10BASE-T1L: Single-Pair Ethernet Overview

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What is 10BASE-T1L?

10BASE-T1L is a Single-Pair Ethernet (SPE) standard designed to transmit Ethernet signals using only **one twisted pair** of copper wires. Unlike traditional Ethernet (which uses 4 pairs), this solution supports longer distances and is especially useful in industrial and building automation applications.

- **10BASE**: Refers to a data rate of **10 Mbps**.
- **T1**: Indicates that the transmission uses **1 pair** of twisted copper wires.
- **L (Long)**: Means it is designed for long-range communication.

Cable Reach

One of the key features of 10BASE-T1L is its extended reach. It can support distances up to **1000 meters (1 km)** without the need for repeaters, making it ideal for long cable runs in industrial environments.

Link Performance

- **Speed:** Constant **10 Mbps**.
- **Reach:** Up to **1000 meters**.
- **Stability:** Low latency and high reliability.
- **Power Delivery (PoDL):** Can deliver power over the same wire pair.

Typical Applications

- Industrial automation networks.
- Smart building systems (e.g., HVAC, lighting).

- Remote sensors and actuators.

Comparison with Other Ethernet Standards

Standard	Cable Pairs	Speed	Reach
100BASE-TX	2 pairs	100 Mbps	100 meters
1000BASE-T	4 pairs	1 Gbps	100 meters
10BASE-T1L	**1 pair**	**10 Mbps**	**1000 meters**