9th & 10th August 2023, Bangalore, India

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Implementation of 5G in India

International Conference on 5G Network Security

2023

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Agenda

- The India Story
- The Jio Story
- Jio's Journey to make India 'Atmanirbhar'

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The India Story

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National Digital Communications Policy

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National Digital Communications Policy (NDCP) Vision: Creating the **digital infrastructure** that supports the **next generation of digital services** and allows India to realize the **true potential of the digital economy.**

Mobile Communication has played a central role in realizing the ambitions of the **Digital India** initiative. It will also be central to realize the NDCP's goals to **'Connect India', 'Propel India'** and **'Secure India'.**

India is now firmly established as a **giant in the global mobile industry**, with almost **1.15 billion unique subscribers** at the early 2023.

India alone is forecast to generate almost **a quarter of the world's new mobile subscribers over the period to 2025,** and the market is seeing rapid migration to 4G-capable devices and smartphones.

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The Launch and the Rollout

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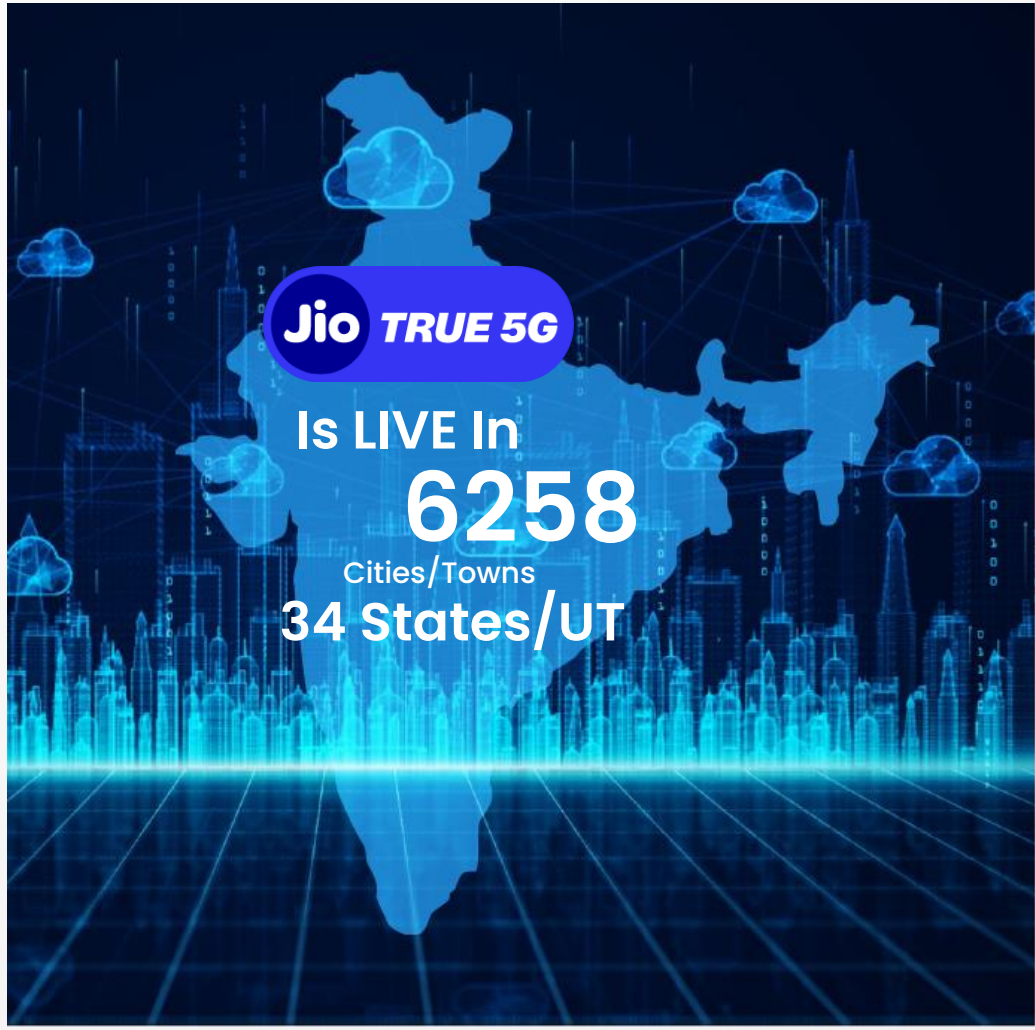
India witnessing fastest 5G Roll Out

