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Broadband Community Profile

Douglas County, Oregon

Building a Fiber Pathway Forward

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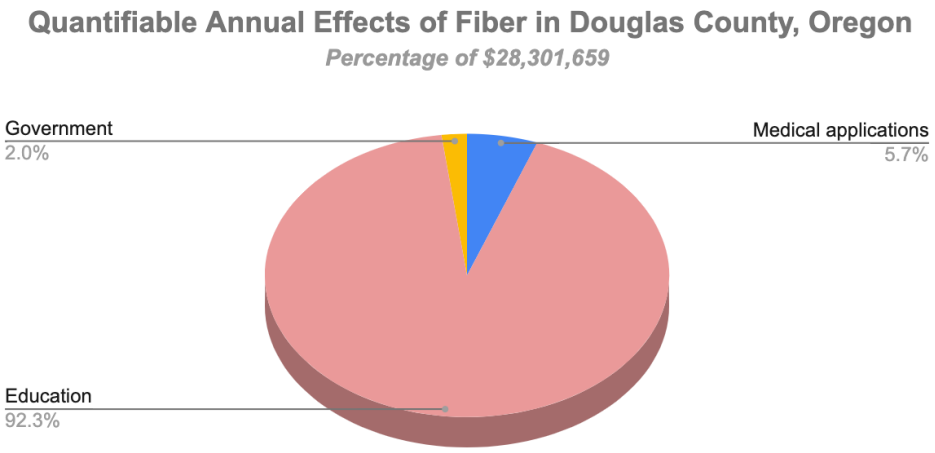
Executive **Summary**

- Douglas County was among the first municipalities in the state of Oregon to get symmetrical 1-Gbit/s Internet service and has remained among the first to embrace 10-Gbit/s backbone services, which will soon be offered as part of commercial and residential packages.
- Douglas Fast Net (DFN), based in Roseburg, Oregon, the county seat, was established as a subsidiary of Douglas Electric Cooperative (DEC) in 2000. Since then, DFN and DEC have followed an unorthodox but mutually beneficial route to adding value to the regional community of Douglas County and surrounding areas.
- To launch DFN and establish its network, citizens leveraged approximately $25 million in funding from a range of government entities and private contributors. In 2021, DFN was awarded another $25 million by the FCC's Rural Digital Opportunity Fund (RDOF) to complete its final fiber installations.
- Despite economic setbacks in Douglas County, fiber optic facilities have been key to preserving business in the region and have contributed significantly to healthcare, education, and government.
- Fiber has brought many intangible benefits to Douglas County, including support for fighting notorious wildfires that savaged the area's forests in 2020.
- While Internet service provider (ISP) competition ramps up in various parts of Douglas County, DFN's fiber infrastructure has become a source of revenue, as DFN is able to lease fiber to other carriers, even competitors.



	Amount	Category of effect
Medical applications	$1,600,000	Savings
Education	$26,128,359	Revenue
Government	$573,300	Savings

Douglas County by the Numbers

Area: 5,036 square miles
Population: 111,201
County seat: Roseburg, Oregon
Median home value: $199,200
Median age: 47
Median household income: $47,267
Percent of homes with broadband Internet: 81.4%
Poverty level: 13.3%
Gross domestic product 2020: $3.4 billion

Fiber in Douglas County

Approximate total cost to date: $25 million
Annualized cost of network to date: $1.13 million
Cost per mile of fiber: $8,931
Cost per subscriber: $1,995

Mt. Thielsen in the Cascade Mountains, Douglas County, Oregon. Source: Gary Halvorson, Oregon State Archives, via Wikimedia Commons

The rural U.S. is often perceived by city dwellers as a pastoral idyll, where dramatically beautiful vistas surround small towns that exemplify community values. This view masks one of the realities of rural life -- namely, the struggle for digital equality with metropolitan centers. Sadly, a lack of adequate Internet service can affect rural populations by keeping them from fully participating in twenty-first century healthcare, education, and business opportunities.

