India’s 4G Stack: A Step Toward Telecom Self-Reliance and Global Digital Exports

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4G Stack Latest News

- PM Modi, at the India Mobile Congress 2025, announced that India’s indigenously developed 4G stack would not only enhance connectivity and internet access within the country but also be exported globally.
- The **4G stack**, comprising both telecom hardware and software, is part of India’s strategy to challenge China’s dominance in building telecom infrastructure across the developing world, especially in Africa.
- Though less advanced than Chinese systems from Huawei and ZTE, India aims to expand its footprint through affordable, secure, and locally developed solutions.
- Additionally, **New Delhi plans to export its ‘India Stack’** — a set of digital public infrastructure tools for identity, data management, and payments — positioning itself as a key player in digital transformation for developing nations.

About 4G

- 4G (fourth-generation wireless) represents the broadband mobile communication standard that succeeded 3G and paved the way for 5G.
- It delivers high-speed internet, enabling HD video streaming and wireless broadband connectivity without wired ISP networks.
- Technologies such as LTE, MIMO, and OFDM power 4G networks, offering higher bandwidth, lower latency, and improved efficiency.

India’s Indigenous 4G Technology Stack: A Step Toward Telecom Self-Reliance

- India has achieved a landmark milestone by launching its first indigenously developed 4G network, featuring 98,000 Swadeshi 4G towers powered entirely by homegrown technology.
- The initiative — led by **C-DOT (core network)**, **Tejas Networks** (radio access), and TCS (system integration) — marks a major stride towards Aatmanirbhar Bharat and digital self-reliance.
- Previously reliant on foreign technology for 2G, 3G, and 4G, India built this stack from scratch during the Covid-19 pandemic, demonstrating resilience, innovation, and supply-chain independence.
- The BSNL 4G stack, designed to be cloud-native and **5G-ready**, provides seamless connectivity and ensures easy future upgrades.
- Complementary initiatives such as the **Bharat 6G Alliance**, Telecom Technology Development Fund, and **100 5G/6G labs** are accelerating India’s journey toward Viksit Bharat 2047 and global digital leadership.

Key Features of India’s 4G Stack

- **End-to-End Indigenous Stack**: Combines Tejas Networks’ Radio Access Network, C-DOT’s Core Network, and TCS integration, cutting reliance on foreign vendors.
- **Cloud-Native Software Architecture**: Enables scalability, rapid upgrades, and smooth migration to 5G.
- **Future-Proof Design**: The network is 5G-ready, allowing upgrades without replacing existing infrastructure.
- **Nationwide Reach**: Deployed across 92,000+ sites, bringing connectivity to 22 million citizens, including tribal and remote areas.

Benefits and Impact of the Indigenous 4G Stack

- **Strategic Autonomy and Digital Sovereignty** – Empowers India to control its telecom infrastructure, ensuring security, independence, and reduced dependence on global tech providers.
- **Digital Inclusion:** Enhances access to **education, healthcare, and agriculture services** through reliable internet in remote regions.
- **Secure Connectivity for Armed Forces:** Strengthens **national security** and ensures secure communications for defense personnel.
- **Employment and Supply-Chain Development** – Boosts domestic manufacturing, generates jobs, and nurtures a skilled workforce, reinforcing India’s telecom ecosystem.
- **Global Export Potential** – The indigenous 4G stack meets domestic needs while holding export potential, with interest from multiple developing nations.

- **Rapid Indigenous Development** – Developed in just 22 months, the project highlights India's engineering capability and agility in telecom innovation.
- **Swadeshi Principle in Action** – Reflects the Swadeshi ethos, promoting domestic production, local skills, and community enterprise, driving inclusive growth.

India's 4G Export Plan as a Response to China's Digital Silk Road

- For years, China's telecom giants like Huawei and ZTE have dominated developing markets by offering **low-cost telecom infrastructure**, backed by **state funding and easy loans**.
- According to the Organisation for Research on China and Asia, this strategy forms part of China's **Digital Silk Road (DSR)** — a key component of the **Belt and Road Initiative** aimed at expanding **digital connectivity** across the developing world.
- The **DSR** promotes Chinese technology, goods, and services, including cellular networks, mobile apps, and payment platforms, while cementing China's role as the **global supplier of digital infrastructure**.
- It represents a **state–industry alliance**, supported by **policy banks and political backing**, to strengthen China's **technological and geopolitical influence**.

Source: IE | PIB | IE