- ✓ **Formal Launch of 5G services in India:** By Prime Minister Shri Narendra Modi on 1st October 2022, at the 6th edition of India Mobile Congress (IMC).
- ✓ The private CSPs also announced providing 5G services across India by end of 2023- early 2024.
- ✓ As on 30th July 2023, the total **3,08,466** 5G sites/BTS were deployed across India.

source: https://dot.gov.in/5g-bts-deployed



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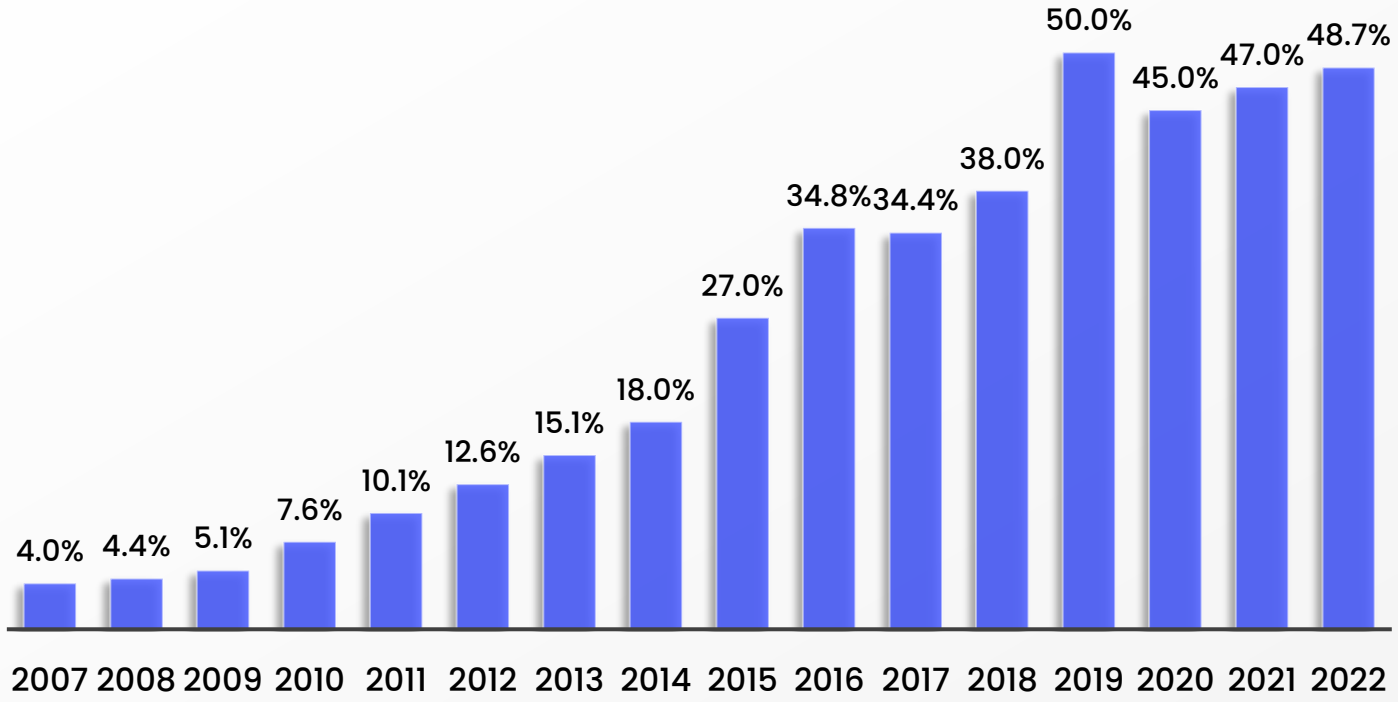
State of digital adoption in India in 2023

Internet Penetration In India



Digital adoption in India in early 2023:

- Mobile subscriptions: **1.1 billion** (77.0 %)
- Internet Users: **692 million** (48.7 %)
- social media users: **467.0 million** (32.8 %)

source: https://www.statista.com/statistics/792074/india-internet-penetration-rate/

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5G Subscriptions in India region by end of 2028

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Total mobile subscriptions (5G, 4G, others) in India, Nepal and Bhutan to reach **1.3 billion**

