Bharat Net Project (erstwhile NOFN)
(25 February, 2022)

Bharat Net Project is of national importance to establish, by 2017, a highly scalable network infrastructure accessible on a non-discriminatory basis, to provide **on-demand, affordable broadband connectivity of 2 Mbps to 20 Mbps** for all households and on-demand capacity to all institutions, to realize the vision of Digital India, in partnership with States and the private sector.

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History of Internet in India

- Internet in India began in **1986** with the launch of **Educational Research Network (ERNET)** and was available only to the educational and research community. ERNET was initiated by the Department of Electronics (DoE), with funding from Government of India and United Nations Development Program (UNDP).
- The first publicly available internet service in India was launched by state-owned **Videsh Sanchar Nigam Limited (VSNL) on 15 August 1995**.
- However, for the next 10 years the Internet experience in the country remained less attractive with narrow-band connections having speeds less than 56 kbit/s (dial-up).
- Integrated Services Digital Network (ISDN) access was introduced in 1997.
- In 2004, the government formulated its broadband policy which **defined broadband as "an always-on Internet connection with download speed of 256 kbit/s or above**." On 1 September 2021, TRAI raised the **minimum broadband speed to 2 Mbps**.
- **From 2005 onward, the growth of the broadband sector in the country accelerated**, but remained below the growth estimates of the government and related agencies due to resource issues in last-mile access which were predominantly wired-line technologies.
- This bottleneck was removed in 2010 when the government **auctioned 3G spectrum** followed by an equally high-profile auction of 4G spectrum that set the scene for a competitive and invigorated wireless broadband market.
- Today, internet access in India is provided by both public and private companies using a variety of technologies and media including dial-up (PSTN), xDSL, coaxial cable, Ethernet, FTTH, ISDN, HSDPA (3G), WiFi, WiMAX, etc. at a wide range of speeds and costs

How many Internet Users are present in India?

- **India has the second highest number of internet users in the world**.
- As of January 2022, there are 658 million internet users in India. India's internet penetration rate stood at 47 % of the total population at the start of 2022.
- Out of those, around 467million users are on social media.
- According to the March 2021 **Speedtest Global Index**, published by Speedtest.net, India was **ranked 66th out of 177 countries** by average fixed **broadband** speed and 86th out of 140 countries by average mobile internet speed.

Potential of Internet in India

- The World Economic Forum (WEF) estimated that about 60% of Indian internet users viewed vernacular content and only about a quarter of internet users were over the age of 35 years in 2019.
- The WEF also estimated that 1.1 billion Indians would have access to the internet by 2030, with 80% of the subscriber base primarily accessing the internet on mobile devices.
- The profile of India's internet user base was predicted to diversify by 2030 with 80% of users accessing vernacular content and with users over 25 years making up 45% of the total subscriber base.

Types of Internet Access in India

- Access to the Internet can be divided into **dial-up and broadband access**.
- Around the start of the 21st century, most residential access was by dial-up, while access from businesses was usually by higher speed connections. In subsequent years dial-up

declined in favour of broadband access.

- **Both types of access generally use a modem**, which **converts digital data to analog** for transmission over a particular analog network (ex. the telephone or cable networks).

What is Dial up access?

- Dial-up access is a **connection to the Internet through a phone line**, creating a **semi-permanent link** to the Internet.
- Operating on a single channel, it monopolizes the phone line and is the **slowest method of accessing** the Internet.
- Dial-up is **often the only form of Internet access available in rural areas** because it requires no infrastructure other than the already existing telephone network.
- Dial-up connections typically **do not exceed a speed of 56 kbit/s**, because they are primarily made via a 56k modem.

What is Broadband Access?

- Broadband access includes a **wide range of speeds and technologies**, all of which provide **much faster access to the Internet** than dial-up.
- Broadband connections are continuous or "always on" connections, **without the need to dial and hang-up, and do not monopolize phone lines**.
- Common types of broadband access include **DSL (Digital Subscriber Lines), Fibre to the x (Optical fibre network), Cable Internet access, Satellite Internet access, mobile broadband via cell phones** and other mobile devices among many others.
- The **Economic Survey 2021-22, reported that 5.46 lakh km optical fibre cable has been laid**. It further said that a total of 1.73 lakh gram panchayats have been connected by optical fibre cable (OFc) and 1.59 lakh gram panchayats are service-ready on OFC, as of September 27, 2021.