According to U.S. Census data, 17.3% of Americans have no access to broadband services[1] which are defined by the U.S. Federal Communications Commission (FCC) as 25 Mbit/s download and 3 Mbit/s upload. Some estimate that over 20% of U.S. households lack any home Internet access at all.[2] Further, there appears to be a correlation between lack of adequate Internet services and rural locales reporting economic stagnation and higher poverty levels.[3]

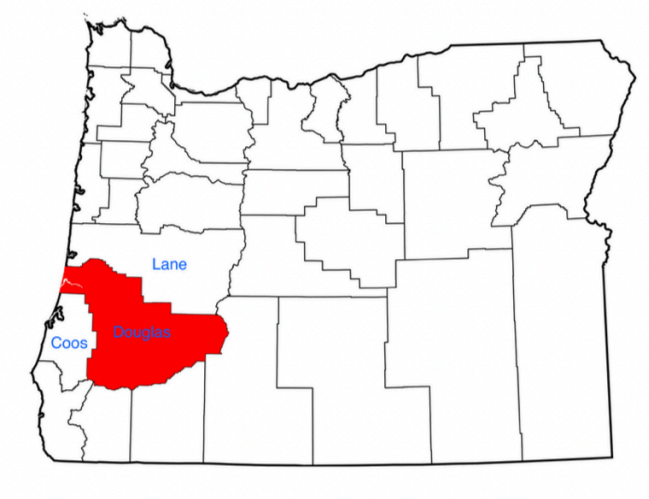
This case study profiles how one rural community in Oregon closed this digital divide. By leveraging a fiber backbone facilitated in part by the incumbent electrical service cooperative, residents of Douglas County launched Douglas Fast Net (DFN), based in Roseburg, Oregon, in 2000. DFN became one of the first Internet service providers (ISPs) in the state to offer symmetrical 1-Gbit/s Internet service. As of this writing, DFN is planning to install 10-Gbit/s service through a backbone upgrade, continuing a pattern of bringing value to local business, education, healthcare, and government agencies.

[1] U.S. Census website, accessed March 1, 2022, https://www.census.gov/quickfacts/fact/table/US/PST045221
[2] Catherine McNally, "Nearly 1 in 4 Households Don't Have Internet—and a Quarter Million Still Use Dial-Up," *Reviews.org*, August 17, 2021, accessed March 1, 2022, https://www.reviews.org/internet-service/how-many-us-households-are-without-internet-connection/
[3] Emily A. Vogels, "Digital Divide Persists Even as Americans with Lower Incomes Make Gains in Tech Adoption," *Pew Research Center*, June 22, 2021, accessed March 1, 2022, https://www.pewresearch.org/fact-tank/2021/06/22/digital-divide-persists-even-as-americans-with-lower-incomes-make-gains-in-tech-adoption/

Background of Fiber Infrastructure

Douglas County, Oregon, is the fifth-largest of Oregon's 36 counties. It covers a geographic area of 5,036 square miles (about double the size of Delaware), extending from a strip along the Pacific coast south and eastward into the Coastal Range and Cascade Mountains. The county contains large tracts of federal forest, as well as hundreds of thousands of acres of commercial timberlands and the entire watershed of the Umpqua River.

The population of about 111,201 is spread across the county in a density of 22 people per square mile, compared to over 40 people per square mile for the state as a whole.
The mostly rural population relies heavily for employment on the woodlands industry, as well as on healthcare and social assistance agencies, retail and wholesale businesses, a local casino resort, and a call center, among other businesses.



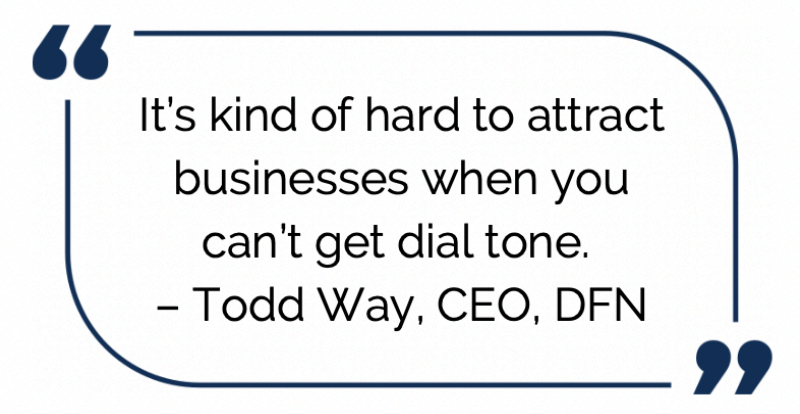
Douglas County and adjacent counties Lane and Coos in DFN service area. *Source: David Benbennick via Wikimedia Commons*