5G subscriptions to reach **690 million (53% of all mobile subscriptions)** due to:

i. Aggressive 5G deployments by CSPs

ii. Growing affordability and availability of 5G smartphones

5G subscriptions	2021	2022	Forecast 2028	CAGR* 2022–2028	Unit
North America	79	141	420	20%	million
Latin America	5	19	400	N/A	million
Western Europe	32	63	490	41%	million
Central and Eastern Europe	1	4	240	N/A	million
North East Asia	408	728	1,710	15%	million
China[1]	357	644	1,400	14%	million
South East Asia and Oceania	10	29	620	N/A	million
India, Nepal and Bhutan	0	31	690	N/A	million
Middle East and North Africa	10	24	270	N/A	million
GCC[2]	6	15	71	30%	million
Sub-Saharan Africa	3	7	150	N/A	million

Source : Ericsson Mobility report Nov 2022

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Impact on Indian Economy

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NASSCOM Report:

- 5G telecom networks are expected to represent **nearly 2% of India's GDP by 2030.**
- The 5G sector will generate revenues of **nearly $180 billion by 2030.**
- Public and Private 5G networks to enable use cases across multiple sectors such as **mobility, healthcare, manufacturing, retail, energy and utilities.**

GSMA Report on India's Digital Transformation journey:

- India's **high level of 4G adoption (79%)** indicates a subscriber base ready to transition to 5G.
- 5G is likely to benefit the Indian economy by **₹ 36.4 trillion ($455 billion) between 2023 and 2040**
- The benefit of 5G technology is expected to be realized in the **manufacturing sector** (representing **20%** of the total benefit), **retail (12%)** and **agriculture (11%)** etc.

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The Jio Story

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Jio Started the Digital Revolution in September 2016 Leading to Dramatic Behavioral Changes

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		Before Jio	After Jio
Data Availability and Affordability	Speed	<1 Mbps Download Speed	> 10 Mbps Download Speed
	Pricing	US$ 4 – 300 Per GB of Data	<US$ 0.1 Per GB of Data
Consumer Revolution	Increasing Usage	240 MB Average Monthly Usage per Subscriber	~23 GB Average Monthly Usage per Subscriber
	Expanding and Shifting Use Cases	Voice, SMS	Audio and video streaming, commerce, social media, news and financial services

90x Increase in **Data Consumption** in the Country | India's Share in Global Data Traffic has Gone **Up From <1% to 21%+**

India saw the First Phase of **'Jiotisation'** starting 2016 and Now ready for **'Jio 5G Effect'**

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Creating a Massive Digital Ecosystem for a Billion Indians

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Jio's Vision of 'Digital Society' is built on the core thesis of **Transformative Power of Data** combining **Connectivity as an Enabler** With **Digital Platforms** across Industry Verticals

Eco-systems

1. Connectivity & cloud
2. Media
3. Commerce
4. Financial Services
5. Gaming
6. Education
7. Healthcare
8. Agriculture
9. G2C
10. Smart Cities
11. Manufacturing

Digital Platforms

1. Devices & Operating Systems
2. IaaS / PaaS
3. Big data
4. AR / VR
5. IOT
6. Secure Identity
7. Blockchain
8. AI / ML
9. Edge Compute
10. Speech / Natural Language
11. Customer Owned Data
12. Super Compute
13. Computer Vision
14. Robotics
15. Drones
16. Quantum / Genomics / 3D printing

Digital Connectivity

Wireless Broadband

Home Broadband

Enterprise and SMBs

People

1. Talent
2. Structure
3. Communities
4. Performance & Growth
5. Leadership
6. Culture

Practices

1. Product management
2. Rapid prototyping
3. Architecture
4. Quality
5. Agile, CI / CD
6. Next Gen Operations

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Mission

To Connect Everyone and Everything, Everywhere

Always at the Highest Quality

And the Most Affordable Price

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5G Spectrum Auction in India

