



COLOR KEY:

- ▶— Coax Cable
- - -▶- - - Wireless Connection
- ▶— Ethernet Cable, Twisted Pairs
- ▶— CAT5 Cable
- ▶— Copper Transport or Fiber

Arrows indicate system construction flow.
Communication between products is generally bi-directional.

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SUMMARY

Carrier backhaul is the transporting of voice and data traffic from the cell site back to the switching location. A backhaul link is the connection that transports traffic from a remote site to a central site. All networks need some form of backhaul in order to bring traffic from the network edges to the core.

As wireless technologies advance and we continue to deploy 3G and 4G data services, the bandwidth demands on the backhaul link are increasing. Backhaul that was originally designed to carry only voice traffic or possibly some low-speed data is now expected to support the increased bandwidth that is being demanded by current mobile devices and the applications that they run. Mobile applications like e-mail, picture and video messaging, streaming audio, streaming video, and others are experiencing huge growth because of the 3G and 4G wireless interfaces that have been deployed, but the backhaul needs to be upgraded to support them.

FEATURES

- Large coverage distances
- Any number of locations can be included
- Typically involve a public carrier who provides the backhaul
- Can be wired or wireless
- Variety of speed options
- Circuit and packet technologies
- Multiple protocols

BENEFITS

- Cost savings from more efficient handling of traffic
- Correctly designed backhaul can reduce capex and opex
- Support for future traffic growth and new applications
- Fewer complaints from customers about bandwidth

REAL WORLD EXAMPLES

Situation: A large wireless carrier was rolling out a nationwide 3G network and had an average of two T1s per cell site throughout their network.

Problem: They needed to increase their backhaul bandwidth. In order to support the 3G launch, they needed to upgrade the backhaul at their sites from two T1s to four T1s on average.

Solution: The customer purchased unlicensed radios in a four-slot chassis. Because the radios were unlicensed, deployment was fast and easy and allowed them to move the radios later if they decided to add additional capacity at a site. Overnight, they doubled bandwidth to a site and improved the mobile user experience.

Situation: An ISP in a large central city had bandwidth of 10-45 Mbps running around town for connectivity to broadband customers. These connections were all leased lines provided by the local exchange carrier (LEC).

Problem: The leased lines were expensive and were no longer meeting the bandwidth demands of the ISP as it grew. Upgrading the links would have been expensive and time consuming.

Solution: The company purchased a mix of unlicensed 60 GHz radios and licensed 80 GHz radios, which increased bandwidth to either 100 Mbps or 1000 Mbps. The new links replaced the leased lines, leaving room for future growth while greatly reducing the cost of the network. The upfront expense for the radios and other wireless equipment had an ROI of a few months based on the leased line charges.

ADDITIONAL CONSIDERATIONS

- What is the current backhaul size to each site?
- Is there currently wired or wireless backhaul?
- If wireless, what frequency is desired?
- Is the frequency licensed or unlicensed?
- What are the bandwidth requirements for each site?
- What types of traffic will be supported?
- What is the distance to the site?
- How much traffic growth is expected?

PRODUCTS

- Broadband radios
- Antennas
- Copper or fiber
- Cable and connectors
- Power systems
- Backup power
- Voltage converters
- Lightning protection
- Tools
- Safety equipment for RF and climbing
- Test equipment
- Installation supplies
- Training



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