CASE STUDY

# Northwest Colorado Council of Governments: Project THOR

Bringing high-quality, lightning-fast, resilient broadband to rural Colorado communities

Ciena has helped build a carrier-grade, responsive, middle-mile network that underpins connectivity for remote communities across ten counties in northwest Colorado while meeting performance and budget requirements.

## Customer

Northwest Colorado Council of Governments (NWCCOG) is an association of county and municipal governments that work together for the benefit of their communities and citizens. NWCCOG has served its communities for over 38 years—covering 7,000 square miles, 28 member jurisdictions, and 230,000 residents in a region of northwest Colorado.

## Challenges

- Lack of high-quality broadband in rural areas
- Challenging terrain and environmental factors leading to cable cuts
- Repairs costly and time consuming
- Commercials challenging for a business case

## Solution

- Programmable, converged, multiservice, carrier-grade 100-gigabyte fiber loop that can scale up while simplifying operational support
- Ciena's Packet Optical platforms to address rapid bandwidth demand growth
- Waveserver® Ai to deliver programmability, scalability, and simplicity
- Real-time network infrastructure monitoring and control with Ciena's MCP software

## Outcomes

- Open access transport for providers and ISPs to increase competition, availability, and lower broadband service prices in our rural communities
- Abundant, reliable, lower cost broadband access to ISP's, participating state and local governments, schools, libraries, and healthcare and public safety facilities throughout CO
- Resilient backup solution using Ciena's best-in-class network equipment
- Fiscally sustainable and scalable network that stimulates economic development and ensures digital equity for all citizens

## Challenge

With a history of providing technical assistance to communities, NWCCOG realized there was a lack of high-quality broadband for many rural areas and set out to solve the problem.

One major challenge is the geography of the area, which includes mountains, steep valleys, high risk of geologic disturbances, and potentially destructive wildfires. Fiber cuts in this terrain are a constant threat—and without protection in the network, these cuts can remove not just broadband, but all connectivity in a community. This can include cell phone towers, utility monitoring equipment, public safety networks, schools, hospitals, and businesses. The terrain and weather conditions then compound the situation by making repairs difficult and time consuming.

With a relatively small and widely distributed population, there was little incentive for larger incumbents, with a focus on profits, to make the investments necessary to meet these challenges.

Though the topography of the area proved to be a major hurdle, NWCCOG wanted the people and businesses in their area to be able to access fast, reliable broadband—and they believed the hard work would be worth it. Appropriate funding was crucial, and this came from local contributions as well as $1.25 million provided by the Colorado Department of Local Affairs (DOLA).

The goal was simple: provide highly resilient, high-capacity, middle-mile infrastructure that enables local service providers, businesses, and government organizations to build high-performance, reliable, and cost-effective connectivity solutions in rural northwest Colorado. This was the inspiration for Project THOR.

## A new approach

Project THOR utilizes over 400 miles of fiber to serve local communities across 10 counties. Around 85 percent of the fiber needed already existed in the form of fiber networks built by organizations like the Colorado Department of Transportation.

Providing resiliency through redundancy was a fundamental challenge that had to be resolved. Consequently, one of the key drivers behind Project THOR was the desire to leverage a mesh architecture with redundant connections, coupled with the ability to use Artificial Intelligence (AI) to dynamically reroute traffic in cases of failure. The aim was to eliminate single points of failure when serving these communities.

