

THE HIDDEN NETWORK.

Task 1. Watch video.

<https://youtu.be/er3v4PVNQqE>

Task 2. Choose the correct answer.

1. What are the two ways copper metal wires influence the transmission of information as electrical signals?

- data rate and distance
- distance and time
- data rate and power
- time and power

2. When a ray of light inside glass hits its surface at an angle, what happens to the ray when it exits into air?

- the ray continues, with no loss power
- the ray reflects
- the ray undergoes total internal reflection
- the ray bends, or refracts

3. Why can fiber optics enable the internet to evolve into a “planetary computer,” where distance doesn’t limit cloud computing?

- because a fiber optic carries many channels of data
- because the undersea fiber optic network can wind around the Earth nearly thirty times
- because a fiber optic’s distance weakly limits a channel’s data rate
- because a fiber optic that isn’t bent, won’t let light leak out

4. How do integrated photonics help solve the power problems of growing data centers?

- integrated photonic chips allow electrical cables between servers to be swapped out for power efficient fiber optics
- integrated photonic chips allow all the devices in a hundred kilometer fiber optic network to be shrunk down into a tiny chip

- integrated photonic chips allow electrical cables between servers to be swapped out for power efficient silicon wires
- integrated photonic chips allow silicon wires to convert electrical signals to light signals, and back

5. How will integrated photonics help solve the bandwidth problems of growing wireless demand?

- integrated photonic chips will allow gigahertz wireless signals to be replaced by terahertz wireless signals
- integrated photonic chips will help relay short-range hyperfast data rate wireless signals, via fiber optics, over long-range distances
- integrated photonic chips will be a stable middleman to carry hyperfast wireless signals over long-range distances
- integrated photonic chips will help relieve the absorption of terahertz wireless signals by moisture in the air

Task 3. Answer the questions.

- ✓ Fiber optics have been “too good for their own good,” fueling an over-reliance on (wireless) cloud computing that now requires integrated photonics to relieve the increasing demands society makes of the technology. Can you think of another example where such a back-and-forth between a technology’s capability and society’s response has guided its evolution?
- ✓ How would you characterize the collaboration between fiber optics and integrated photonics, when it comes to low power cloud computing or hyperfast wireless connectivity? Is the role of one technology more important than the other, or does this seem to be a partnership of equals?
- ✓ Snell’s Law is a model for light as a ray that predicts total internal reflection. When a silicon wire guides light by total internal reflection, the wire scatters relatively more light than an optical fiber, yet can make a sharper bend and not have as much power leak out. Can Snell’s Law fully explain this trade-off, or does it seem a more precise model is needed to describe the flow of light?