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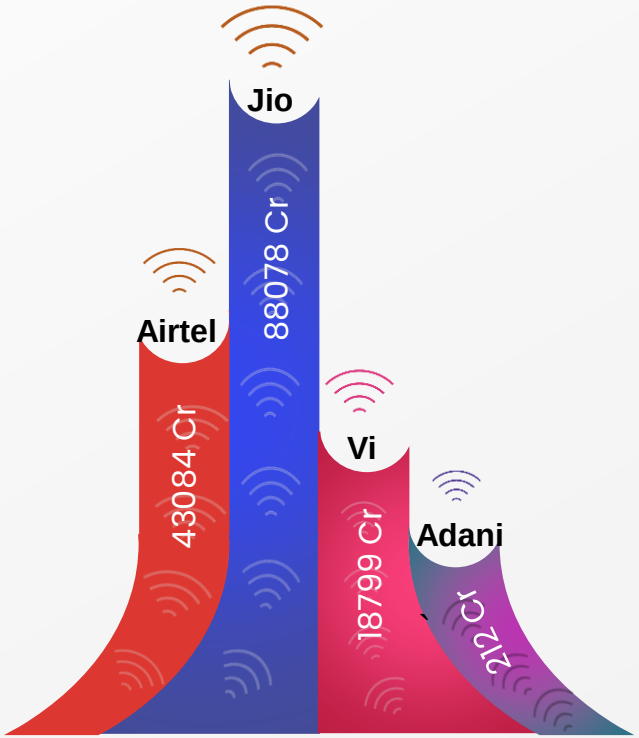
The auction for India's 5G spectrum began July 26, 2022 and closed August 1 after 40 rounds of bidding spread over seven days.

24.740 GHz worth of airwaves across the 700MHz, 800MHz, 1800MHz, 3300MHz, and 26GHz bands

19.867 GHz worth of airwaves across the 900MHz, 1800MHz, 2100MHz, 3300MHz, and 26GHz bands.

800MHz, 2100MHz, 2500MHz, 3300MHz and 26GHz bands, totaling **6.228 GHz** worth of airwaves.

1.26 GHz band to set up a private telecom network for their organization.



Jio has emerged as the highest bidder in the recent spectrum auctions. This underscores our commitment to provide Advanced Connectivity solutions to the Industries.

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Building 5G on top of the 4G scale

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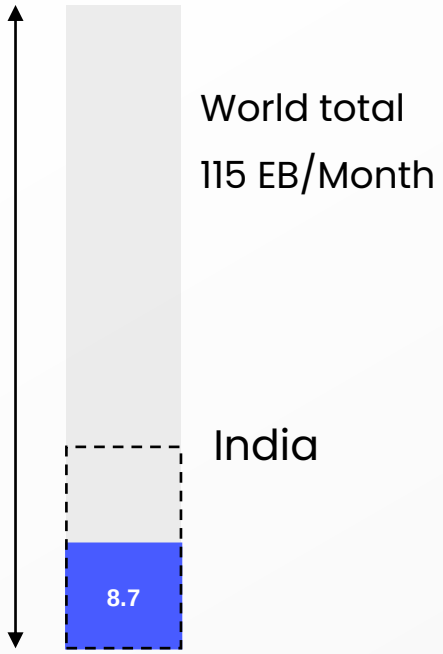

730K Km
Optical Fiber Network

4.35 Mn 4G Cells

330K Routers
World's largest IPv6 Network

8.7 EB
Monthly Data Traffic

430M
4G Customers

22 GB
Data per User per Month

>70%
Video Traffic

15.5B
VoLTE Minutes Per Day

1,260 Min
VoLTE Voice per User per Month

~6 Hours
Daily Use per User

Jio contributes to 8% of global mobile data

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5G Network Deployment Options

