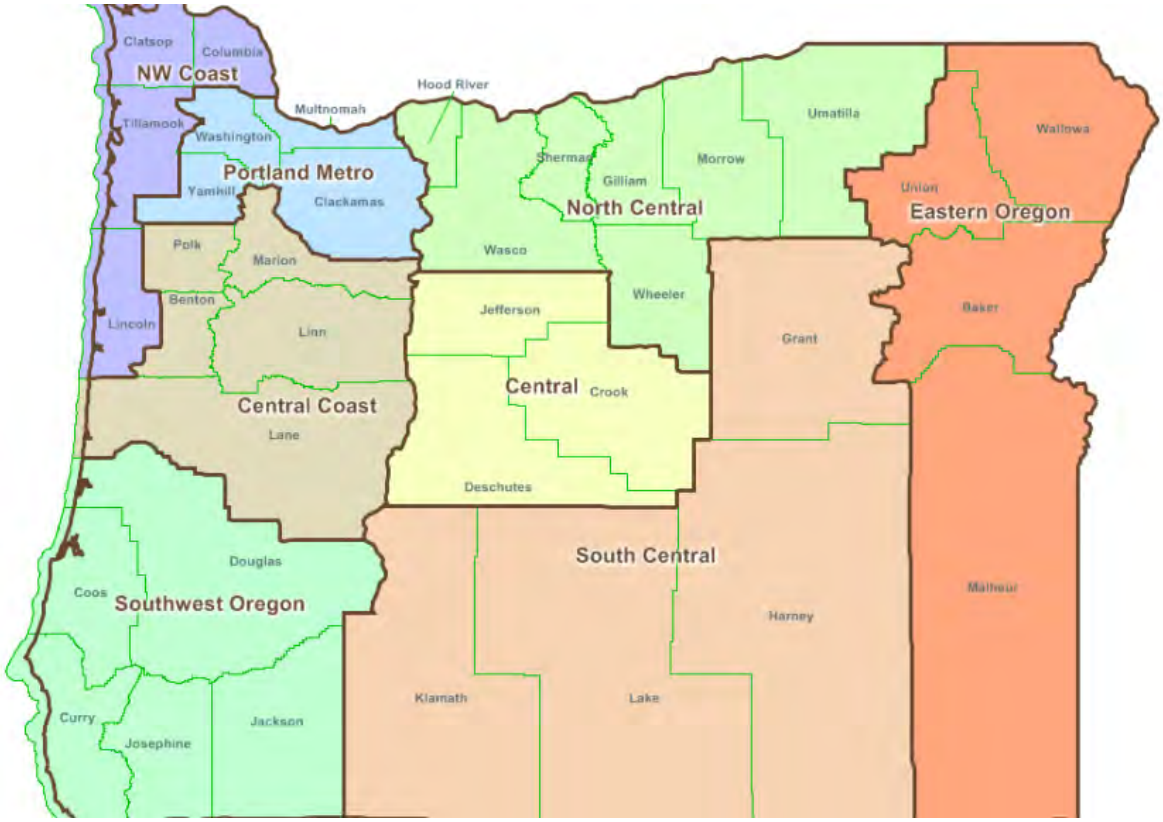
Listserv or E-mail notification services, online bill or fee pay, and online forms submission is very limited. However, most Tribes have exclusive portals for information sharing within the tribal organization. These may provide information and opportunities for interactivity that do not exist at the public website.

Tribe	URL
Burns Paiute Tribe	http://www.burnspaiute-nsn.gov/
Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians	http://ctclusi.org/
Confederated Tribes of the Grand Ronde	http://www.grandronde.org/
Confederated Tribes of the Umatilla Indian Reservation	http://ctuir.org/
Confederated Tribes of the Warm Springs	http://www.warmsprings.com/
Confederated Tribes of Siletz Indians	http://www.ctsi.nsn.us/
Coquille Indian Tribe	http://www.coquilletribe.org/
Cow Creek Band of Umpqua Tribe of Indians	http://www.cowcreek.com/
Klamath Tribes	http://klamathtribes.org/

Oregon Broadband Adoption Survey – 2014

The State of Oregon, through the Public Utility Commission of Oregon, applied for and was awarded a grant from the National Telecommunications and Information Administration through the State Broadband Data and Development Program (SBDD) to collect statewide broadband data. The Oregon Business Development Department on behalf of OBAC is a sub-recipient of the grant to implement a second Oregon Broadband Adoption Survey, following an earlier 2010 telephone survey. The 2010 Survey report published in 2012 may be viewed at http://www.oregon.gov/Broadband/Documents/OR%20Broadband%20Adoption%20Survey%20Report%202012.pdf.

This study was designed to measure the rate of broadband adoption and use across the state and identify the key factors that influence the adoption rate. Other objectives included determining user perceptions of broadband and levels of customer satisfaction across the different regions of the state and demographic groups. The 2014 and 2010 survey questionnaires were kept consistent to create time series data and to display trends and measure changes. Some questions were added in the survey instrument to identify the devices Oregonians use to connect to the Internet and additional Internet activity choices. Oregon data were also compared to key nationwide statistics regarding Internet and broadband adoption.



Eight State Regions

Data for the 2014 Survey was collected using wireless and landline telephone surveys conducted in February and March of 2014 among Oregon residents age 18 or older. 4017 survey interviews

were completed. The margin of error for the entire sample is plus or minus 1.5 percentage points at a 95% confidence level. A total of 138 surveys were completed in Spanish.

Findings:

- 87% use the Internet.

- 82% use broadband / high-speed Internet at home, which is above the national rate of 80%, though has leveled off at the same percentage observed in the 2010 survey.

    - Home broadband use among Oregon Hispanics, who make up 12% of Oregon's population, is significantly lower (66% in 2014 compared to 80% in 2010). A significantly higher percentage of individuals who've never used the Internet are Hispanic.
    - Significantly fewer Oregonians with less than a high school education are using broadband at home (53% vs. 60% in 2010).
    - There are significant variations in adoption and use across the different regions of the state.
    - Computer ownership, whether it's a desktop, laptop or tablet PC, is highly correlated with home broadband use.
    - Home broadband use among smartphone-only users is significantly lower than among those who have a desktop, laptop or tablet PC (86% vs. 97%).

- 84% have a desktop, laptop or tablet PC at home.

- 42% have a tablet PC at home.

- 91% have either a basic cell phone or smartphone.

- 60% have a smartphone.

- 31% have a basic / traditional cell phone.

- 5% have a smartphone only and not a desktop, laptop or tablet PC.

- 38% have a cell phone or smartphone but no landline at home.

- 97% of those who have either a desktop PC, laptop PC, or tablet PC use the Internet.

- 97% of those earning $75K or more annually use home broadband.

- 93% of college graduates use home broadband.

- 68% of Internet non-users earn less than $30,000 in household income.

- 42% of Internet users access the Internet at a cafe or other type of business.

- 51% of all home Internet users say they use cable as their primary connection type.

- Cost continues to be the primary reason for not having home broadband service.

- Using the Internet for social networking is significantly more common than it was in 2010, as 69% of Oregonians now perform this activity, vs. 63% in 2010. This increase is attributed mainly to the oldest age group, as 47% of those 65 and older have participated in social networking in the past 30 days, up from 33% in 2010. Significant increases in social networking were also observed among Hispanics and non-white/non-Hispanic Oregonians.

- As cell phone/smartphone adoption has reached 91% statewide, an increasing number of Oregonians are dropping landline phone service in favor of cellular phone service.