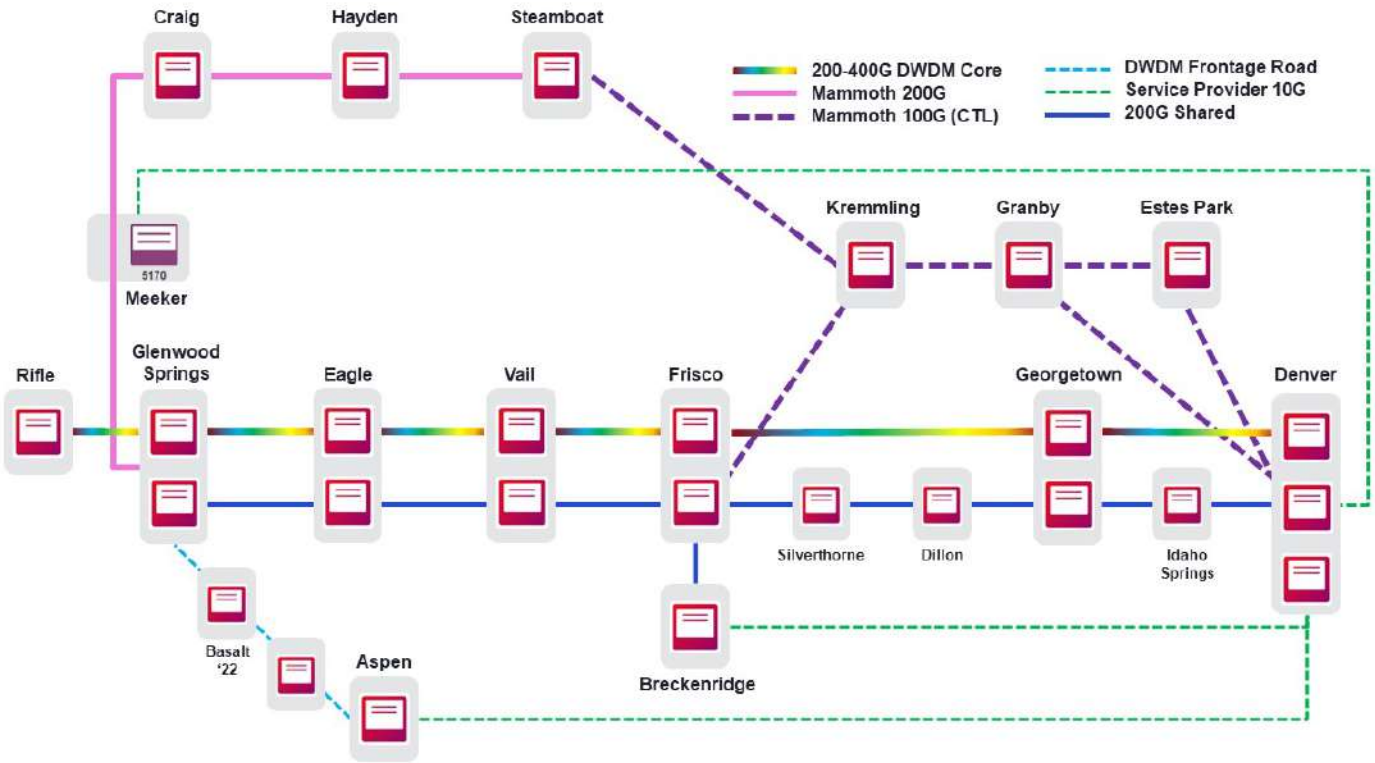



*Figure 1. NWCCOG – Project THOR 2.0 with Region 10*

## Solution

With these challenges in mind, NWCCOG chose to work with Ciena to build a carrier-grade regional fiber network. Funded by grants and government contributions, NWCCOG worked with Ciena and Graybar to create a middle-mile network operated by Mammoth Networks and supported by Ciena's backbone network equipment. The network was designed as a series of geographically diverse fiber loops to overcome the issues raised by the area's mountains and rough terrain.

