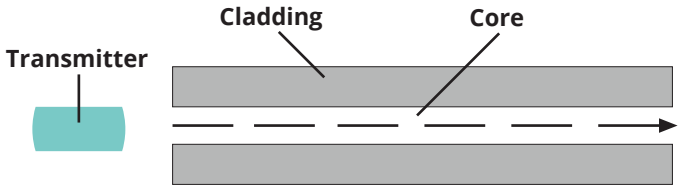
DATANET
ASSETS

Single-mode vs Multimode fiber optics

The two basic fiber cable types used in data centers are single-mode and multimode. The fiber optic cables are identified by their core and cladding diameters expressed in microns (one millionth of a meter). The industry standards for data centers are 9/125 micron for single mode fiber and 50/125 or 62.5/125 micron for multimode fiber. The core is the center of the fiber where the light is transmitted. The cladding is located outside the optical layer of the fiber (core) and catches the light in the core and guides it along - even through bends.

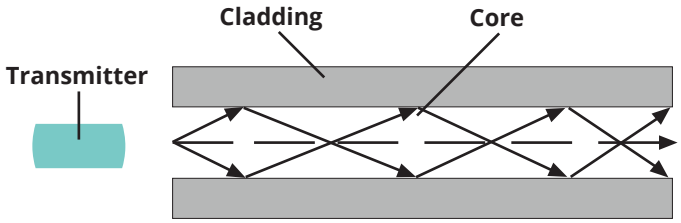
Within single-mode as well as multimode, mode means the path which light follows. This means that in a single-mode fiber, the light travels down one path, while in a multimode fiber, the light travels in multiple paths.

The core of a single-mode fiber optic cable is 9 microns. As a result, light can only travel in one mode (hence the name single mode). This means that the bandwidth is theoretically almost infinite. However, in practice it has been found that the limit is around 100,000 gigahertz (which is still high).
Single mode cables are used in combination with transceivers transmitting at wavelengths of 1310 and 1550 nm.



Single-mode Fiber

Multimode fibers use a larger core to send multiple light modes simultaneously. The core of the multimode cables used in data centers is 50 or 62.5 microns. Transceivers used for transmitting data through multimode cables usually use wavelengths of 850 or 1300 nm.



Multimode Fiber

We do not recommend extending single-mode cables with multimode cables. The same applies to connecting a single-mode cable with a multimode transceiver or a multimode cable with a single-mode transceiver. The difference in the cores of the fibers and the characteristics of the transceivers can lead to large power values losses in the connection. This applies even when extending a 50 micron to a 62.5 multimode cable.