Access Devices:

- Tablet PCs and smartphones have replaced a significant portion of desktop PCs and basic cell phones. The percentage of desktop PC owners has decreased significantly since 2010, from 72% to 57%. On the other hand, quite significant increases have occurred in the ownership of tablet PCs (8% to 42%) and smartphones (33% to 60%).

- Ownership of basic cell phones in Oregon has decreased from 54% to 31%, obviously being replaced by smartphones. The youngest Oregonians (age 18-29) are 2.8 times more likely than someone age 65 or older to have a smartphone.

- Hispanic Oregonians are significantly less likely than other racial/ethnic groups to own a desktop, laptop or tablet PC, while they are just as likely as white adults to own a game console or smartphone. Hispanics in Oregon are significantly more likely than non-Hispanics to live in a cell-phone-only household.

- The primary device used to access the Internet at home correlates more strongly with age than any other demographic. Forty-one percent (41%) of Internet users aged 18-29 use a smartphone as their primary connection device, while older age groups are more likely to use a desktop PC (57%).

- Hispanic and non-white/non-Hispanic respondents are significantly more likely than white respondents to use a smartphone as their primary device for accessing the Internet.

Internet Use:

- Eighty-seven percent (87%) of Oregonians use the Internet, which is statistically unchanged since the 2010 study (88%). Oregon's current rate of Internet use is exactly the same as the nationwide Internet usage rate of 87%.

- Ninety-five percent (95%) of Oregonians aged 18 to 29 use the Internet. Internet use drops significantly at age 65 or older (72%), but this is significantly higher than nationwide Internet use within the 65 or older age group (72% vs. 57%).

- Hispanics are significantly less likely than other racial/ethnic groups to use the Internet. Furthermore, Internet use among this group (74%) is significantly lower than it was in the findings of the 2010 survey (84%).

- Internet use continues to be more prevalent in the Portland area and Central Oregon. The South Central (-6%) and Eastern (-5%) regions each show significantly lower percentages of Internet use.

Places Internet Users Access the Internet:

- Among all users, 96% access the Internet at home. The percentage of Hispanics connecting at the public library has increased from 31% in 2010 to 45% in 2014.

- Younger adults aged 18 to 29 are becoming extremely mobile and comfortable accessing the Internet from virtually anywhere. Just over half of this age group connect to the Internet at four or more locations. Conversely, 55% of those aged 65 or older access the Internet only at home. Among Internet users who don't access the Internet at home, 54%

Home Internet Connection Type:

- Statewide, cable Internet service is significantly more prevalent than it was in 2010 (51% vs. 43%). Conversely, the percentage of DSL connections is significantly less common (25% vs. 34%). The greatest increases since 2010 among those who use cable are found in Northwest Coast, Southwest Oregon, and North and South Central regions. DSL is still used by over half in the Eastern Oregon region.

- Mobile / Cellular Internet access has increased significantly in the Portland area and has decreased significantly in Central Oregon as a specified connection type at home. Hispanics are significantly more likely to use only a Mobile/Cellular connection at home (29%) than white (7%) and non-white/non-Hispanic Internet users (15%).

Home Broadband Adoption:

- The demographic factors most correlated with home broadband adoption continue to be age, household income and educational attainment. Adults aged 18 to 49 are significantly more like to have broadband Internet access at home compared to those aged 50 or older. Oregon seniors aged 65 and older, however, are more likely than seniors across the nation to have broadband at home (64% vs. 47%; note this excludes mobile/cellular access for national comparison purposes.)

- Higher income households and college graduates are significantly more likely to have broadband at home.

- Hispanics are less likely than other racial/ethnic groups to use the Internet. Therefore it's not surprising that home broadband adoption among Hispanics (66%) is significantly lower than non-Hispanics.

- Statewide home broadband adoption is at 82%. Just 69% of adults in South Central and 67% in Eastern Oregon subscribe to broadband service at home.

Reasons for Not Using the Internet at Home:

- Cost-related reasons are the highest-rated overall, especially among not-at-home Internet users, 60% of whom rated monthly cost a 4 or 5. The percentage who rated the cost-related reasons a 4 or 5 is similar to the percentage in 2010.

- Among those who have never used the Internet, cost-related reasons are not as common as are reasons pertaining to discomfort and perceived need

- Among those who have never used the Internet, top reasons are related to discomfort and perceived need: "I am not comfortable using a computer" (43%), "There is nothing on the internet I want to see" (39%), and "I am worried about all the bad things that could happen" (34%). Among all respondents who don't use the Internet at home, significant increases have occurred with all reasons related to discomfort and perceived need. This supports other findings that Internet use is near saturation levels in the state overall.

- Internet users who don't use the Internet at home have alternate access locations, as 54% access either at work, 50% at someone else's house and 49% connect at the public library. A significant increase over 2010 was observed for the reason "I have all the access I need through my cell phone or wireless device," which is likely due to the rise in tablet and smartphone use.

Interest in Using the Internet in the Future:

- The percentage of those who are either somewhat or very interested has decreased significantly from 20% to 13%.

- A wide gap exists between survey periods with regard to the percentage of broadband non-adopters who are past users, as 45% were interested in 2010, compared to 29% this year.

Satisfaction with Internet Service

- Overall, Oregonians are generally satisfied with their Internet service. When asked to rate overall satisfaction with their service provider using a 5-point scale, 75% of home broadband users rated them either a 4 or 5. There was little variance in satisfaction ratings by income, educational attainment, or by racial/ethnic group, although older respondents (65+) and female respondents were generally more satisfied.

- Compared to the 2010 findings, significantly fewer respondents rated connection speed a 4 or 5.

- Residents with broadband access in Portland Metro and the Central Coast regions are significantly less satisfied with their connection speeds compared to four years ago. Portlanders are also significantly less satisfied with their connection reliability in 2014 compared to 2010. South Central Oregon was the only region that saw improvement in satisfaction ratings across the board. Overall satisfaction across the state does not vary much by region, although South Central Oregon is trending higher and Eastern Oregon is trending lower.

The full 2014 Oregon Broadband Adoption Report was published in August 2014 and is posted on the OBAC website at www.broadband-oregon.org and the Oregon Broadband Map website at www.broadband.oregon.gov.

Broadband Related Challenges and Opportunities

Community Broadband Strategic Planning

OBAC believes that local community and business leaders, elected officials and tribal governments should continue to engage in proactive strategic planning to realize and accelerate broadband adoption and utilization for economic and community development, and should initiate that process where it has not begun. Local engagement is key to success.

In 2012, the Oregon Business Development Department on behalf of OBAC received a grant to fund the *Oregon broadband Outreach and Strategic Planning Project*. The project is part of the State Broadband Data and Development Program funded through the American Recovery and Reinvestment Act (ARRA) http://www.ntia.doc.gov/category/state-broadband-initiative. The grant is administered by the National Telecommunications and Information Administration and was distributed through the Oregon Public Utility Commission.

The project facilitated and supported the development of plans in eight communities from around the state; the City of Eugene, the City of Myrtle Point, the City of Sandy, the City of Sherwood, the Cities Monmouth and Independence, the City of The Dalles and Wasco County, Klamath and Lake Counties, and the Warm Springs Indian Reservation. The strategic plans seek to advance each individual community's goals through the increased adoption of broadband services and increased utilization of broadband-enabled applications. The focus of the plans is not on broadband infrastructure, but on broadband adoption and utilization. Nevertheless, OBAC believes that this type of planning effort can also have a positive long term impact on infrastructure development as the best incentive for continued investment in broadband telecommunications infrastructure is a growing market of paying customers.