Over the past twenty years, Douglas County's economy, like others in rural areas of the Pacific Northwest, has been hit with setbacks. Businesses have moved their manufacturing facilities south or offshore. Forestry has been limited by the inability to harvest timber on federal lands. The situation has led to a reduced mean household income that is roughly 33% below the national average, a poverty level higher at 13.3% than the national average of 11.4%, and a median home value 9% lower than the U.S. average. Despite all this, the region has managed to steadily grow its gross domestic product and to sustain local business at a reasonable level. As we will see, this is thanks in part to the county's fiber-based broadband services.

Origins of a Fiber Provider

DFN was established in 2000 as a subsidiary of Douglas Electric Cooperative (DEC) and it became operational in 2001. That utility, founded in 1938, serves an area of over 2,200 square miles, covering not only Douglas County but portions of adjacent Coos County to the southwest and Lane County to the north (see map).

Two years prior to DFN's founding, the incumbent local exchange carrier (ILEC), US West, had reached its service capacity limit in the region but claimed an upgrade would cost more than consumers were willing to pay. As a result of the carrier's service limitations, users across Douglas County heard busy signals instead of dial tone when circuits were saturated.



Libraries and schools were forced behind the U.S. technology curve with manual procedures and little adequate computer service. The county had trouble recruiting new business. “It’s kind of hard to attract businesses when you can’t get dial tone,” said Todd Way, CEO of DFN.

At a large local hospital, Mercy Medical Center in Roseburg, staff deployed a self-styled “sneakernet” courier service because there wasn’t sufficient bandwidth to transmit medical records over the Internet. Even emergency-room physicians there got a “fast busy” when trying to reach necessary consultations with Oregon Health Sciences University in Portland.

As the situation came to a head, the Oregon Public Utilities Commission got involved and set up hearings to air concerns about the poor service. The Roseburg Chamber of Commerce formed a telecommunications task force, with representation from local businesses, educational institutions, healthcare facilities, and government. It was clear the community had a choice: to live with the faulty service or to create their own grassroots network.

Fiber from the Cooperative

From the start, the telecom task force was intent on delivering a fiber optic broadband service to local customers. When Qwest took over US West in 2000, the carrier upgraded its switches to digital models, eliminating the “fast busies,” but refused to lay a strand of fiber.

DEC seemed a sensible choice to spawn a new network. The cooperative utility had poles from which fiber could be strung. It had trucks. And it knew the economics of the region well.

At the time, other cooperative utilities in Oregon had begun to explore the potential to create regional telecom startups – a trend that would gain momentum over the next twenty years. So the gears started moving. In 2000, with widespread community support, DEC established DFN as a subsidiary with an initial mandate to provide institutional and commercial services.

The first service connections comprised three 1-Gbit/s Ethernet WAN links to the local medical centers in the county seat in Roseburg, including Mercy Medical Center and VA Roseburg Health Care System at the end of 2000. In 2001, DFN became fully operational, and by 2003, residential service was added via fixed wireless. Later, DSL service was added via leased lines from Qwest. But fiber was always the ultimate goal, and by 2005 DFN laid fiber optic links to most anchor institutions – schools, hospitals, and government offices – in Roseburg.

Douglas Fast Net (DFN) Fact Box

Headquarters: Roseburg, Oregon
Miles of installed fiber: 2,799
Installed sites: >13,000
Installed circuits (voice and data): >20,000
Subscribers: 12,531
Take rate: 70% to 90% in unserved areas; in competitive areas, 25% to 30%
Employees: ~ 80

Simultaneous to the formation of DFN, DEC, along with six Oregon electric cooperatives and one Native American tribe, formed a regional interexchange carrier called NoaNet Oregon. NoaNet Oregon connected the telecom subsidiaries to one another around the state and to major Internet exchanges.

NoaNet Oregon achieved its goal by entering into a long-term fiber optic lease with the Bonneville Power Administration (BPA), a federal agency that markets and creates the infrastructure to transmit electric power from the Bonneville Dam on the Columbia River. NoaNet Oregon also constructed its own fiber optic lines and purchased circuits from other carriers. In 2005, NoaNet Oregon became LS Networks, a for-profit corporation with stock held by the same owners, minus one of the original cooperatives.