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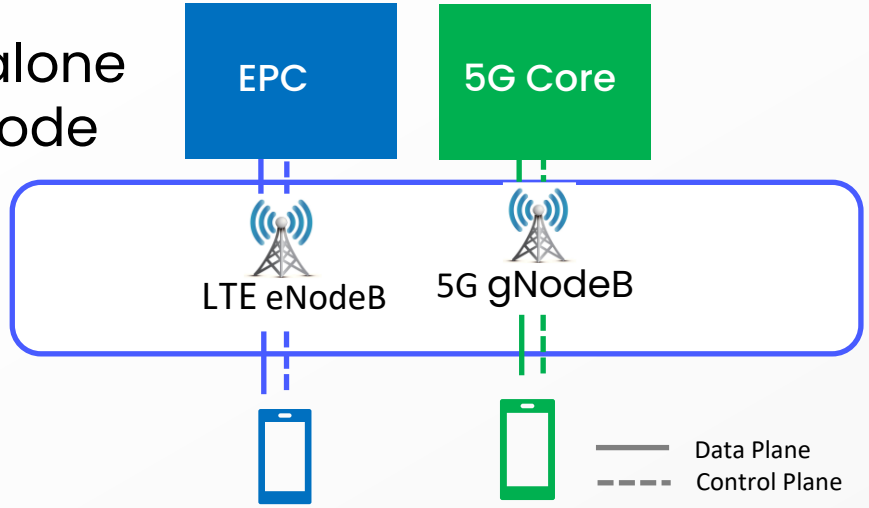
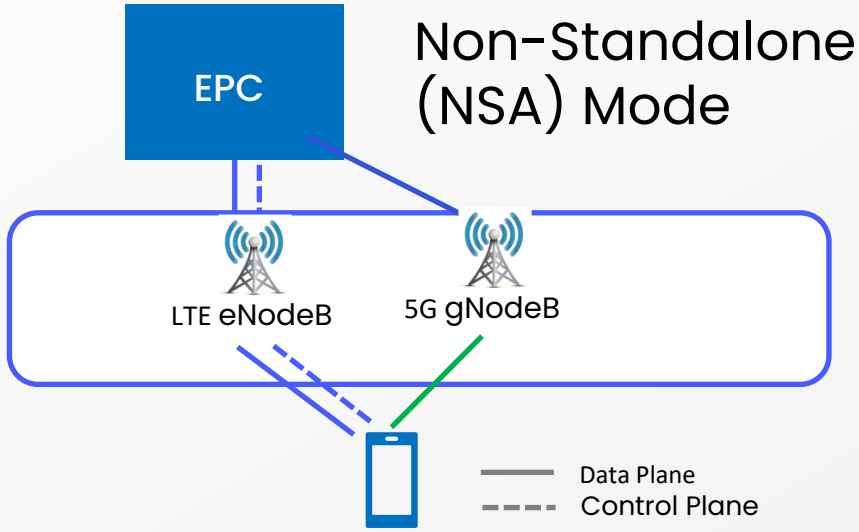
Standalone (SA) Mode



Jio True 5G - Complete 5G

- Enables ALL 5G Use Cases
- Requires complete suite of 5G Products standardized by 3GPP
- Progressive operators are planning for Standalone 5G.
  - Verizon – 2020 - 2021
  - AT&T – 2020
  - T-Mobile – 2020
  - SKT, Korea – 2020

Non-Standalone (NSA) Mode



5G RAN supported by 4G Core

- Allows only Mobile Broadband
- Works with existing 4G LTE Core

Jio has developed its own 5G product suite for SA mode as this will enable a whole lot of new services through Network Slicing, Cloud Native Deployments and Mobile Edge Computing technologies which are not otherwise possible in NSA mode.

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Jio's approach to deliver best 5G experience globally

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World's most advanced 5G Network for Mobility, Homes & Enterprise customers

1 Service Differentiation — Higher Data Speeds | Ultra-Low Latency | Cloud + AI at Edge | Vertical Applications

2 Customer Experience — Hyper Connectivity | Deep Indoor Coverage | Widest Reach | 5G Voice

3 Future-proof architecture — Augmented Intelligence | Carrier Aggregation | Elastic Network Capacity

4 Dedicated 24,660 MHz 5G Spectrum* — 700 MHz | 3500 MHz | 26000 MHz

5G Stand-Alone Architecture

* 1,120 MHz spectrum per circle

Largest 5G Stand-Alone Network being deployed Globally

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Jio among Global 5G data consumption trend