OBAC sought and selected participants that were already motivated and excited to engage in broadband strategic planning, and that also had a robust broadband infrastructure in place. It was interesting to note that communities that had been locally proactive in the past in deploying broadband infrastructure, were also communities that stepped forward to engage in planning process for adoption and utilization. Five of the eight communities that participated in the project have municipal or tribal owned fiber networks in service.

Local participants included representatives from the key community sectors of education, government, public safety, libraries, health care, business, broadband service providers, and individual citizens. One of community Task Forces included representatives from an area Air National Guard military base.

The project employed a consultant to assist in organizing and facilitating the planning meetings, collecting the input and documenting the output. This was very valuable in effectively using the time of the community team members. The consultant captured the issues, ideas, and strategies discussed, and documented them in a draft plan for further consideration and editing by the community task force. After review and refinement, a final version of the Broadband Strategic Plan is provided to the members of the task force for approval.

Community goals established in the strategic plans included understanding and mitigating the barriers to adoption of broadband, increasing broadband adoption rates and residential subscription rates to levels above the national average, using the community's broadband resources to recruit businesses to locate in the community, increasing the number of residents telecommuting in the community, using broadband technology to expand P-20 educational opportunities, improving health and education outcomes by leveraging telehealth and on-line learning, and growing businesses to create jobs and improve economic growth.

Sample Community Strategies from the plans included:

- Promotional campaign to improve broadband awareness *(this proved to be an issue even among the community leaders. Even Task Force members were unaware of all the community's assets).*

- Integrate broadband into the region's economic development plans and efforts. (Many city, county, chamber of commerce and economic development organization plans do not currently incorporate broadband – Many community websites fail to even mention it even though it is a key site selection factor for businesses of all sizes)

- Develop high capacity broadband access in collaboration with service providers in libraries, schools, new housing developments and business corridors.

- Create awareness of, and competency in digital skills for the entire population through mentoring and partnerships.

- Enhance health-care through expanded telehealth services.

- Train and retain technologists and entrepreneurs in area schools and colleges, and integrate technology education in elementary education.

- Integrate broadband into the region's economic development efforts to develop more home-based businesses and telecommuters.

- Develop at least one high capacity broadband public access point in collaboration with schools, churches, and other community institutions

- Develop an e-commerce zone in downtown

- Open a proctored broadband access space after school hours for school-age children.

- Position the city as tech-friendly hubs of entrepreneurism and innovation.

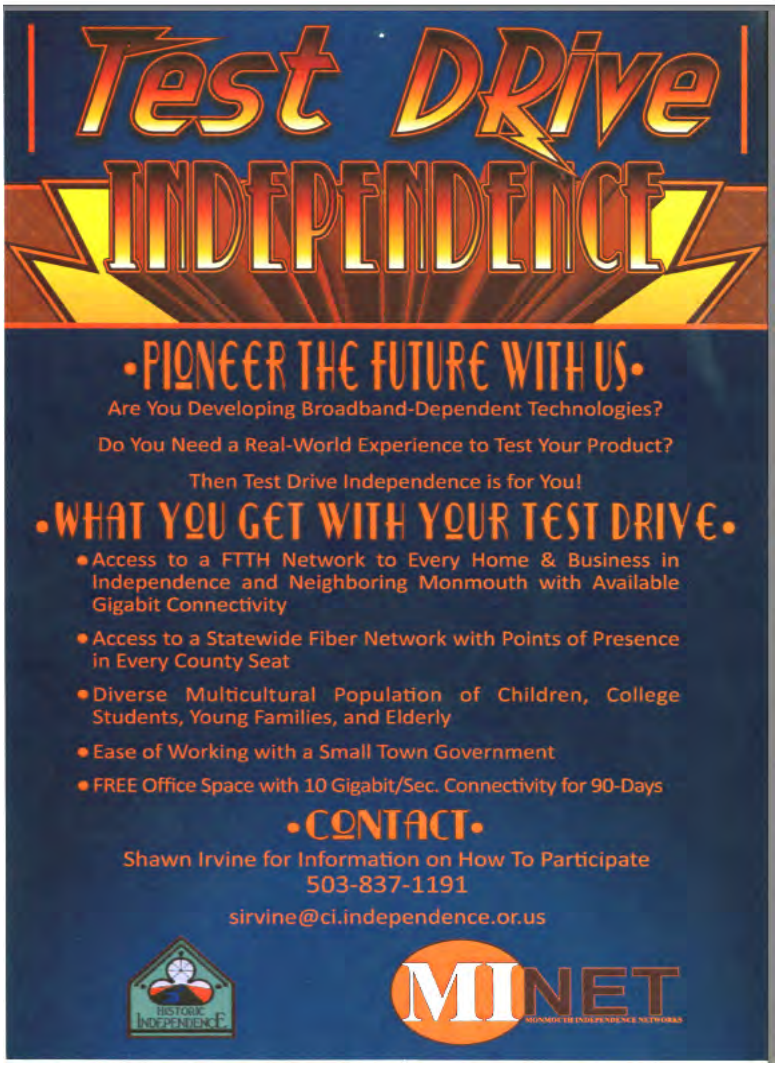
- Recruit higher learning and knowledge industry satellite campuses by leveraging the community's connectivity.

- Create high capacity Broadband access and mentoring at libraries and senior centers.

- Provide a more bandwidth-rich multi-modal student experience through broadband utilization throughout the K-14 school system.

- Establish digital equity across the school district

A particularly innovative strategy was developed by the city of Independence. It offers broadband applications companies a community "Test Drive" including free Office Space with 10 Gbps broadband service for 90 days, and access to a Gigabit fiber-to-the-home network in a diverse multi-cultural community to develop next generation broadband technologies and applications .



Test Drive Independence

The project developed a broadband adoption strategic planning template that can be used by communities as a guide on what to do and how to do it. The process seeks to build community wide collaboration and cooperation to promote the utilization of broadband telecommunications as a strategic tool for economic and community development. It begins with identifying a sponsor for the project; mayor, city manager, council member, county commissioner, judge or other honored citizen who can garner interest and participation of other community leaders, and also a local project manager to organize and host the planning meetings and handle communications. The process engages them in the preparation of a project charter to define the mission and goals of the local task force; the time commitment, the scope of activity, and the community needs or problems to be addressed. The project ran for two years with the last local community plan completed in May 2014.

A Communities Broadband Briefing Book providing a look at best practices was developed and served as a Tutorial on Broadband and how it can be used for economic development, education, healthcare, government, public safety and energy management. Other informational resources such as the National Broadband Plan, and NTIA's Broadband Outreach, and Broadband Adoption Took Kits, along with other references were also made available. Two outreach videos was produced to generate awareness of the project, the tools it developed, and to stimulate local community interest in broadband planning, and to document the project. The briefing book and links to the videos are on the project website www.oregonbroadbandplanning.org.

Key lessons learned in working with the eight local communities included:

- Power of local champions – the availability of broadband infrastructure and rates of adoption and utilization can be significantly influenced by local champions.

- Power of local engagement in producing results.

- Value of Awareness - infrastructure does not produce value unless it is put to use and the community needs to be aware that it exists and its potential value to solve problems and support economic and community development.

- Value of a structured process to convene community leaders – great things can happen by just getting people together in the same room

- Value of public libraries - proved to be an extremely important resource, and critical source of broadband access for the public)

- Value the time of volunteers – participation and effectiveness is enhanced by minimizing the time commitment of the participants.

It is hoped that Communities with successful plans can share their experiences with other communities across Oregon through organizations such as the Telecommunications Advisory Committees of the Association or Oregon Counties and League of Oregon Cities, as well as the

Oregon chapter of the National Association Telecommunications Officers and Advisors (www.natoa,org).