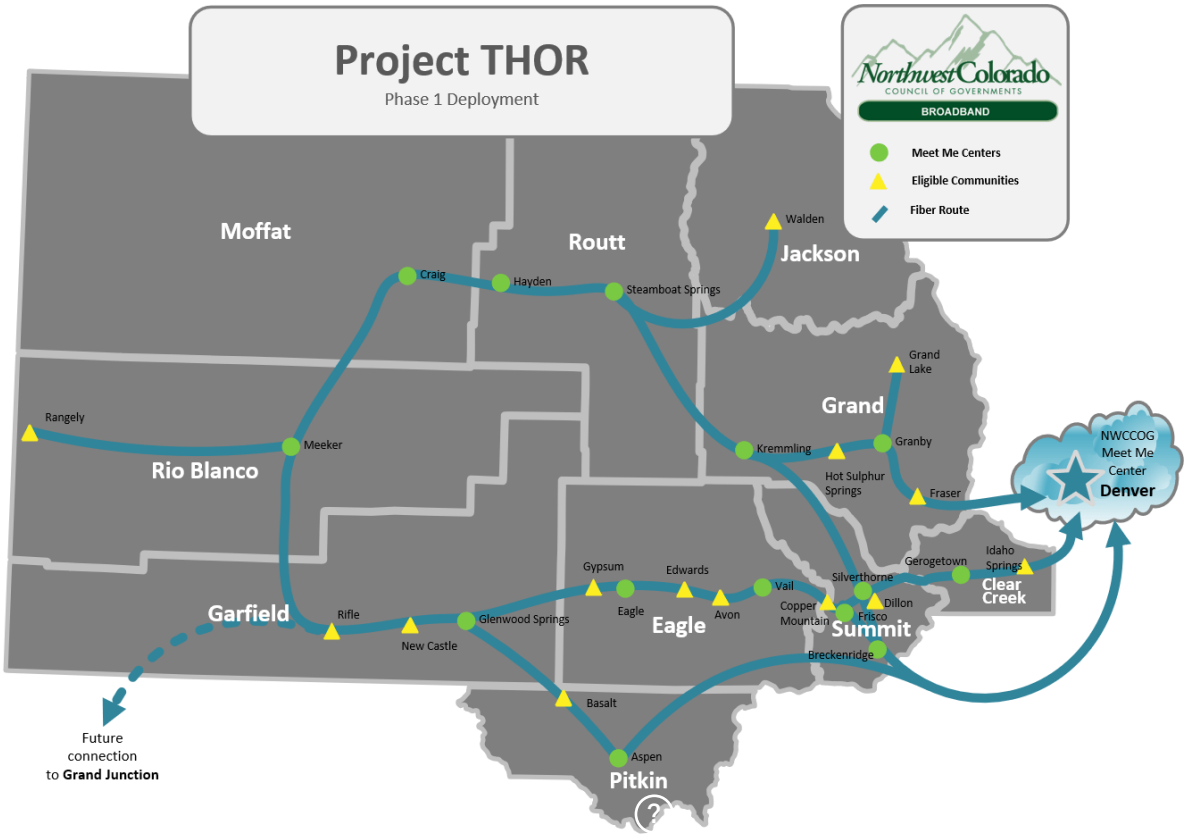
Ciena provided Waveserver Ai and the 5170 Platform to turn up Ethernet and other packet-based services rapidly and securely, and to adapt to changing service requirements in real time. This network equipment provides unique advantages for mountain communities—perfect for northwest Colorado.

The capacity in the network, combined with Ciena's edge aggregation solution, allows wholesale access for local ISPs to get closer to the communities in the region with broadband services at competitive prices. Even in locations where they could purchase commodity internet from the incumbent providers, Project THOR offers a more cost-effective solution.

Additionally, Ciena's Manage, Control and Plan (MCP) domain controller provides end-to-end lifecycle operations to unify network and service management across the infrastructure. This means traffic can be monitored and rerouted automatically when a fiber cut or service outage occurs, avoiding service interruptions.

*"With current events increasing our demand for critical communications and remote working, Project THOR is reliably delivering the robust broadband services required by the Aspen community, including city, county, school district, GrassRoots Community Network, local ISPs, and emergency operations."*

Paul Schultz, former IT Director for the City of Aspen, CO



## Results

Communities that want to become part of Project THOR can connect through 'Meet Me' centers distributed around the network. There are over 400 miles of open-access fiber to connect communities through the 'Meet Me' centers, which are available to all network providers. A monthly fee and some of their own infrastructure is required, but NWCCOG provides administrative help and technical assistance. This includes the set up and operation of their broadband service, as well as identifying grant opportunities.

With communities across northwest Colorado now accessing fast, reliable broadband through Project THOR's infrastructure, the project is a huge success. Almost a quarter of Colorado is now serviced by Project THOR, and although this is only 4 percent of the total population, it represents 23 percent of the rural population. The project has allowed many of these community members to access fast broadband for the first time. Residents, healthcare providers, emergency services, and businesses can now access fiber connectivity no matter their location.

## Real impact

Dr Thomas Coburn, CMO and Emergency Department Physician, described the case of a stroke victim requiring remote experts to assess whether there was internal bleeding to the brain.
Using the performance provided by Project THOR, it was possible to transmit the patient's brain scan in just five minutes, and not much longer to get an assessment back, which allowed local physicians to react quickly. The resilience designed into the Project THOR solution ensures that this capability is always there when it is needed.

Previously, regularly outages of hours, or even days, occurred regularly. The poorly performing backup increased the delay in getting an assessment by as much as half a hour — a life or death difference.