

Internet Ocean

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378 fiber optic cables criss-cross the oceans, connecting nearly every country in the world to the internet.

Deep below the waves, under the whales and fishes, the internet zips around the world on highways made of glass.

Say you're curious about giraffes. You do a web search and click on a link that looks interesting. The information on the web page comes from another computer far away. That computer sends it to yours along a hopping path. Most of its journey is through cables—some under the sea.

How does the internet get to your house?

Your computer might connect to the internet wirelessly, using radio signals.



A routing computer translates the radio code into light pulses and sends these out through glass cables buried underground.



I think I saw some information this way!



Internet signals don't stop when they get to the ocean. They keep going, through cables under the sea.

Your request jumps from computer to computer until it finds one that answers. Then the reply jumps back.

ask

How does the internet get under the sea?

1. Make a Glass Cable

Cables that carry the internet on land and under the sea are made of super-clear glass, spun into strands thinner than a hair. Several hundred strands are bundled together. Then they're covered with layers of metal and plastic to make a cable that's tough, flexible, and waterproof.

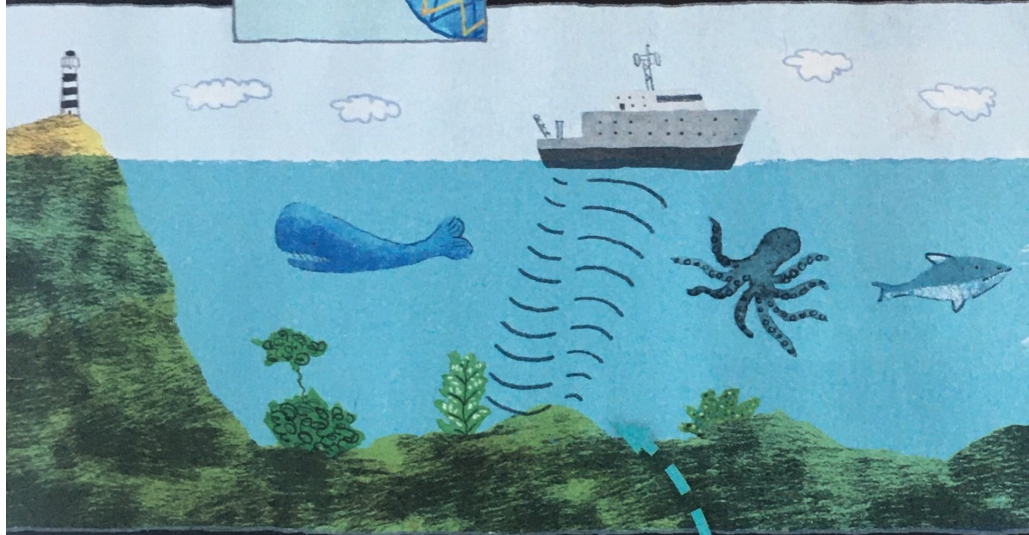
Light signals bounce back and forth from the sides of the glass threads inside the cable. This lets the signal keep going even when the cable bends.

Computer signals travel along the glass threads as pulses of light. Computers read these signals and translate them into web pages, or movies, or the sound of a voice. Light beams are so thin that a single hair-sized fiber can carry over 25,000 phone calls at the same time.

How fast do these signals go? Take a breath. In one second, a light signal could travel five times around the earth. That's two-thirds the speed of light (186,000 miles a second).

glass

The whole internet goes through that!?!?

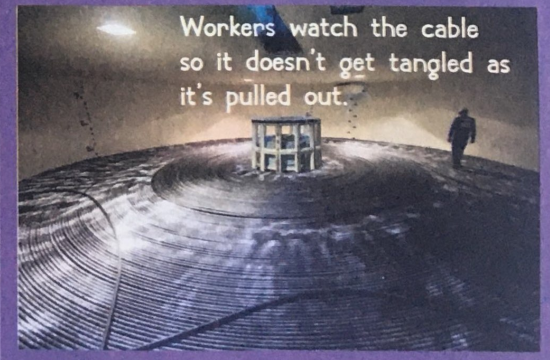
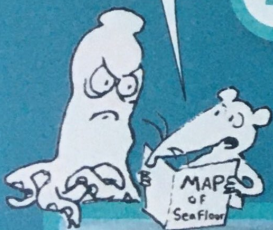


Sorry for the disturbance.