Government Efforts for Internet in India

The Indian Government has embarked on projects such as BharatNet, Digital India, Brand India and Startup India to further expedite the growth of internet-based ecosystems.

Bharat Broadband Network Limited or Bharat Net (erstwhile NOFN)

- On 25th Oct, 2011 Government approved National Optical Fibre Network (NOFN) initiative to connect all 250,000 gram panchayats in the country covering nearly 625,000 villages, by utilizing the existing optical fibre network and extending it to the gram panchayats.
- **NOFN was renamed in 2015 as BharatNet**.
- To achieve this, Bharat Broadband Network was incorporated as a Special Purpose Vehicle(SPV) on 25 February 2012 under Companies Act of 1956.
- It is a highly scalable network infrastructure accessible on a non-discriminatory basis, to provide on demand, affordable broadband **connectivity of 2 Mbps to 20 Mbps** for all households and on demand capacity to all institutions, to realise the vision of Digital India, in partnership with States and the private sector.
- BharatNet, is a **government-owned broadband infrastructure provider**, set up by the Ministry of Communications for the **establishment, management, and operation** of the **National Optical Fibre Network** to provide a **minimum of 100 Mbit/s broadband connectivity** to all **250,000-gram panchayats** in the country, covering nearly **625,000**

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villages, by improving the **middle layer** of nation-wide broadband internet in India to **achieve the goal of Digital India**.

- BharatNet is the **world's largest rural broadband connectivity program**, which is built under the Make in India initiative with no involvement of foreign companies.
- It is both an enabler and a beneficiary of other key government schemes, such as Digital India, Make in India, the National e-Governance Plan, UMANG, Bharatmala, Sagarmala, the dedicated freight corridors, industrial corridors, and UDAN-RCS.
- The **Common Service Centers (CSCs) act as the nodal point** from where the Wi-Fi and Broadband services are distributed. At present, there are about 3.60 lakh CSCs operating across the country.

National Optical Fibre Network (NOFN), 2011

- NOFN is an ambitious initiative to trigger a broadband revolution in rural areas.
- NOFN was envisaged as an information super-highway through the creation of a robust middle-mile infrastructure for reaching broadband connectivity to Gram Panchayats.
- The Ministry of Communications has launched the National Broadband Mission that will facilitate universal and equitable access to broadband services across the country, especially in rural and remote areas.

Aim of NOFN

- To facilitate the delivery of e-governance, e-health, e-education, e-banking, Internet and other services to rural India.
- To connect all the 2,50,000 Gram panchayats in the country and provide 100 Mbps connectivity to all gram panchayats.
- To achieve this, the existing unused fibres (dark fibre) of public sector undertakings (PSUs) (BSNL, Railtel and Power Grid) were utilised and incremental fibre was laid to connect to Gram Panchayats wherever necessary.
- Non-discriminatory access to the NOFN was provided to all the service providers like Telecom Service Providers (TSPs), Cable TV operators and content providers to launch various services in rural areas.
- The entire project is being funded by the **Universal Service Obligation Fund (USOF),** which was set up for improving telecom services in rural and remote areas of the country.
- Dark fibre network thus created was lit by appropriate technology thus creating sufficient bandwidth at the Gram Panchayats.
- Based on NOFN experiences, newer, updated and upgraded version - BharatNet was conceived as a nation-wide broadband network.

Dark fibre

- It is an **unused optical fibre** that has been **laid but is not currently being used** in fibre-optic communications.
- Since fibre-optic cable transmits information in the form of light pulses, a 'dark' cable refers to one through which **light pulses are not being transmitted**.
- Companies lay **extra optical fibres** in order to avoid cost repetition when more bandwidth is needed. It is also known as **unlit fibre**.

Phases of BharatNet

- **Phase I:** Provide one lakh gram panchayats with broadband connectivity by laying underground Optic Fibre Cable (OFC) lines by December 2017.
- **Phase II:** Provide connectivity to all the gram panchayats in the country using an optimal mix of underground fibre, fibre over power lines, radio and satellite media by March 2019.
- **Phase III:** From 2019 to 2023, a state-of-the-art, future-proof network, including fibre between districts and blocks, with ring topology to provide redundancy would be created.
- The last mile connectivity, with a total of 700,000 Wi-Fi hotspots to cover all 625,000 villages of India by adding 2 to 5 Wi-Fi hotspots per gram panchayat and a minimum of one Wi-Fi hotspot per village, have been created by connecting high-speed 4G base tower stations of commercial telecom operators to BharatNet.