OBAC will continue its outreach to Oregon communities across the state to become engaged. Broadband adoption strategic planning resources, the eight community plans, the outreach video, and other information may be viewed on the broadband planning project website at www.oregonbroadbandplanning.org.

K-12 Schools

OBAC believes that Information technology and broadband network access are now essential infrastructure for Oregon schools. Oregon's K-12 schools are currently moving to implement common core standards and the Smarter Balanced system for student assessment.

Current and detailed information on broadband network access and supporting IT infrastructure in Oregon's K-12 schools is not available for needs assessment, policy development and strategic planning. The current status of facilities and the technical and financial needs facing these key community anchor institutions statewide is not known. Anecdotal data indicates that there is currently a wide range of broadband access and supporting facilities in place in Oregon's schools and a wide range of preparedness for the digital future.

Broadband Access and supporting IT Infrastructure Impacts

- Staff and student access to upcoming *Smarter Balanced* on-line student assessment applications (2014-15)
- Staff and student ability to meet *Common Core Standards*
- Staff and student access to digital course content materials and information
- Staff and student access to web/cloud based educational resources
- Staff and student digital literacy required for college and career success
- Staff access to administration and reporting applications
- Staff ability to distribute information and communicate with parents and other stakeholders
- Staff access to professional development resources

Broadband network capabilities directly affect education delivery, student learning and student achievement. Oregon needs to adopt standards for IT and broadband access in its schools and plan for how these essential resources bill be funded. The FCC recently issued orders that may produce significant benefits for Oregon on this issue.

FCC E-Rate Program

In 2014, the FCC significantly enhanced its E-Rate Program, the federal government's largest education technology program supporting Internet connectivity and other communications services for schools and libraries. The changes commit at least $1 billion in support to local area Wi-Fi network deployments next year to connect over 10 million students across the country in

2015, followed by another $1 billion in 2016 with predictable support continuing in future years. FCC action on the E-Rate Program changes this summer would allow new rules to be in place for the 2015 Funding Year. This will be a resource that Oregon may use to address the K-12 broadband access challenge.

ConnectED Initiative

In 2013, the White House announced the ConnectED Initiative. The goal of this federal initiative is to connect 99 percent of America's students to the internet through high-speed broadband and high-speed wireless within 5 years by focusing on upgrading connectivity, training teachers and encouraging private sector innovation all of which is alignment with the needs the Council identified http://www.whitehouse.gov/blog/2013/06/06/what-connected.

Public Safety

Oregon needs to continue to plan for a statewide migration to the next generation of public safety communications technology. Oregon has long been pursuing interoperability in the state's public safety communications systems.

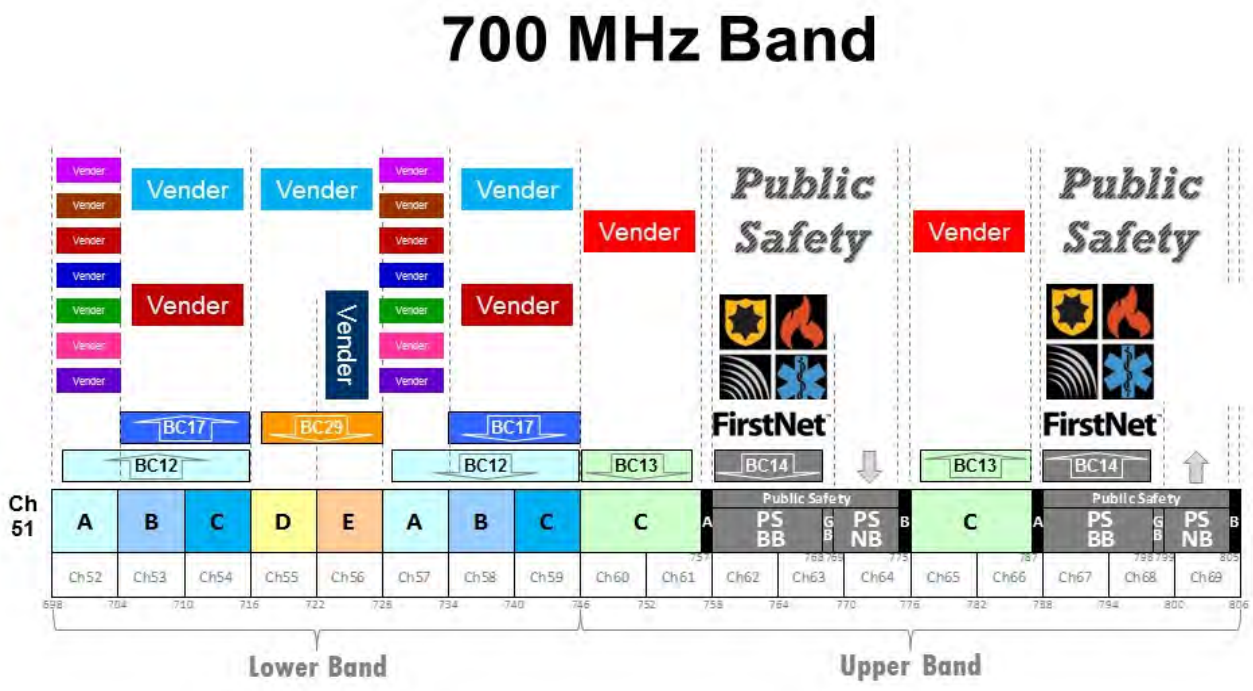
> *"It is the policy of the State of Oregon to encourage and support the rapid deployment of broadband telecommunications services in areas of the state where such services do not exist, to support redundancy of critical telecommunications assets in order to ensure homeland security protections in the state and to ensure that a secure conduit is available for emergency communications and public safety networks in all Oregon communities."* [ORS 401.706]

FirstNet

FirstNet is a national initiative to build a nationwide broadband public safety network supported by federal funds and dedicated public safety radio frequency spectrum www.firstnet.gov. FirstNet will provide Oregon with an opportunity to address long standing needs and public policy goals for public safety communications.

The U.S. Congress has allocated the "D-block" (758 megahertz to 763 megahertz and between 788 megahertz to 793 megahertz) radio spectrum for use by public safety agencies.

- D-Block Allocation: **P**rovides public safety officials across the country with the same radio frequency spectrum resource, a portion of the 700 MHz wireless airwaves known as the D-Block.
- Funding: $7 billion in dedicated funding is provided to deploy a nationwide, wireless, broadband network using the D-block spectrum. This will be funded with spectrum auction revenues, not tax dollars.
- Public Safety Input: Provides for public safety input and leadership by the states in the development, operation, and maintenance of the first responder network.
- Governance: **A**n independent First Responders Network Authority to manage the public safety network has been created and is housed within the National Telecommunications and Information Administration (NTIA), and will have separate leadership, including a board with public safety, commercial, federal, state and local expertise to oversee the D-Block license and development of the network.



Dedicated Public Safety Spectrum

The mission of the First Responder Network Authority (FirstNet) is to establish a nationwide, interoperable broadband network for America's first responders and other public safety workers. It is an ambitious mission that implements one of the final recommendations of the federal 9/11 Commission—and will fundamentally change the way public safety communicates. Oregon's

Jeff Johnson, CEO of the Western Fire Chiefs Association and former Chair of the Oregon State Interoperability Executive Council is a member of the FirstNet Board of Directors.

