

EXPLAINED

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The process of connecting radio towers with each other via optical fibre cables is called fiberisation | Photo Credit: Getty Images

The story so far: India is preparing to auction off about 72 Ghz of airwaves to rollout 5G services in the country. However, the infrastructure needed for such a rollout requires existing radio towers to be connected via optical-fibre cables. The work of connecting the towers could prove to be a huge challenge for the country.

The process of connecting radio towers with each other via optical fibre cables is called fiberisation. It helps provide full utilisation of network capacity, and carry large amounts of data once 5G services are rolled out. It will also aid in providing additional bandwidth and stronger backhaul support. The backhaul is a component of the larger transport that is responsible for carrying data across the network. It represents the part of the network that connects the core of the network to the edge. As a result, fibre backhaul remains an important part of transport across all telecoms, Sajan Paul, Managing Director & Country Manager, India & SAARC, Juniper Networks, a telecom infrastructure company, told *The Hindu*.

Fibre-based media, commonly called optical media, provides almost infinite bandwidth and coverage, low latency and high insulation from interference. With 5G, it will also be necessary to increase the density of mobile towers to provide better coverage to consumers and businesses. This calls for increased requirements for fibre deployment, Mr. Paul said.

To transition into 5G, India needs at least 16 times more fibre, according to estimates by STL, a technology company specialised in optical fibers and cables.

In India, currently only 33% of the towers are fiberised, compared to the 65%-70% in South Korea and 80%-90% in the U.S., Japan and China, according to a 2021 report by India Infrastructure Research. The fibre kilometer (fkm) per capita in India is lower than other key markets. Ideally, a country needs 1.3 km of fibre per capita to ensure good fiberisation. India's fkm is just .09 compared to 1.35 in Japan, 1.34 in the U.S. and 1.3 in China, the report noted.

There is also a need to increase data capacity in the fiberised towers. These tower sites which are connected via fibre are called fibre point of presence (POP). Currently these fibre POPs at a tower site can handle data at one to five Gbps speed, Nitin Bansal, managing director, India & head – Networks, Southeast Asia, Oceania & India, Ericsson, told *The Hindu*.

To reach the targeted level of fiberisation, India requires about 2.2 lakh crore of investment to help fiberise 70% towers. About 2.5 lakh crore will be needed to set up 15 lakh towers in the next four years, according to estimates by the National Broadband Mission and Cellular Operator Association of India (COAI).

Government programmes like BharatNet and Smart Cities will further add to the demand of fibre deployment, necessitating a complete tower fiberisation. Indian Prime Minister Narendra Modi, in his 2020 Independence Day speech, laid out the vision to connect every village in the country with optical fiber cable (OFC) in 1,000 days. To achieve that vision, cables must be laid at a speed of 1,251 km a day, around 3.6 times the current average speed of 350 km a day, according to a report by EY, a global professional services company.

One of the biggest issues in the way of fiberisation remains the Right of Way (RoW) rules. The Indian Telegraph RoW Rules 2016 were gazette notified by the Department of Telecommunications (DoT), Govt. of India on November 15, 2016. The rules aim to incorporate nominal one-time compensation and uniform procedure for establishment of Overground Telegraph Line (OTL) anywhere in the country.

While all States/UTs are required to implement these rules, they are not in complete alignment and still require certain amendments to align, the EY report pointed out. Further, several districts and local bodies have not agreed to the RoW policies as notified in those respective States. These places are following their own bylaws overriding the State RoW policies aligned with the RoW rules, 2016, EY said.

Other central Ministries like the Ministry of Road Transport and Highways, National Highway Authority of India, Ministry of Environment and Forests, Ministry of Railways, Ministry of Defense, Ministry of Civil Aviation, Department of Post, etc. have not yet adopted these Rules, citing their own departmental rules, EY said.

Global network intelligence firm Ookla highlighted the DoT's GatiShakti Sanchar online portal as a way to simplify RoW approvals and help deploy cables for 5G. "This initiative will enable centralisation of RoW approvals for telecom infrastructure projects, including 5G and help operators to deploy required infrastructure for the upcoming 5G rollout in a timely manner," Sylwia Kechiche, Principal Analyst, Ookla, said to *The Hindu*. In October 2021, the DoT revised the RoW rules, making it easier to install aerial optical fibre cable in the country. This can enable infrastructure providers to deploy cables overhead via street light poles and traffic light posts.

Pilot projects are underway in a few locations like the Delhi airport. The Telecom Regulatory Authority of India has also published a consultation paper on using street furniture for small cell and aerial fiber deployment. This along with the findings from the pilot projects will help to inform the regulatory and policy framework, Ms. Kechiche added.

Processing power needs to be distributed from centralised data centres to edge servers closer to users.

Satellite communication can provide high-capacity backhaul connectivity to large numbers of edge servers over wide areas, thereby complementing the terrestrial network with cost-effective scalability, according to a report by Intelsat, a satellite service provider.

Satellite communication can facilitate 5G broadband connectivity to underserved areas where it is not feasible to deploy terrestrial infrastructure like remote villages, islands or mountainous regions. Satellite-based networks are the only means for delivering 5G broadband to users on board moving vessels, including cars, ships, airplanes and high-speed trains. In addition, space-based broadcast capabilities support over-the-air software updates for connected cars anywhere in the world, the Intelsat report said.

Space-based backhaul will also provide disaster relief services, support emergency response teams as well as deliver broadband connectivity for one-off entertainment or sports events anywhere in the world, Intelsat said.

The low-Earth Orbit (LEO) satellites will be well-suited to offer not only backhaul, but also direct connectivity. As the 5G standard is adopted, new markets will open up for satellite operators, including IoT, private 5G, and cellular backhaul for densification to enable more cell sites and edge devices, Ms. Kechiche added.

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