Fiber Now

As of this writing, DFN has run 2,799 miles of fiber to over 13,000 installed sites containing over 20,000 voice and data circuits in the Douglas County region. Over 12,531 subscribers, representing roughly one-third to one-half the total population of Douglas County, have fiber-based services,. Symmetrical 1-Gbit/s fiber-optic service is available to businesses and homes in DFN's service area, and the company is planning a network upgrade to 10-Gbit/s residential and commercial service.

Over the past twenty years, DFN has extended its planned service area into nearby Lane and Coos counties, working with utilities and other phone companies and acquiring resources as needed. For example, in 2014, DFN purchased Orca Communications, a fiber-optic network provider owned by the Coquille Tribe of Native Americans in the Coos County cities of Coos Bay and North Bend. And in 2020, as the pandemic raged, DFN acquired all assets and employees of Comspan, another fiber-based network supplier with over 70 miles of infrastructure in the cities of Roseburg and Reedsport in Douglas County, as well as the municipalities of Bandon, Coquille, and Myrtle Point in Coos County.[4]

DFN also has made inroads in cellular networking. It now has over 70 fiber optic backhaul sites from which users can tap services from AT&T and other IXCs. The fiber currently handles LTE and is ready to support 5G as that becomes available.

DFN has been profitable since 2006, but much of its cash goes back into building out its network, a reality that has kept it from providing DEC with a dividend as hoped. And to complete its network, outside funds are still required. In 2021, DFN was awarded $25 million in funding from the FCC Rural Digital Opportunity Fund (RDOF), which will help DFN to bring fiber along its final stretch, the ocean-facing border of Western Douglas County.

[4] Comspan Communications Inc., "Douglas Services Inc. (D/b/a Douglas Fast Net) to Acquire Comspan Communications Inc.," *Newswire*, July 20, 2020, accessed March 1, 2022, https://www.newswire.com/news/douglas-services-inc-d-b-a-douglas-fast-net-to-acquire-comspan-21179006

Suppliers, Competition, Etc.

Douglas County's DFN has enlisted Ciena Corporation (NYSE: CIEN) and Juniper Networks Inc. (NYSE: JNPR) for its switching equipment. Adtran Inc. (Nasdaq: ADTN) supplies residential gear, including gigabit passive optical network (GPON) technology. Fiber is supplied by Corning (NYSE: GLW) with Preformed Line Products (PLP, Nasdaq: PLPC) providing hardware such as cable attachments and splice closures.

DFN belongs to the Northwest Telecom Association (NWTA) and the Oregon Telephone Association. Through DFN, citizens of Douglas County have participated in the FCC's Emergency Broadband Benefit Program, as well as the Affordable Connectivity Program to subsidize broadband subscriptions for impoverished households.

Over the past twenty years, Douglas County has caught up with other areas of the state in terms of Internet access. Spectrum, the ISP arm of Charter Communications (Nasdaq: CHTR), offers up to 1-Gbit/s fiber-based Internet services in Douglas County. Though Spectrum's high-speed Internet plans begin, like DFN's, at $50/month, Spectrum also offers separate cable TV services, which DFN does not. Along the Pacific coast, Ziply Fiber is gaining traction, with a $60/month Internet service supporting rates to 1 Gbit/s.

Despite the competition, DFN continues to maintain solidly competitive offerings and plans to increase those services as it finalizes its fiber build-out. Further, DFN has been in a position to lease some fiber resources to competing carriers and IXCs, creating a revenue stream with the potential to reduce costs for DEC customers in the future. Indeed, DEC views DFN as a potential source of dividends to its membership – though that remains a future goal.

DEC and DFN: **Mutual Benefits**

The relationship between the Douglas Electric Cooperative and its DFN subsidiary has been unusual from the start. Where most electric utilities looking to venture into telecom start by servicing their own electric substations with fiber, DFN began its service outside DEC's footprint, running fiber to anchor institutions at the county seat in Roseburg. In DEC and DFN's view, that was where at least 80% of data traffic originated, so it would be in the best interests of the community and the local economy to start there.