Oregon, through the Oregon Department of Transportation, received a federal grant of $2.1 million to help Oregon prepare for outreach and data collection in support of FirstNet deployment. The State and Local Implementation Grant Program is:

- Supporting planning, consultation and outreach activities as Oregon prepares for FirstNet.
- Funding efforts to collect data on existing infrastructure and equipment that could be used by FirstNet in building out the national system.

The grant has a performance period of three years and is broken into two phases. FirstNet in Oregon is currently performing Phase 1 activities:

- Establishing or enhancing a governance structure to consult with FirstNet.
- Developing procedures to ensure local and tribal representation when the state is consulting with FirstNet.
- Conducting education and outreach for all relevant stakeholders.
- Identifying potential public safety users for FirstNet.
- Developing a standard memorandum of agreement to facilitate the possible sharing of infrastructure with FirstNet.
- Developing plans to involve local and tribal stakeholders in Phase 2.
- Updating the Statewide Communications Interoperability Plan (SCIP) to include public safety broadband initiatives or create a complementary plan.

Phase 2 activities will support infrastructure data collection activities that may assist FirstNet or continue Phase 1 activities. Phase 2 funds will be released to Oregon when:

- FirstNet has approved and released the data elements and collection methodology.
- The National Telecommunications Information Agency works with Oregon to collect updated budgets and then with the grants office to approve the modified budgets and release the Phase 2 funds.

Oregon's FirstNet efforts are currently managed by the Department of Administrative Services CIO Office with governance oversight coordinated by the State Interoperability Executive Council and the Governor's Office. A website for public outreach and information distribution has been established at www.firstnetinoregon.org.

FirstNet – State of Oregon Consultation

FirstNet Deputy General Manager T. J. Kennedy has outlined the state consultation process from the federal government.

- Consultation is an active process, not a single event. FirstNet will collaborate and partner with stakeholders in a meaningful consultation process.

- FirstNet will communicate the consultation process and necessary roles and responsibilities. It will be clear to the stakeholders what the process is and what the expectations are for those involved.
- Consultation will focus only on critical information and data. FirstNet will focus on gathering only necessary data to help build the network.
- Plan development will be iterative. Stakeholders and FirstNet will have the opportunity to refine information and improve drafts.

Oregon's first consultation meeting with FirstNet was held on October 8, 2014 in Salem. The consultation process culminates with the creation of the state plan. State plans will be created with the information gathered during the consultation process and presented to each state's Governor in the 2016-2017 time-frame with full implementation by 2022.

The State of Oregon may choose to opt-in or opt-out of FirstNet. If Oregon chooses to opt-out, it will be required to develop an alternate plan to serve the state and interconnect with FirstNet. That alternate state plan will be subject to the approval of the FCC. Local communities and their first responders also have the ability to choose whether or not to subscribe to FirstNet services.

The Council believes that the FirstNet initiative provides an opportunity to further leverage federal funds and resources to meet the state's broadband and public safety needs.

Disaster Recovery Planning

Disaster Recovery Planning is a topic of great public and political interest following major disasters. Unfortunately, that public interest typically fades over time once a disaster event has passed.

Oregon needs the discipline to actively engage in sustained and ongoing disaster recovery planning. The top three hazards facing Oregon are flood, earthquake, and tsunami. These hazards are low frequency, but can have a high impact. The probability of a major Pacific Northwest event is 100%. The last major quake was in January 1700 and there is evidence of many others over the past 10,000 years.

The Council is concerned that infrastructure services such as telecommunications, water, energy, and transportation may take months and possibly years to recover from a major disaster event and the Oregon Coast and Willamette Valley will likely be the hardest hit. Eastern Oregon will need to serve as the staging area for recovery efforts, given a major disaster.

Functional telecommunications systems will be critical and essential to public and private recovery efforts. Telecommunications networks can anticipate severe damage to infrastructure, including

- Central Offices
- Remote Terminals

- Internet Exchange Points
- Submarine Cables and Landings
- Outside Plant
- Suspended Ceilings
- Raised Floors
- Equipment
- Control Cabinets
- Battery racks
- Cable trays, overhead racks
- Switches
- Computer systems
- Vaults
- Transmission towers
- Emergency power generators

Additionally, the restoral of telecommunication systems are dependent on other infrastructure resources including electric power, transportation, as well as the availability of skilled technicians. These resources are all likely to be limited following a major disaster event as described in the 2013 report to the Legislative Assembly in the *Oregon Resilience Plan* http://www.oregon.gov/OMD/OEM/osspac/docs/Oregon_Resilience_Plan_Final.pdf submitted by the Oregon Seismic Safety Policy Advisory Commission.

The Oregon Office of Emergency Management and the Federal Emergency Management Administration (FEMA) need to continue to plan for and establish post-event channels of communication to the Oregon's telecommunications service providers so that these agencies will be in a position to know the status of the telecommunications networks statewide to effectively support recovery efforts.

Oregon needs to engage in an ongoing process of hazard identification, risk assessment, stakeholder engagement, risk prioritization, and risk mitigation. Oregon needs "resilience" in its infrastructure to minimize damage and enable a more rapid recovery from disasters. Electric power and telecommunications will be key to the success of emergency response and recovery efforts.

Effective disaster preparedness requires planning, personnel training, and plan implementation exercises.

- Incident: Occurrence – caused by human, technological, or natural phenomena – that requires response actions to prevent or minimize loss of life, or damage to property, the environment, reputation, financial or other impact areas.

- Event: Pre-planned to ensure an emergency doesn't occur, and system is in place to respond if necessary.

Disaster events may be natural, technological or human (accidental or intentional).

Having a plan in place, personnel trained in the plan, and practiced in putting the plan into action serves to reduce confusion in an emergency, support the efficient use of resources, and improve safety, coordination, and communication.

It should also be noted that for employees of organizations to be prepared to respond effectively to an emergency at work, they must be prepared at home. It is valuable to create a *culture of emergency preparedness and awareness* organizationally and individually.

Federal Funding Programs

The importance of broadband infrastructure and the utilization of broadband have been recognized by the federal government which has begun a series of initiatives and funding programs administered by the U.S Department of Agriculture (USDA), the National Telecommunications and Information Administration (NTIA), and the Federal Communications Commission (FCC). Oregon needs to fully utilize and leverage the broadband related federal initiatives and funding programs as they become available to help meet the state's future broadband needs.

USDA Rural Development has had some of the longest standing broadband programs and has invested $66.3 million in new and improved broadband infrastructure and services for rural Oregon. These programs include:

Farm Bill Broadband Loan Program

This program is designed to provide loans for technology neutral funding for the costs of construction, improvement, and acquisition of facilities and equipment to provide broadband service to eligible rural communities. Applicants may be either a nonprofit or for-profit organization, and must take one of the following forms:

- Corporation
- Limited liability company (LLC)
- Cooperative or mutual organization
- Federally recognized Indian tribe or tribal organization
- State or local government

www.rurdev.usda.gov/utp_farmbill.html

Community Connect Grants - USDA Rural Utility Service

The following entities are eligible for funding:

- Incorporated Organizations
- Indian Tribes or Tribal Organizations, as defined in 25 U.S.C. 450b (b) and (c).
- State or local units of government, or
- Cooperative, private corporations or limited liability companies, organized on a for-profit or not-for-profit basis

http://www.rurdev.usda.gov/utp_commconnect.html

Distance Learning and Telemedicine Program
The Distance Learning and Telemedicine (DLT) Grant Program is specifically designed to assist rural communities in acquiring distance learning and tele-medical technologies so that local teachers and medical service providers who serve rural residents can establish interactive video conferencing links to teachers, medical professionals, and other needed expertise located at distances too far to access otherwise. This video connection links the rural students, rural patients, and rural residents needing various services directly to the source of services needed in their communities, with the local service providers as intermediaries and beneficiaries.