Universal Service Obligation Fund (USOF):

- USOF, established in 2002, provides **effective subsidies** to ensure telegraph services are provided to everyone across India, **especially in the rural and remote areas**.
- It is headed by the **USOF Administrator** who reports to the Secretary, Department of Telecommunications (DoT).
- **Funds come from the Universal Service Levy (USL) of 5% charged from all the telecom operators on their Adjusted Gross Revenue (AGR)** which are then deposited into the **Consolidated Fund of India** and require prior parliamentary approval to be dispatched.
- The **USOF works through a bidding process**, where funds are given to the enterprise quoting the lowest bid.

PPP Model of BharatNet Programme

- The project will be extended to all inhabited villages **beyond the gram panchayats in 16 States** which are: Kerala, Karnataka, Rajasthan, Himachal Pradesh, Punjab, Haryana, Uttar Pradesh, Madhya Pradesh, West Bengal, Assam, Meghalaya, Manipur, Mizoram, Tripura, Nagaland and Arunachal Pradesh.
- The revised strategy will include creation, upgrading, operation, maintenance and utilisation of BharatNet by the private sector partner, who will be selected by a competitive international bidding process.
- The selected private sector partner is expected to provide reliable, high speed broadband services as per predefined Services Level Agreement (SLA).
- According to the plan, the private player who will be selected through bids will set up, **operate and maintain the network**.
- Recently, the Union Cabinet approved a **Viability Gap Funding** support of up to Rs. 19,041 crore (Out of the total expense of Rs. 29,430 crore) for the implementation of the BharatNet project through Public-Private Partnership model.
- **Viability Gap Funding (VGF)** means a grant one-time or deferred, provided to support infrastructure projects that are economically justified but fall short of financial viability.
- The PPP Model will leverage private sector **efficiency for operation, maintenance, utilisation and revenue generation** and is expected to result in the faster roll out of BharatNet.
- The private sector partner is expected to bring an equity investment and raise resources towards capital expenditure and for operation and maintenance of the network.
- Extension of BharatNet to all inhabited villages will enable **better access to e-services offered by various governments,** enable online education, telemedicine, skill

development, e-commerce and other applications of broadband.

- Union finance minister Nirmala Sitharaman announced in her Budget speech 2022 that **BharatNet broadband will be ready by 2025**. She also said that BharatNet contracts for laying optical fibre will be awarded through Public-Private Partnership (PPP).

Challenges in the success of BharatNet Project

- It is unlikely to meet the 2025 target of connecting all 2.5 lakh gram panchayats due to lack in coordination among different stakeholders.
- Total fibre laid was 5.65 lakh km under BharatNet project. However, 3 lakh km was given to Common Service Center (CSC), which is under MEITy. But, the quality of fibre and even its existence became questionable due to CSC's failure, leading to no response in PPP model due to poor or non-existent network on 'as is where is basis.
- The BharatNet project has been in the works for several years (more than a decade now) and according to various sources from the government and the industry, many private firms are also reluctant to join the project in the public-private partnership (PPP) mode, terming it as a 'dead asset' now.
- It was initially launched with the objective of providing optical fibre to each GP and six lakh villages across India. However, the scope has recently been extended again, to reach all villages.
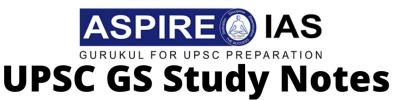
National Broadband Mission

- The Ministry of Communications has launched 'National Broadband Mission' that will **facilitate universal and equitable access to broadband services across the country, especially in rural and remote areas**.
- The Mission is part of the **National Digital Communications Policy, 2018**.
- The vision of the Mission is to fast-track growth of digital communications infrastructure, bridge the digital divide, facilitate digital empowerment and inclusion, and provide affordable and universal access of broadband for all.
- It can be noted that through BharatNet, broadband services have reached in as many as 142,000 village blocks, and the latest mission aims to offer broadband for all by 2022 including remotely-located hospitals, schools and post offices.