Starting in 2006, DFN began linking DEC's substations to fiber, and thanks to its subsidiary, costs were substantially lower than they would otherwise have been – later figures indicated that DEC spent $470,000 for 158 miles of fiber, roughly 19.5% of the total $2.4 million it cost to hook up the substations. So by 2011, DEC had paid just 20 cents on the dollar to extend its plant in a way that ensured it would be able to automate electrical connectivity.[5]

[5] These numbers are from an August 2018 profile of DEC and DFN by the National Rural Electric Cooperative Association (see References).

Key Features of DFN

Smart Grid	✓
Remote and Online Education	✓
4G LTE, 5G	✓
Managed WiFi	✓
FirstNet	✓
Healthcare Connectivity	✓
Enterprise Security and SLAs	✓
Government Connectivity	✓

Douglas County **Timeline**

2000 — Douglas County residents determine the need for a grassroots alternative to the incumbent carrier service. DEC joins NoaNet Oregon. DFN is established with funding from DEC and Douglas County.

2001 — DFN starts to extend fiber to anchor institutions in Roseburg, Oregon.

2003 — Residential service is introduced via fixed wireless.

2005 — NoaNet becomes LS Networks.

2006 — Fiber starts to be extended to DEC electrical substations.

2007 — Todd Way is hired as DFN CEO as part of a management restructuring for growth. DFN begins installing fiber to 71 cell towers in Douglas County.

2011 — Fiber connections are completed to county cell towers and to DEC substations. DFN introduces residential fiber broadband service – fiber to the home (FTTH).

2014 — DFN purchases Orca Communications, a fiber optic network provider in Coos County to help extend fiber network.

2017 — DFN becomes the first ISP in Oregon to offer symmetrical 1-Gbit/s fiber optic service to business and residential customers in Douglas County.

2020 — DFN acquires all employees and assets of Comspan, another fiber-based network supplier with over 70 miles of infrastructure in Douglas and Coos counties.

2021 — An award of $25 million in funding from the FCC's RDOF supports plans to upgrade fiber backbone to offer future 10-Gbit/s services throughout the region.

DEC has taken full advantage of its fiber infrastructure, equipping all of its substations with SCADA (supervisory control and data acquisition) and also AMI (advanced metering infrastructure) technologies. These smart-grid protocols automate control and monitoring of remote systems. They also are the precursors to future full smart-grid functionality, which entails distribution automation, whereby the entire grid is automatically regulated by sensors and monitors. This is a planned next step that could substantially reduce the cost to offer electrical service across Douglas County.

Today, DEC's subsidiary DFN has grown bigger than its parent. It has twice as many employees (at 80) than DEC and generates more revenue. But there are no plans for the two to separate.

Rounding Up Resources

Funding for DFN has come from an array of sources. Originally, DEC obtained roughly $5 million in a loan, which DFN paid; Douglas County kicked in $300,000. The Lane Council of Governments, a voluntary regional services support organization, passed through monies awarded as part of the National Telecommunications and Information Administration (NTIA)'s Broadband Technology Opportunities Program (BTOP) for DFN's fiber project. Funding also came from a variety of state and federal government programs. In all, DFN obtained and then invested approximately $25 million over a ten-year period to fund the rollout of fiber optic infrastructure. Most recently, DFN has been awarded $25 million in funding from the FCC's Rural Digital Opportunity Fund (RDOF) to finalize its network.

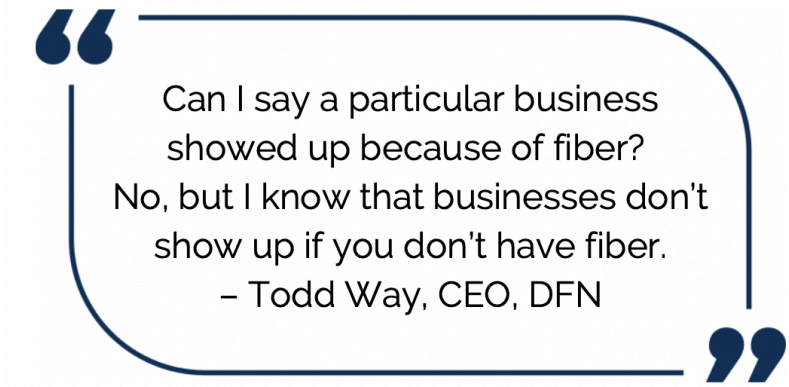
Original funding sources for Douglas Fast Net (DFN):

