Fiber Vision

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We want to Present the e-newsletter for sharing updates in the field of fiber optics and optical communication. We solicit your feedback as well as contributions towards it.

Article

Ethernet Passive Optical Network (EPON)

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A Passive Optical Network (PON) is a single, shared optical fiber that uses inexpensive optical splitters to divide the single fiber into separate strands feeding individual subscribers. PONS are called "passive" because, other than at the CO and subscriber endpoints, there are no active electronics within the network.

Using these techniques to create a passive optical infrastructure, Ethernet in the First Mile PON (EFMP) builds a point-to-multi-point fiber topology that supports a speed of 1 Gbps for up to 20 km. While subscribers are connected via dedicated distribution fibers to the site, they share the Optical Distribution Network (ODN) trunk fiber back to the Central Office. Eliminating the need for electrical equipment in the first mile network is a key facet of the EFMP topology. Another dvantage is that much less fiber is required than in point-to-point topologies To visualize the lower fiber requirements, it is useful to look at the topologies of point to point Ethernet and "curb switched" Ethernet along with EPON. Figure 1 illustrates all of these options.

EPON is based on the Ethernet standard, unlike other PON technologies, which are based on the ATM standard. This lets you utilize the economies-of-scale of Ethernet, and provides simple, easy-to-manage connectivity to Ethernet-based, IP equipment, both at the customer premises and at the central office. As with other Gigabit Ethernet media, it is well-suited to carry packetized traffic, which is dominant at the access layer, as well as time-sensitive voice and video traffic.

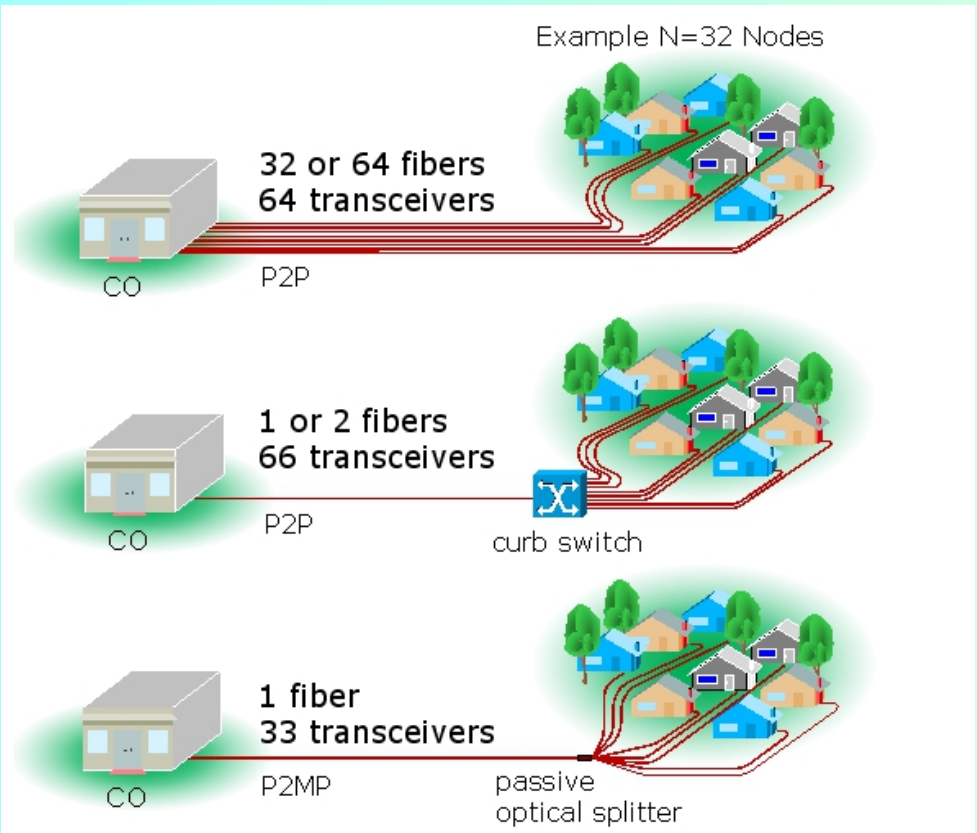


Figure 1: Point to Point Ethernet, Curb-Switched Ethernet, and EPON

Point-to-point Ethernet might use either N or 2N fibers, and thus has 2N optical transceivers. Curb-switched Ethernet uses one trunk fiber and thus saves fiber and space in the Central Office (CO). But it uses 2N+2 optical transceivers and needs electrical power in the field.