Entities providing education and medical care via telecommunications including corporations or partnerships, Indian tribes or tribal organizations, state or local units of government, consortia, and private for-profit or not-for profit corporations. Individuals are not eligible.
http://www.rurdev.usda.gov/UTP_DLT.html

Telecommunications Infrastructure Loan Program - USDA Rural Utility Service
The Telecommunications Infrastructure Loan Program makes Long-term direct and guaranteed loans to qualified organizations for the purpose of financing the improvement, expansion, construction, acquisition, and operation of telephone lines, facilities, or systems to furnish and improve Telecommunications service in rural areas. All facilities financed must be capable of supporting broadband services. RUS makes Loans to:

- Entities providing, or who may hereafter provide, telephone service in rural areas
- Public bodies providing telephone service in rural areas as of October 28, 1949
- Cooperative, nonprofit, limited dividend or mutual associations
- RUS does not make loans to individuals or partnerships

http://www.rurdev.usda.gov/utp_infrastructure.html

USDA field staff support contact information for all of the USDA programs may be found at http://www.rurdev.usda.gov/UTP_GFRContact.html.

The FCC, with its strong new focus on broadband, is another source of significant funding.

FCC Connect America Fund
The FCC has adopted reforms of its Universal Service Fund (USF) and Intercarrier Compensation (ICC) systems to accelerate broadband build-out. This funding program is directed at telecommunications carriers and reflects the new focus of the FCC on broadband rather than basic voice service.

Earlier this year, the FCC announced that funding of $3 million for Oregon is going to CenturyLink and Frontier Communications to support broadband deployment in rural areas of their service territories. CenturyLink Communications reported that the funds will be used in the following counties: Baker, Clatsop, Douglas, Harney, Hood River, Jackson, Jefferson, Josephine, Klamath, Lake, Lane, Lincoln, Malheur, Polk, Umatilla, Union, and Wasco.

This is a new emerging set of programs that should be monitored for funding opportunities. http://www.fcc.gov/encyclopedia/connecting-america.

FCC Broadband Experiments Program

On July 14, 2014, the Federal Communications Commission (FCC) issued an Order establishing a $100 million budget for broadband experiments to advance the deployment of voice and broadband-capable networks in rural, high-cost areas, including extremely high-cost areas. The order also establishes a methodology for selecting winning applications which must be submitted by 90 days from release of the Order.

Earlier this year, fifteen Rural Broadband Experiments Expressions of Interest were submitted to the FCC for Oregon projects.

The FCC order may be found at http://www.fcc.gov/document/rural-broadband-experiments-order.

FCC E-Rate Program

As was noted in the Education section of this report, the FCC has significantly enhanced its E-Rate Program, the federal government's largest education technology program supporting Internet connectivity and other communications services for schools and libraries. The changes have committed at least $1 billion in support to local area Wi-Fi network deployments next year to connect over 10 million students across the country in 2015, followed by another $1 billion in 2016 with predictable support continuing in future years. The FCC action on the E-Rate Program changes adopted this past summer allow the new rules to be in place for the 2015 Funding Year.

The FCC continues to phase out the voice-focused Universal Service Fund and migrate to the broadband-focused Connect America Fund http://www.fcc.gov/encyclopedia/connecting-america.

Funding for Rural Infrastructure

On July 24th, the White House Rural Council Announced $10 Billion Private Investment Fund to Finance Job-Creating Infrastructure Projects in Rural America targeting hospitals, schools, water and wastewater systems, energy projects, broadband expansion, local and regional food systems, and other rural infrastructure. The White House press release may be viewed at: http://www.whitehouse.gov/the-press-office/2014/07/24/fact-sheet-increasing-investment-rural-america

Oregon Special Public Works Fund (SPWF) – State of Oregon

The State of Oregon is also a source of funding. The Oregon Business Development Department administers the Special Public Works Fund (SPWF) which provides funds (primarily loans) for publically owned facilities that support economic and community development in Oregon. Public agencies that are eligible to apply for funding are cities, counties, county service districts

(organized under ORS Chapter 451), tribal councils, ports, districts as defined in ORS 198.010, and airport districts as defined in ORS 838). Facilities and infrastructure projects that are eligible for funding include telecommunications facilities, however, for telecommunications projects the applicant must establish that the proposed telecommunications system project is necessary and would not otherwise be provided by a for-profit entity within a reasonable time and for a reasonable cost. More information on SPWF may be found at http://www.orinfrastructure.org/Learn-About-Infrastructure-Programs/Interested-in-a-Community-Development-Project/Special-Public-Works-Fund/ .

Funding Summary

Broadband infrastructure will always be a work-in-progress. These funding programs coupled with local strategic broadband planning will enable Oregon to further develop its broadband resources.

Cyber Security

The security of data and communications system is a growing challenge for individuals and organizations. Oregon can benefit from an increased focus on and coordination of cyber security education, training and workforce development.

The cost of a data-breach is now estimated to be $216 per lost record and can potentially bankrupt companies. The loss of access to the Oregon Secretary of State's website for many weeks due to a hacking attack in 2014 underscores government vulnerability. The U.S. National Security Administration (NSA) has identified the Bonneville Power Administration, with a significant presence in Oregon, as the most vulnerable large target in America. Individuals face the risk of identity theft that can ruin credit ratings that can take years to restore.

The Oregon University System and its Engineering Technology Industry Council (ETIC) is working on an initiative to establish an Oregon Center for Cyber-Excellence (OCOE) to coordinate and leverage cyber-security activities in state and to serve as a point of contact for private and public organizations. The concept is also supported by the Technology Association of Oregon which has conducted a needs assessment and developed a Cyber Studies Strategy for Oregon. This plan is posted at http://www.techoregon.org/sites/default/files/uploads/OM/COE%2020140505%20FINAL.pdf

In another initiative, Mount Hood Community College (MHCC) has established a Cyber Security and Networking Associate of Applied Science degree program. The MHCC program is designed to train students for and to obtain industry recognized certifications such as CCNA, CompTIA, and EC-Council. Program information may be found at http://www.mhcc.edu/CIS.aspx?id=3068.

On a national level the U.S. Office of Personnel has created the US Cyber-Corp Scholarship for Service Program to increase the pool of cyber-security professionals available to protect the

government's critical information infrastructure https://www.sfs.opm.gov/. This program offers opportunities for state and local governments recruit service interns and graduates of the program to Oregon.

Oregon's Attorney General, Ellen Rosenblum, hosted a cyber-security and big data symposium earlier this year to explore cyber-security issues and the related risks facing Oregon's citizens and organizations. In addition, local government organizations such as the League of Oregon Cities, Association of Oregon Counties, National Association of Telecommunications Officials and Advisory-Oregon Chapter, Oregon Municipal Finance Officers Association and Oregon Association of Government Information Technology Management (OAGITM) are also actively engaged in protecting local public service delivery systems.

OBAC joins the Oregon University System, the Office of the Oregon Attorney General, and the above local government associations in promoting this issue and raising the public level of awareness so that individuals and organizations can effectively manage their risks.

Concluding Remarks

On October 29, 2013, the U.S. Senate confirmed Tom Wheeler as the chair of the Federal Communications Commission (FCC). Upon his confirmation, Commission Wheeler issued the following statement.