- Douglas Electric Cooperative (via guaranteed loan)
- Douglas County
- Business Oregon
- NTIA's Broadband Technology Opportunities Program
- FCC Rural Broadband Experiment (RBE)
- Connect America Fund II (CAF II)
- E-Rate program of FCC

Gauging Fiber's Impact for Douglas County

Total cost of fiber infrastructure to date: $25 million (approx..)
Approx. annual cost: $1.13 million
Approx. annual gain: $28.3 million

The impact of fiber on a community is often difficult to quantify, since there are many intangibles and values involved and calculating specific benefits are complex and changeable over time. How, for instance, can one assign specific value to the role of fiber optic communications in battling the region's recent devastating wildfires? What value can be placed on the ability for soldiers deployed in far-off regions of the world to obtain degrees via online services enabled by fiber? How can one be certain a particular business started because fiber was available? DFN CEO Todd Way puts it like this: "Can I say a particular business showed up because of fiber? No, but I know that businesses don't show up if you don't have fiber."



Major Employers

Douglas County's top employers rely on DFN fiber. These include Roseburg Forest Products, the region's largest employer, which is based in Springfield, Oregon, in Lane County; Mercy Medical Center and the VA Roseburg Health Care System, both in Roseburg; the Roseburg Independent School District; Seven Feathers Casino Resort in Canyonville, Oregon, in Douglas County; the Swanson Group forest products center in Roseburg; Douglas County Government; the FCR Call Center in Roseburg; and the Orenco Systems wastewater management company, based in Sutherlin, Oregon, in Douglas County.

Each of these firms depends to some extent on the fiber grid. Roseburg Forest Products, for example, uses wide-area Ethernet over fiber to tie together multiple mills and sites across the region and to support the company's 3,500 employees in their day-to-day operations.

Datacenter Attractions

Douglas County offers prime real estate for datacenters. The climate is mild. There is plenty of available large-tract, industrially zoned land. The county is local to interstate highways. Roughly 80% of all traffic from Asia passes through 16 trans-Pacific subsea cables that hit the Oregon coast, and four of these cables come ashore near Bandon, Oregon, in Coos County, subsequently traversing Douglas County.

"Our fiber facilities make us attractive to entities looking for low latency," said Dave Sabala. "Fiber comes up in every conversation with them." Indeed, thanks to its fiber infrastructure, Douglas County has been making it onto short lists for datacenter builders looking to break new ground. Fiber is the key to unlocking future opportunities.

> Our fiber facilities make us attractive to entities looking for low latency. Fiber comes up in every conversation with them.
> – Dave Sabala, retired general manager, DEC

Wildfire Firefighting

In 2020, at the height of the COVID-19 pandemic, tens of thousands of acres of federal and private forested land in Douglas County were consumed by wildfires. Over 1,000 residents were evacuated, with many losing homes. There were many injuries and one firefighter fatality. The Douglas Forest Protective Association (DFPA), in league with other firefighting agencies, set up command centers at local schools to battle the fires. Each center supported hundreds of workers, and for each center DFN supplied 1-Gbit/s symmetrical Internet service. Circuits were provided for both emergency-only and personal use by the firefighters. The firefighters also used pole-top cameras that had replaced older manned fire towers when DFN strung fiber. The cameras helped initially locate the fires and track the progress of the battle against the flames. The fires were finally declared contained in November, after more than 130,000 acres of forest had burned to the ground.

Wildfires being fought near Roseburg, Oregon. *Source: Bureau of Land Management Oregon and Washington, via Wikimedia Commons*

Medical Applications

By the time DFN was founded, healthcare facilities in Douglas County, including Mercy Medical Center and VA Roseburg Health Care System, were faced with Internet service so poor that it was virtually impossible to transmit medical images, such as x-rays, MRIs, CT scans, and mammograms from one facility to another. Once fiber was installed, the need to physically carry imaging files on CDs or film via "sneakernet" was eliminated, and online medical record-keeping was instituted as well. Today, healthcare facilities in Douglas County depend on fiber to sustain daily activities.