EPON also uses only one trunk fiber and thus minimizes fibers and space in the CO, and also only uses N+1 optical transceivers. It requires no electrical power in the field. The drop throughput can be up to the line rate on the trunk link. EPON can support downstream broadcast such as video.

The IEEE 802.3ah EPON specification defines MultiPoint Control Protocol (MPCP), Point-to-Point Emulation (P2PE), and two 1490/1310nm PMDs for 10 and 20 km, required to build an EPON system. Typical EPON-based systems may include extra features above the IEEE 802.3ah standard, including security, authentication and dynamic bandwidth allocation.

References:
[1]: " Metro Ethernet Networks – A Technical Overview",
[2]: MEF Technical Specification "Ethernet Service Attributes, Phase 1",
[3]: "Virtual Bridged Local Area Networks",
[4]: "CSMA/CD Access Method and Physical

LIGHT RUNNER INSTALLATION

What's New

Institute of Engineering & Technology, Devi Ahilya Vishwavidyalaya

LIGHT RUNNER- Premium has been delivered and successfully installed at Electronics and Instrumentation department of Devi Ahilya Vishwavidyalaya, Indore

P.E.S. College of Engineering, Mandya

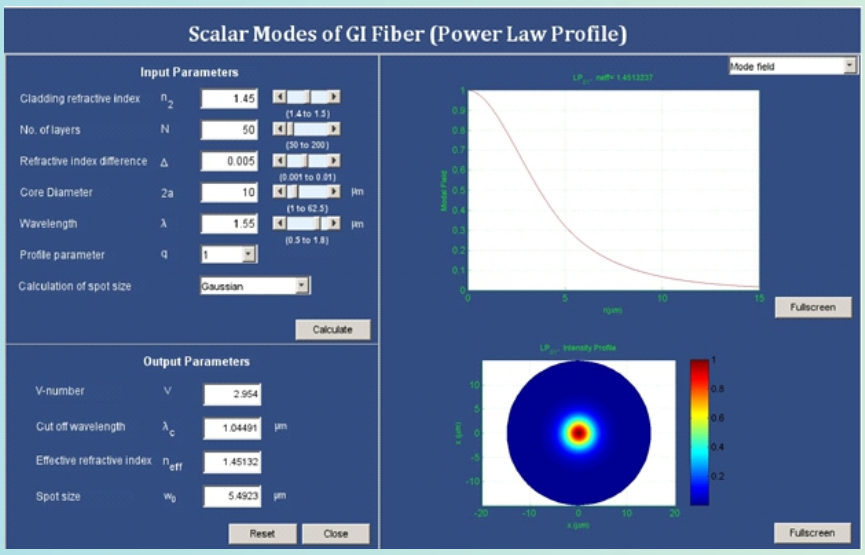
LIGHT RUNNER- Premium has been delivered and successfully installed at P.E.S. College of Engineering, Mandya. Experiments that Light Runner can conduct were successfully demonstrated to the concerned faculty members.

LIGHTSIM- Simulation Tool

LIGHTSIM Simulations

LIGHTSIM

Scalar Modes of Graded Index Fiber



A Graded-Index Fiber is an optical fiber whose core has a refractive index that decreases with increasing radial distance from the optical axis of the fiber. Core closer to the fiber axis have a higher refractive index than the parts near the cladding. The refractive index profile is nearly parabolic.

Using our LightSIM simulation software user can study the Scalar Modes of GI fiber with the image of Intensity Profile Distribution and can visualize the graphical plot of Refractive Index profile, Mode field etc on a single screen.

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