> *"What excites me about this new responsibility is how we are at a hinge moment of history; the Internet is the greatest communications revolution in the last 150 years. We must all dedicate ourselves to encouraging its growth, expanding what it enables, and assuring its users' rights are respected."*

To date, through its forward looking public policy and progressive service providers, Oregon has greatly benefited from this "revolution." Key broadband challenges and opportunities facing Oregon include strategic planning at the local community level, broadband access in K-12 schools, public safety communications, disaster recovery planning, infrastructure funding, and cyber security.

Access to competitive high-speed broadband telecommunication networks and the Internet is essential for Oregon's institutions, businesses and individual citizens, and is a valuable asset and strategic tool for economic and community development. Continued public policy development and action are required to ensure that Oregon's broadband needs are met in the future and that broadband benefits are realized. OBAC believes that broadband will continue to grow in importance and in public awareness as a valuable asset and strategic tool available for economic and community development for the benefit of all Oregonians.

Appendix A
What is Broadband?

Broadband is a general term used to represent a wide range of telecommunications technologies and services which utilize a faster data transmission rate than that available over the standard voice grade telephone line, which is 56 Kbps and usually less. Broadband is also widely referred to as "high-speed" Internet access service.

Until 2008, the FCC's official definition of broadband was a transport service offering a minimum data transmission rate of 200 Kbps in one direction. That year, the FCC established a set of Broadband Tiers:

Tier	***Rate***
1	200 Kbps up to 768 Kbps
2	768 Kbps to 1.5 Mbps
3	1.5 Mbps to < 3.0 Mbps
4	3.0 Mbps to < 6.0 Mbps
5	6.0 Mbps to < 10.0 Mbps
6	10.0 Mbps to < 25.0 Mbps
7	25.0 Mbps but < 100.0 Mbps
8	100.0 Mbps and beyond

FCC Broadband Service Speed Tiers

Tier 1 is characterized as "First Generation Data." 768 Kbps is now the minimum data transmission rate for "Basic Broadband." Tiers 3 through 8 reflect the range of service speeds available and expected to become available from providers.

In its National Broadband Plan, the FCC proposes a goal that every household and business location in America should have access to affordable broadband service with actual download speeds of at least 4 million bits per second (Mbps) and actual upload speeds of at least 1 Mbps with the further recommendation that the FCC review and reset this target every four years. The FCC is currently considering a goal of at least 10 Mbps download and 1.5 Mbps upload.

Many different technologies are employed to deliver broadband services in Oregon including Digital Subscriber Line (DSL), Cable-Modem, wireless (mobile 3G / 4G, fixed, satellite), and fiber to the premises (FTTP). These service technologies range in transmission performance from 200 Kbps up to 1 billion bits per second (Gbps) and beyond.

Broadband services in Oregon are available from a wide mix of service providers including telephone companies, cable companies, competitive access providers, fixed and mobile wireless providers, municipal and consortia providers, and satellite service providers.

Appendix B
Website URL Directory of Oregon Counties

www.bakercounty.org

www.co.benton.or.us

www.clackamas.us

www.co.clatsop.or.us

www.co.columbia.or.us

www.co.coos.or.us

www.co.crook.or.us

www.co.curry.or.us

www.co.deschutes.or.us

www.co.douglas.or.us

www.co.gilliam.or.us

www.gcoregolive2.com (Grant)

www.co.harney.or.us

www.co.hood-river.or.us

www.jacksoncounty.org

www.co.jefferson.or.us

www.co.josephine.or.us

www.klamathcounty.org

www.lakecountyor.org

www.co.lane.or.us

www.co.lincoln.or.us

www.co.linn.or.us

www.malheurco.org

www.co.marion.or.us

www.morrowcountyoregon.com

https://multco.us/

www.co.polk.or.us

www.co.sherman.or.us

www.co.tillamook.or.us

www.co.umatilla.or.us

www.union-county.org

www.co.wallowa.or.us

www.co.wasco.or.us

www.co.washington.or.us

www.wheelercountyoregon.com

www.co.yamhill.or.us

Appendix C
Oregon Broadband Advisory Council Members – 2014

The mission of the council is to encourage coordination and collaboration between organizations and economic sectors to leverage the development and utilization of broadband for education, workforce development, government and healthcare, and to promote broadband adoption by citizens and communities. The council members represent Oregon's cities, counties, telecommunications service providers, tribes, educators, economic development organizations, public safety agencies, healthcare providers, E-Government, the Public Utility Commission, the State House of Representatives and the State Senate. Members of the Council were appointed by the Governor, the Speaker of the House and the President of the Senate.

Council Members

Susan Ackerman
Commissioner and Chair
Public Utility Commission of Oregon

Anne Carloss
Director of Special Education
Hood River County School District

Brian Clem
Representative
Oregon House of Representatives

Chris Denzin
Vice President & General Manager
CenturyLink - N. Oregon / S. Washington

Miles Ellenby
Associate Professor of Pediatric Critical Care Medicine
Medical Director, Telemedicine Program
Doernbecher Children's Hospital / Oregon Health and Science University

Ted Ferrioli
Senator
Oregon State Senate

Joseph Franell **(Council Chair)**
General Manager and CEO
Eastern Oregon Telecom

Mary Beth Henry **(Council Vice-Chair)**
Deputy Director, Office for Community Technology
City of Portland / Mt. Hood Cable Regulatory Commission

Wade Holmes
Vice President of Technology
BendBroadband

Lonny Macy
Community and Economic Development Planner
Confederated Tribes of Warm Springs

Julie Pearson
IT Governance Lead
Oregon Department of Administrative Services

Dave Sabala
General Manager
Douglas Electric Cooperative

Michael Smith
Commissioner
Sherman County

Tom Worthy
Captain
Oregon State Police

Staff:
Christopher Tamarin
Telecommunications Strategist
Oregon Business Development Department
121 SW Salmon Street, Suite 205
Portland, Oregon 97204
503 508-0178 Phone / Cell
503 581-5115 Fax
christopher.tamarin@state.or.us

Council Website URL: www.broadband-oregon.org

Appendix D
Oregon Broadband Advisory Council Activity Summary 2010-2014

The Oregon Broadband Advisory Council (OBAC) was created in the 2009 Legislative session to help ensure the implementation of statewide broadband strategies. The mission of the council is to encourage coordination and collaboration between organizations and economic sectors to leverage the development and utilization of broadband for education, workforce development and telehealth, and to promote broadband utilization by citizens and communities. The council members represent Oregon's cities, counties, telecommunication service providers, Tribes, educators, economic development organizations, public safety agencies, healthcare providers, e-government experts, the Public Utility Commission, the State House of Representatives and the State Senate.

OBAC began meeting in January 2010 and is now in the fourth year of its six year statutory life. As of November 2014, the Council has convened forty-nine times to discuss, deliberate, and report on broadband issues, economics, technologies, and public policy as they relate to the interests of Oregonians. OBAC presenters (in chronological order) are listed below, and OBAC meeting attendees have represented the organizations listed below.

The Council prepared and submitted *Broadband in Oregon* reports to the Legislative Assembly and the Governor in November of 2010, 2012 and 2014. It also produced the *Gas & Electric Utilities Broadband Deployment Report* and *Broadband Outreach Survey Report* in 2012.

OBAC participated several State Broadband Data and Development Program grant projects administered by the National Telecommunications and Information Administration and the Oregon Public Utility Commission.

- OBAC participated in the Oregon Broadband Mapping Project and the 2010 Oregon Broadband Adoption Survey
- OBAC was a grant sub-recipient and directly supervised the Oregon Broadband Outreach and Strategic Planning Project and the 2014 Oregon Broadband Adoption Survey.

OBAC reports and projects are posted on the Council website at www.broadband-oregon.org.