VALUE ESTIMATE: Mercy Medical Center recorded 40,435 emergency room visits between 2019-2020.[6] If even half of those visits required medical consultation, and if the transmission of records to Oregon saved even one hour of physician time per consultation, the time savings credited to fiber could be $1.6 million annually, given a modest cost of $81 per hour in physician time.

Education

During the height of the Covid-19 pandemic, DFN's fiber-based Internet services helped schools throughout Douglas County to maintain classes via Zoom. Aside from the pandemic, Roseburg Public Schools also offers a fully equipped and staffed Roseburg Virtual School for elementary school students, grades 1-5. The program is part of a larger initiative called Roseburg Virtual Options, which also offers online schooling to middle- and high-school students.

The online options meet a demand for remote schooling that isn't just local. In the wake of the pandemic, unpredictable closings and staff shortages nationwide led to parents questioning the need for live, five-day-a-week attendance at a school facility. Just as work-from-home became popular, school-from-home caught on as a trend.

DFN's fiber also connects Umpqua Community College (UCC) in Roseburg to online courses for a range of degrees and certifications. Early adopters of this program included military personnel, who were able to take advantage of online courses while deployed. The program is also convenient for non-traditional students who may be in the workforce or caring for family at home. The program saves transportation costs and offers help 24/7, allowing students to attend courses to fit their schedules.

VALUE ESTIMATE: According to Niche.com, nearly 31%, or 2,661 of UCC's 8,585 students, rely solely on online learning – a conservative estimate of the value of fiber, since another 23% rely on a combination of online and campus learning.[7] If we multiply 2,661 by the current estimated annual tuition and costs of UCC ($9,819), we can estimate that fiber contributes $26 million annually to UCC revenue.

[6] Mercy Medical Center, "Our Year in Review 2019-2020," accessed March 1, 2022, https://www.chimercyhealth.com/assets/year_in_review.2019.2020.pdf
[7] "Umpqua Community College, *Niche.com*, accessed March 1, 2022, https://www.niche.com/colleges/umpqua-community-college/#online

County Government

Douglas County's first responders connect directly to AT&T FirstNet service. Further, DFN provides the infrastructure to serve FirstNet to at least one other carrier in the region.

In another application, the Douglas County courthouse uses DFN fiber service to facilitate virtual arraignments from other parts of the county. Prior to this system, a sheriff would have to transport a plaintiff in person from the Douglas County Jail in Roseburg to one of three court locations (Reedsport 70 miles, Drain 35 miles and Canyonville 35 miles). The virtual system saves the cost of time and travel as well as making it easier to secure offenders without transporting them many miles to Roseburg at taxpayers' expense.

VALUE ESTIMATE: According to police statistics,[8] Douglas County reported 10,556 arrests from 2013-2020 – an average of roughly 1,500 arrests per year, or approximately 28 arraignments per week. Given the distances traveled and assuming one hour per deputy sheriff's time of $35 per hour, it's reasonable to calculate that remote arraignments have saved the county from $1,225 to $2,205 per day, or up to $573,300 annually.

Douglas County Courthouse, Roseburg, Oregon. *Source: Gary Halvorson, Oregon State Archives*

Conclusion

Over the last twenty years, fiber has brought numerous advantages to Douglas County, Oregon. Though economic challenges persist, the benefits of the underlying infrastructure have proven solidly supportive. One anecdote is telling: Reportedly, a key call center in Douglas County was prepared to leave last year for greener pastures, taking several hundred jobs with it. DFN stepped in and offered redundant networking based on fiber. The call center renewed its contract for another ten years.

[8] Douglas County Sheriff's Department, "Scorecard at a Glance," *Police Scorecard*, accessed March 1, 2022, https://policescorecard.org/or/sheriff/douglas-county

Fiber optic facilities continue to provide specific benefits to the key regional hospitals and schools. The days when medical images had to be hand-delivered are long gone, and emergency room physicians have immediate access to consultations with offsite experts. Schools have been able to support remote learning and homeschooling in the wake of the recent pandemic. And the local community colleges have a thriving online program. The future looks even brighter. With renewed funding, DFN plans to expand its network footprint significantly while offering 10-Gbit/s symmetrical services in the near term. What began as a grassroots alternative has become a source of regional opportunity.

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