

# All Aboard for Next-Generation Rail Communication



For more than a century, rail has remained the most efficient method of freight transport around the world—and it will remain vital for a long time to come. To make sure their lines run around the clock, rail operators are turning to cutting-edge networking equipment to keep trains and cargo moving.

In Australasia, one regional rail operator faces the challenge of keeping trains running through areas that experience extreme temperatures, severe weather, and the potential for other natural disasters. Realizing that their network equipment required a significant upgrade, the operator overhauled its communications system along the entire length of one of its main trunk lines. Ciena, using its ability to provide tailored technical solutions, worked alongside the operator on this major upgrade.

## **Challenge: Bringing rail signaling into the twenty-first century**

The project was an extensive undertaking and included the complete replacement of a buried direct multi-mode fiber cable that had been in use since the 1980s. In its place, new fiber was laid along the entire length of the rail operator's main trunk line. A length of more recently installed fiber, which also runs alongside the trunk line, was retained and upgraded with new Ethernet technology to form a core part of the upgraded system. Additional networking and communications equipment—including new signaling systems at all stations—was installed at 74 sites along the line.

With these new installs and upgrades, the operator brought its communications systems up to date with plenty of capacity for future growth.

A significant challenge to this project was the remoteness of some locations on the rail line. There are signaling junctions along the line that are completely unmanned and visited only occasionally due to the difficulty of getting to them. Because of this, the rail operator required all new technology to be

resilient—beyond withstanding the local climate—and able to be commissioned and managed from a remote central control location.

### **Solution: A strong yet simple system**

To meet this requirement, the network was divided into distinct rings. Each ring featured multiple nodes and redundancies that provide the network with routing and switching capability so that data can travel down one of several possible paths. This design, combined with smart-management technology, allows the system to handle issues immediately and intelligently. If any section of the communications line experiences a failure, the system will automatically alert human operators while rerouting signals down alternate paths to prevent interruptions to rail services.

Because many installation sites are remote, the rail operator was looking for a zero-touch commissioning solution. To meet this need, the Ciena equipment was delivered preconfigured and only needed to be moved in place and plugged into the network. There was almost no need to ever have a human presence at any installation site. Once plugged into the network, routine management of the equipment becomes completely remote. All software configurations and upgrades are made through Ciena's management dashboard. In the event of any issues, human operators receive immediate alerts on their dashboards so they may begin working on a solution.

Should the problem require a physical repair, the zero-touch commissioning setup allows for simpler maintenance. There is no need for technicians to spend an extended period out in a remote location to try and implement a fix. Instead, the problem product can simply be removed, replaced, and brought back for repairs. The new component, meanwhile, will automatically update itself to match its predecessor's configuration. This improves worker safety while minimizing downtime.

### **Results**

With these solutions, Ciena has been able to provide the rail operator with a significant technology upgrade which allows plenty of room for growth due to extra capacity built into the new infrastructure. It will be able to handle increased communications loads without the need for upgrades or added capacity for a long time to come.

Future plans include additional upgrades and augmentations to the new communications system. Upgrades and new equipment installations will be made to sub rings on the main trunk line and spur lines. The rail operator is also considering other transformation and modernization activities that are in line with their current tech efforts.

As the rail operator's work progresses, Ciena looks forward to continuing this collaboration and providing further upgrades to the rail communications network alongside upgrades and extensions in other locations.

### **Summary**

#### **Challenges**

- Legacy infrastructure and services, cost management, and support
- Network resiliency, reliability, and security of critical infrastructure
- Remote location of equipment and potential for natural disasters

#### **Solution**

- Ethernet Ring Protection network solution
- Centralized management technology
- Near zero-touch commissioning

#### **Benefits**

- Always-on network availability and automated fault handling
- Significant technology update to meet demands now and in future
- Low touch maintenance without the need for expert resource across remote locations



Was this content useful?

Yes

No