OBAC presenters (in chronological order) have included:

2010
Rep. Jefferson Smith
Ray Baum, Oregon Public Utility Commission
Roger White, Oregon Public Utility Commission
Dawn Bonder, Oregon Health Information Technology Oversight Council
Milo Mecham, Lane Council of Governments
Barbara Young, CenturyTel

Frank Miller, BendBroadband
Michael Weidman, LSN
Brant Wolf, Oregon Telecommunications Association
Fred Ziari, EZ Wireless / IRZ Consulting / OnSmart Technologies
Doug Cooley, Comcast
Phil Garrett, MINET
Mike Dewey, Oregon Cable Telecommunications Association
Judy Peppler, Qwest
Vicki Walker, U.S. Department of Agriculture Rural Development
Joe Bradley, U.S. Department of Agriculture Rural Development
Scott Lazenby, City of Sandy
Dudley Slater, Integra Telecom
Cobi Jackson, One-Economy Corporation
Eddie Choi, One-Economy Corporation
Rebecca Yalch, Opinion Research Corporation
Bryan Conway, Oregon Public Utility Commission
Adam Grzybicki, AT&T Wireless
Mary Beth Henry, City of Portland

2011
Renee Willer, Frontier Communications
Rich Bader, Easystreet Online Services
Eric Schmidt, Association of Oregon Counties
Michael Lainoff, Lane Community College / Small Business Development Center Network
Mark Gregory, Lane Community College / Small Business Development Center Network
Doug Cooley, Comcast
Steve Noel, Oregon Department of Transportation / Oregon Wireless Interoperability Network
Andrea Crosby, Citizens Utility Board
Rebecca Yalch, Opinion Research Corporation
Cobi Jackson, One-Economy Corporation
Brant Wolf, Oregon Telecommunications Association
Sean McSpaden, Oregon Department of Administrative Services
Wally Rogers, Oregon Department of Administrative Services
Bill Casale, iLinc
Heather Burks, Oregon Department of Administrative Services
┐ oger White, Oregon Public Utility Commission
Carla Wade, Oregon Department of Education
Mary Beth Henry, City of Portland
Kristi Wilde, Oregon State Interoperability Executive Council (SIEC)
Kim Lamb, Oregon Health Network
Rebekah Dohrman, League of Oregon Cities
Carol Robinson, Oregon Health Information Oversight Council
Doug Cooley, Comcast
Jeff Nicol, Gorge Technology Alliance

Tom Potiowsky, Portland State University
Marilyn Harbur, Oregon Department of Justice
Linda Blacklock, Oregon Department of Justice
Rebecca Yalch, ORC International

2012
Shelley Jones, Oregon Public Utility Commission
John Horvick, Davis Hibbitts and Midghall, Inc.
Tom Lauer, Oregon Department of Transportation
Paul Baldwin, Fortune Data Centers
Brant Wolf, Oregon Telecommunications Association
Barbara Young, CenturyTel
Michael Lainoff, Lane Community College / Small Business Development Center Network
Mark Gregory, Lane Community College / Small Business Development Center Network
Carla Wade, Oregon Department of Education
Steve Noel, Oregon Department of Transportation / FirstNet
Albert Gauthier, Oregon State Police
Steve Viotolo, Oregon Department of Transportation
Renee Willer, Frontier Communications
Peter Trnavskis, Oregon Health Network
Dr. Miles Ellenby, Oregon Health & Science University/ Doernbecher Children's Hospital
Michael Seelig, Oregon Education Investment Board
Will Saunders, Washington State Department of Commerce
Ed Arabas, Oregon Department of Administrative Services
Philip Woods, Oregon Department of Administrative Services

2013
Zach Holander, NetCity Inc.
Michael Lainoff, Lane Community College / Small Business Development Center Network
Laura Cleland, Association of Oregon Counties
Carla Wade, Oregon Department of Education
Amy McLaughlin, Oregon Department of Education
Michael Seelig, Oregon Education Investment Board
MaryKay Dahlgreen, Oregon State Library
Steve Noel, Oregon Department of Transportation / FirstNet
Brant Wolf, Oregon Telecommunications Association
David Bell, Fibersphere
Rock Rakosi, Myrtle Point Police Department / SIEC
Nancy Jesuale, NetCity Inc.
Yumei Wang, Oregon Department of Geology and Mineral Industries
Michael Curri, Strategic Networks Group
Craig Settles, Gigabit Nation
Vicki Walker, U.S. Department of Agriculture Rural Development

2014
Steve Noel, Oregon Department of Transportation / FirstNet
Neil Grubb, Freewire Broadband
Shawn Irvine, City of Independence
Don Patten, MINET
Ben Tate, Oregon Department of Education
Gillien Duvall, Oregon Office of Emergency Management
Bob Duehmig, Telehealth Alliance of Oregon
Cathy Britain, Telehealth Alliance of Oregon
Rick Williams, Leidos
Steve Boespflug, Pivot Group
Dave Nieuwstraten, Pivot Group
Laura McKinney, Oregon University System
David Childers, Compli
Ann Steeves, Portland General Electric
Dave Sabala, Douglas Electric Cooperative

OBAC meeting attendees have represented:

Ashland Home Net
Association of Oregon Counties
AT&T
AT&T Wireless
Azimuth Communications
BendBroadband
BroadMap
Central Lane 911
CenturyLink
CenturyTel
Charter Communications
Citizens' Utility Board
City of Eugene
City of Independence
City of Portland
City of Sandy
City of Springfield
CJSpeaks / Gigabit Nation
Clackamas Community College
Comcast
Compli
ComSpan USA
Comstructure Consulting
Converge Communications
Dale Hines Consulting
DAS-CIO-Economic Recovery Exec. Team
Davis, Hibbits & Midghall, Inc.
Day Wireless
Douglas Electric Cooperative
Douglas FastNet
EasyStreet Online Services
Electric Lightwave
EZ Wireless
Fibersphere
Fortune Data Centers
Freewire Broadband
Frontier Communications
Gorge Technology Alliance
Greenwire Broadband
Hermiston School District
High Desert ESD
Hood River County School District
Hunter Fiber
iLinc
Individual citizens representing themselves
Integra Telecom
Intel
Intermountain ESD
IRZ Consulting
J. Irwin Consulting

Keenwire
Lane Community College / Oregon Small Business Development Center Network
Lane Council of Governments
League of Oregon Cities
LSN
MiddleGate
MINET
Motorola
Mt. Hood Cable Regulatory Commission & Office for Community Technology
Multnomah ESD
NetCity, Inc.,
NWAX
Office of the Oregon Attorney General
Opinion Research Corporation
ORC International
Oregon Cable Telecommunications Association
Oregon Connections Academy
Oregon Department of Administrative Services
Oregon Department of Education
Oregon Department of Geology and Mineral Industries
Oregon Department of Revenue
Oregon Department of Transportation
Oregon Economic Recovery Executive Team
Oregon Education Investment Board
Oregon Governor's Office
Oregon Health Information Technology Oversight Council
Oregon Health and Science University
Oregon Health Network
Oregon Legislative Assembly
Oregon Legislative Fiscal Office
Oregon Office of Emergency Management
Oregon Public Utility Commission
Oregon State Interoperability Exec. Council
Oregon State Library
Oregon State Police
Oregon Telecommunications Association
Oregon University System
One-Economy Corporation
OnSmart Technologies
Opinion Research Corporation
PACE Engineers
Pivot Group, LLC
Portland General Electric
Portland Public Schools
Portland State University
Project A
Qwest
SAIC / Leidos
Salem-Keizer Public Schools
Sherman County
SNGroup.com
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