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# Utility-based Telecommunications Fiber Optic Networks

## Route redundancy versus carrier redundancy - there is a difference

**Operations folks don't like single points of failure and this is particularly true of the people who run or rely on data centers or data networks. Simply put, single points of failure keep those of us in operations awake at night. This is why most data centers have back-up power supplies and other redundant systems to support the quest for zero downtime. This asymptotic goal is harder and more expensive to achieve as you approach 100% uptime. A central question then is if you have redundant power feeds, why not redundant telecommunications feeds? Historically, this was an expensive proposition; however, there is a potential alternative that might give you a big jump in reliability and uptime for the same or perhaps at a lesser cost.**

A second telecommunications feed is different than a second carrier though. To demonstrate this concept **Figure x** depicts a separate building entry where physically diverse telecommunications are run through the electric infrastructure and into a building entrance, which is often different than the normal telecommunications entry point. The use of the electric utility infrastructure provides a safe, secure and economical alternative in most cases. For instance, in IP Networks' home service area of downtown San Francisco, a separate diverse path into a building using the electric utility gateway is almost always the preferred method. Customers may choose this second entry path for capacity or reliability (or both) purposes. In either case, the second physical path permits a customer to achieve both commercial/carrier and physical redundancy objectives.

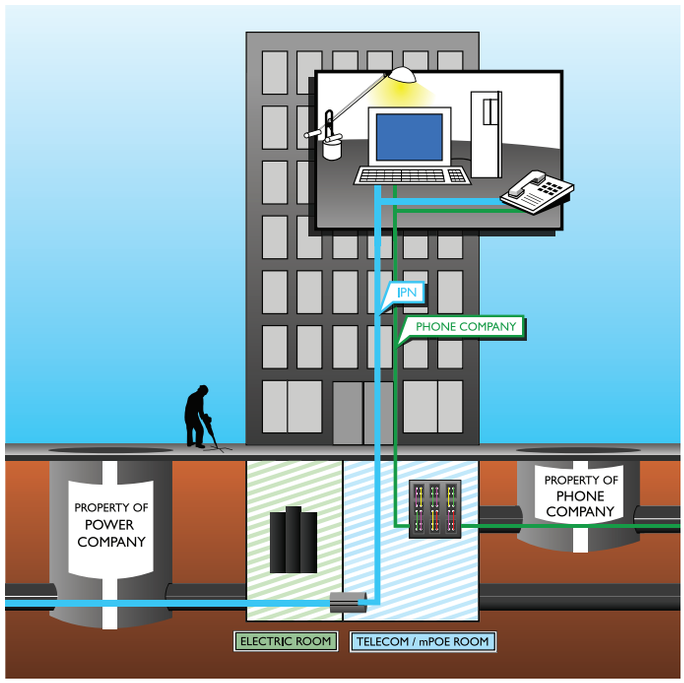


**Figure x:** The building access picture

A former university president once said: "If you think the price of education is expensive, try the cost of ignorance." This quotation can be applied to the information technology world: "If you think the price of zero downtime is expensive, try the cost of an outage." This is exactly the perspective one most take in designing data centers and data networks that tie those centers and other facilities together. Granted, achieving 100% uptime is very expensive and each organization realistically must choose the number of 9s that makes sense in the overall plan. For example, five 9s sounds like a very high standard, which of course it is, but that translates into about 5 minutes of outage per year.

In the end, the overall reliability of an information technology system is a function of all of the components that make up that system. It is the data center, the computing equipment, the application itself and of course the networks that tie things together. Telecommunications deregulation brought forth many competitive telecommunications and network alternatives. However, these alternatives are often commercial as opposed to physical alternatives. During the telecom boom, vast amounts of fiber were deployed, which resulted in both physical and commercial/carrier redundancy in the long-haul market.

As we drill down into the metro area and certainly at the last-mile level, there are fewer alternatives, particularly when it comes to true physical diversity. Commercial or carrier alternatives sometimes are not physically diverse because they are merely "Type 2" or resale from the Incumbent Local Exchange Carrier's (ILEC). In looking at the diversity of the network connecting different points, customers should be aware of both the commercial/carrier and physical layer at (i) the building entry, (ii) local loop, (iii) metro area and (iv) national or international levels, as applicable.

For example, if your back-up circuit is with a different carrier, but it comes through the same building entry or is part of the same local loop, then you don't have physical diversity. If your back-up circuit is commercially/carrier diverse, but not physically diverse, you have mitigated commercial risks, but not physical risks. A fiber cable cut at the building entry or local loop, for example, would take out both carriers.

In the past, regulation and the ILECs controlled issues such as physical diversity and options were limited from a regulatory, economic and tariff standpoint. With deregulation, options expanded in theory, however, they often were expensive. Many competitive alternatives provided by Competitive Local Exchange Carriers (CLECs) emerged from deregulation were commercial/carrier provided on a Type 2 or resale basis. However, these alternatives are often provided utilizing the same physical cable or paths as the ILEC. Again, this provided commercial/carrier diversity, but not always physical diversity. Some CLECs provided physical diversity and found it was very expensive to deploy new physically diverse networks because of the construction costs associated with trenching and installing new conduits, cables and other infrastructure. In a purely price-driven world, it was hard to justify the added construction expenses.