Key Features of National Broadband Mission

Some of the objectives of the Mission which are structured with a strong emphasis on the three principles of universality, affordability and quality are:

- Broadband access to all villages by 2022.
- Significantly improve quality of services for mobile and internet.
- Develop a Broadband Readiness Index (BRI) to measure the availability of digital communications infrastructure and conducive policy ecosystem within a State/UT.
- Creation of a digital fiber map of the Digital Communications network and infrastructure, including Optical Fiber Cables and Towers, across the country.
- Laying of incremental 30 lakhs route km of Optical Fiber Cable and increase in tower density from 0.42 to 1.0 tower per thousand of population by 2024.
- The Centre will work with States and UTs for having consistent policies pertaining to expansion of digital infrastructure including for Right of Way (RoW) approvals required for laying of optical fibre cable.

- Investment from stakeholders of Rs 7 Lakh Crore including Rs 70,000 crore from Universal Service Obligation Fund (USOF).

National Digital Communications Policy, 2018

- The Union Cabinet has approved the new telecom policy now named National Digital Communications Policy (NDCP) 2018 and also re-designation of the Telecom Commission as the "**Digital Communications Commission**".
- The new National Digital Communications Policy -2018 will **replace the existing National Telecom Policy-2012**, to cater to the modern technological advancements such as 5G, IoT, M2M etc. in the Telecom Sector.
- It has been broadly estimated that a 10% increase in broadband penetration in a country could potentially lead to an over 1% increase in GDP. Therefore, a consistent policy and principles framework is required to create a vibrant competitive telecom market to strengthen India's long term competitiveness.

Features of National Digital Communications Policy

It envisages three Missions: Connect India, Propel India and Secure India

1) Connect India: Creating Robust Digital Communications Infrastructure.

- **National Broadband Mission (Rashtriya Broadband Abhiyan)-** Provide Universal broadband connectivity at 50Mbps to every citizen by 2022.
- **BharatNet**- Provide 1 Gbps connectivity to all Gram Panchayats of India by 2020 and 10 Gbps by 2022.
- **GramNet** – Connecting all key rural development institutions with 10 Mbps upgradeable to 100 Mbps.
- **NagarNet** – Establishing 1 Million public Wi-Fi Hotspots in urban areas.
- **JanWiFi** – Establishing 2 Million Wi-Fi Hotspots in rural areas.
- Enable 100 Mbps broadband on demand to all key development institutions including all educational institutions by 2022.
- **Fibre First Initiative** to take fibre to the home, to enterprises and to key development institutions in Tier I, II and III towns and to rural clusters.
- **Establishment of a National Digital Grid by National Fibre Authority**.
- **Strengthening Satellite Communication Technologies** in India by reviewing SATCOM policy, making available new spectrum bands, streamlining administrative processes for assignment and allocations, clearances and permissions related to satellite communication systems, etc.
- Ensuring Customer Satisfaction, Quality of Service and effective Grievance Redressal by establishing Telecom Ombudsman, framing a comprehensive policy to encourage the adoption of environmental and safety standards and incentivising the use of renewable energy technologies in the communications sector.

2) Propel India: Enabling Next Generation Technologies and Services through Investments, Innovation and IPR generation.

- Attract investments of USD 100 Billion in the Digital Communications Sector, expand IoT ecosystem to 5 Billion connected devices, accelerate transition to Industry 4.0 by 2022.
- Creation of innovation led Start-ups in Digital Communications sector.
- Creation of Globally recognized IPRs (Intellectual Property Rights) in India.

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- Development of Standard Essential Patents (SEPs) in the field of digital communication technologies.
- Train/ Re-skill 1 Million manpower for building New Age Skills.

3) Secure India:Ensuring Sovereignty, Safety and Security of Digital Communications.

- Establish a comprehensive data protection regime for digital communications that safeguards the privacy, autonomy and choice of individuals and facilitates India's effective participation in the global digital economy.
- Ensure that net neutrality principles are upheld and aligned with service requirements, bandwidth availability and network capabilities including next generation access technologies.
- Develop and deploy robust digital communication network security frameworks.
- Build capacity for security testing and establish appropriate security standards.
- Address security issues relating to encryption and security clearances.
- Enforce accountability through appropriate institutional mechanisms to assure citizens of safe and secure digital communications infrastructure and services.