

Why are undersea cables important?

What are undersea cables? How do they connect internet networks globally? What is India's subsea cable ecosystem? What are some of the challenges in laying the cables in India? Why is India considered vulnerable to disruptions? How can it be improved?

EXPLAINER

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The story so far:

India is getting new cable landing systems coming online gradually. The latest addition is Airtel's 2Africa Pearls system, which has investments from Facebook parent Meta, adding 100 terabits per second of capacity to India's international bandwidth. Earlier this year, the SEA-ME-WE-6 cable was also landed in Chennai and Mumbai.

What are undersea cables?

Undersea cables are the main link connecting the world's internet networks. They connect internet service providers and telecom operators everywhere with those in other countries. These cables are a few inches thick and are heavily padded to withstand the hostile environment of the sea floor. Inside, strands of fiber optic cable – similar to those that connect modern telcos' towers and routers – provide massive capacity for large volumes of data to quickly crisscross the earth.

At each "landing point," usually a manhole covered with a lid and then topped with sand, these cables make landfall and go further inland to connect to a "landing station," where they become accessible to major networks. These systems are critical to the modern information society. "There are about 600 cables, as per Goldman Sachs," said Amajit Gupta, CEO of Lightstorm, a network provider at the first Sub-Sea Cable Systems Conference in Delhi. "90% of data, 80% of world trade, and about \$10 trillion of financial transactions, as well as secure government information, move through these cables. That's the impact this infrastructure has."

Each modern cable has several hundred gigabits per second of capacity, and can support thousands of telecom users. The other side of undersea cables is terrestrial networks, the less



Powering up: More cables land in Singapore, a small city-state, than they do in all of India. FILE PHOTO

well-mapped network of cables and towers that bring connectivity from the coast to people.

Does India have enough undersea cables?

India has two major hubs of cable landing sites: Mumbai and Chennai. "Practically speaking, 95% of subsea today goes into a small six-kilometre patch in Versova, Mumbai," Mr. Gupta said.

Many of the cables connected to Chennai also land in Mumbai. In total, 17 cable systems land at some point in India. India also has two domestic cable systems – the Chennai Andaman and Nicobar Islands (CANI) cable to provide high-speed connectivity to the islands, and the Kochi Lakshadweep Islands project.

Cables take several months, even years, to plan out and lay, at a cost of millions of dollars. Most cables in countries with well-developed internet infrastructure are able to commission capacity years before it is required. As such, most international internet traffic in India is largely served by existing capacity.

Anil Tandan, the Director General of the Broadband India Forum, said that this may not hold forever. "Well, there are differences of opinion," Mr. Tandan said

of the existing cable infrastructure's sufficiency. "The capacity may be adequate at this moment of time, but the way the data [traffic] is growing, one has to keep in mind that the capacity may not be adequate as we go along."

Aruna Sundararajan, a former Union IT and Telecom Secretary and current chairperson of the BIF, said, "It is significant to note that India's share presently constitutes around 1% and 3% respectively for cable landing stations and subsea cable systems" respectively.

What are some risks surrounding undersea cable deployment in India?

More cables land in Singapore, a small city-state, than they do in all of India, making India vulnerable to the consequences of cable cuts at sea. "If there is a disruption at the Red Sea, it pretty much brings down 25% of India's Internet in our estimate," Mr. Gupta said. "It's not a theory because it just happened about two years back." He was referring to the cuts that brought down subsea cables in the Bab-el-Mandeb Strait, likely caused by strikes by Houthi rebels in Yemen. That strait is a critical narrow passage through which dozens of subsea cables pass.

These cuts – some of which happened in 2024 – have not destabilised India's

internet experience so far, thanks to excess capacity built into other networks. But that may not always be the case. If several cables in the Red Sea are damaged, large parts of the internet may stop working, and there is only so much data that can be rerouted through other cable systems.

"Traditionally, most subsea corridors strangely have followed the trade routes of the past," Mr. Gupta said. "Rarely have subsea routes been built which are different from shipping routes, because back in the day, it was easier to follow the trade routes to be able to lay down your cables and make it work."

What can be done to bolster India's subsea cable infrastructure?

For one, the companies laying subsea cables complain of excessive permissions needed to land a single cable in India. "By last count, about 51 permissions were needed, beyond just the Department of Telecom, including the Home Ministry, Department of Fisheries, the Environment Ministry, local municipalities," and so on, Mr. Gupta said.

"If I have an 8,000-mile point-to-point transoceanic system starting tomorrow, I can guarantee you where I'm going to spend 80% of my time and effort," said Scott Cowling, a senior Meta executive who manages the social media conglomerate's global network infrastructure. "And that's going to be in 24 miles of territorial waters at either end."

In addition to streamlining regulations, securing these cables is also important. "Fishing trawlers break my cables all the time," complained Rahul Vatts, Bharti Airtel's chief regulatory officer.

India depends on foreign repair vessels with long permission processes for them to begin work in Indian waters. "India currently does not have the requisite subsea cable repair ships and cable storage depot capacity that we need," Ms. Sundararajan said, calling for more domestic investment in cable repair capabilities.

THE GIST

India has 17 international cable systems, mainly landing in Mumbai and Chennai, along with two domestic cable systems connecting island territories. However, its share in global subsea cable infrastructure remains low.

India's internet is highly dependent on a few key landing sites, making it vulnerable to disruptions such as Red Sea cable cuts. Fishing trawlers and the lack of domestic cable repair ships further threaten network stability.

Laying undersea cables in India requires around 51 permissions from various authorities, delaying projects. Experts call for regulatory reforms, more cable landings, and local investment in repair and maintenance facilities.