2. Map the Sea Floor

Before laying a cable under water, surveyors spend many months making maps of the sea floor. They plot a route that avoids sharp coral reefs, undersea volcanoes, canyons, shipwrecks, and other hazards. The best route is the flattest ocean floor.

Ships that map the sea floor sail back and forth, back and forth, building up a picture of what's below.



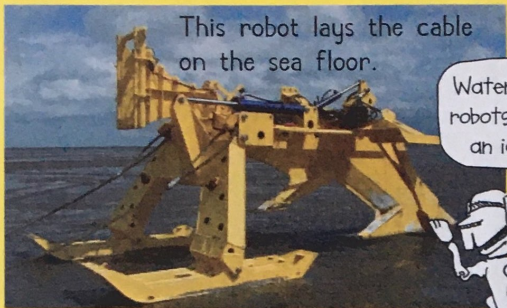
3.

Coil Up Cable

The glass cable is loaded onto a special cable-laying ship. Hundreds of miles of cable are coiled up inside huge round rooms below the deck.

4. Send Down Robot

The ship carries a truck-sized underwater robot called the plow. This robot sinks to the bottom of the ocean and crawls along the sea floor. New cable is fed out the back of the ship to the plow. The plow cuts a shallow trench on the ocean floor and buries the cable. Sometimes it just lays the cable on the sea bed without burying it.



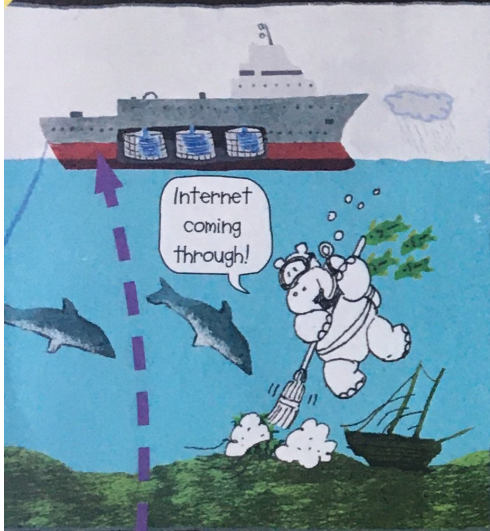
Waterproof robots—what an idea!

5. Make Repairs

A special cable repair ship fixes breaks. Crews can tell where the problem is by sending test signals. If a signal bounces back, there's a break. The time it takes to bounce tells them how far along the cable to look.

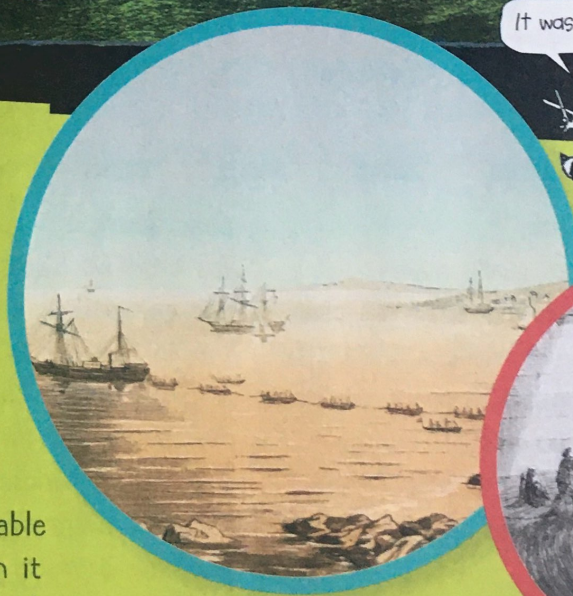
A repair team cuts the damaged cable with a sharp hook. They hoist both ends to the surface. Then they cut out the damaged part and replace it with a new piece. They fuse the cable together with a laser tool that makes the glass path good as new. Then they lower the cable to the ocean floor again.

After many years under the sea, cables can get a bit crusty.



The First Ocean Cable

The first cable to cross the ocean floor was a telegraph line between New York and Ireland, laid in 1858. The wire was made of copper. It carried electrical signals in Morse code. The ships laying the cable had no maps of the ocean floor, so the cable often snagged and broke. But when it was working, the telegraph could send a message across the ocean in hours, instead of many months.



The first ocean cable was laid by a sailing ship. But the cable room hasn't changed much.