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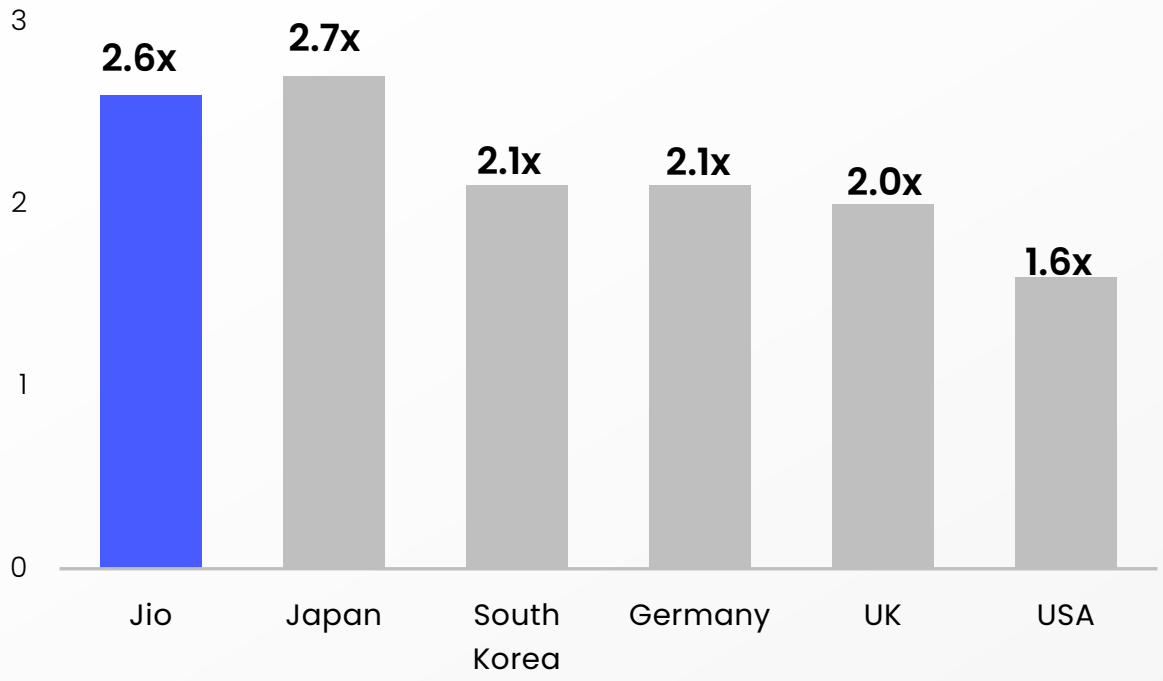
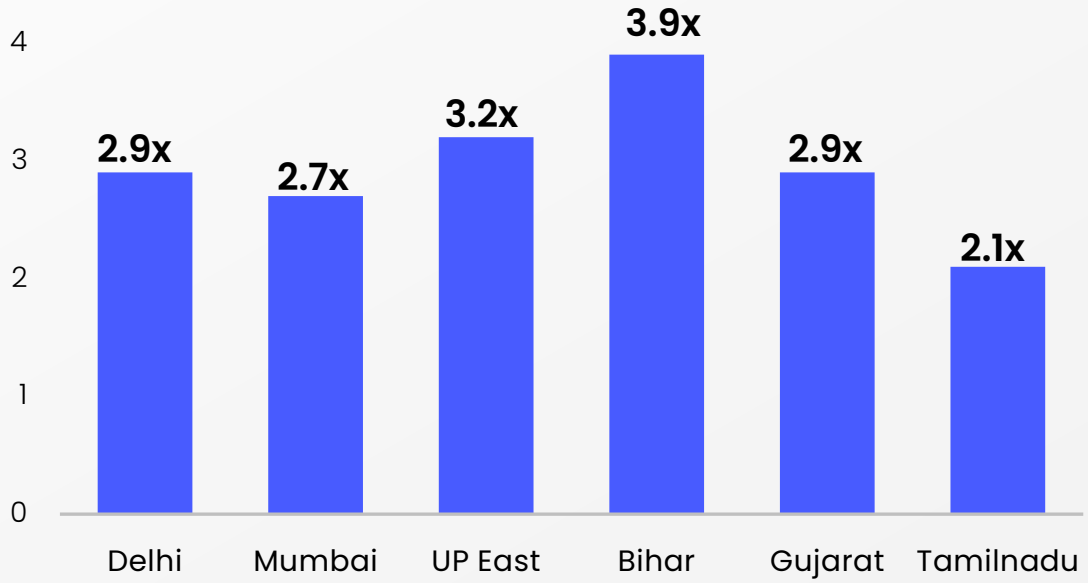
Jio 5G users are consuming 2.6x data as compared to 4G, similar to leading Markets globally





1. Video apps are switching to higher resolution due to 5G speeds, leading to improved experience and higher data consumption.
2. Because of fewer interruptions, 5G users are more likely to watch more and longer video streams over mobile connections.

Faster, better, 5G experience is driving more cellular usage

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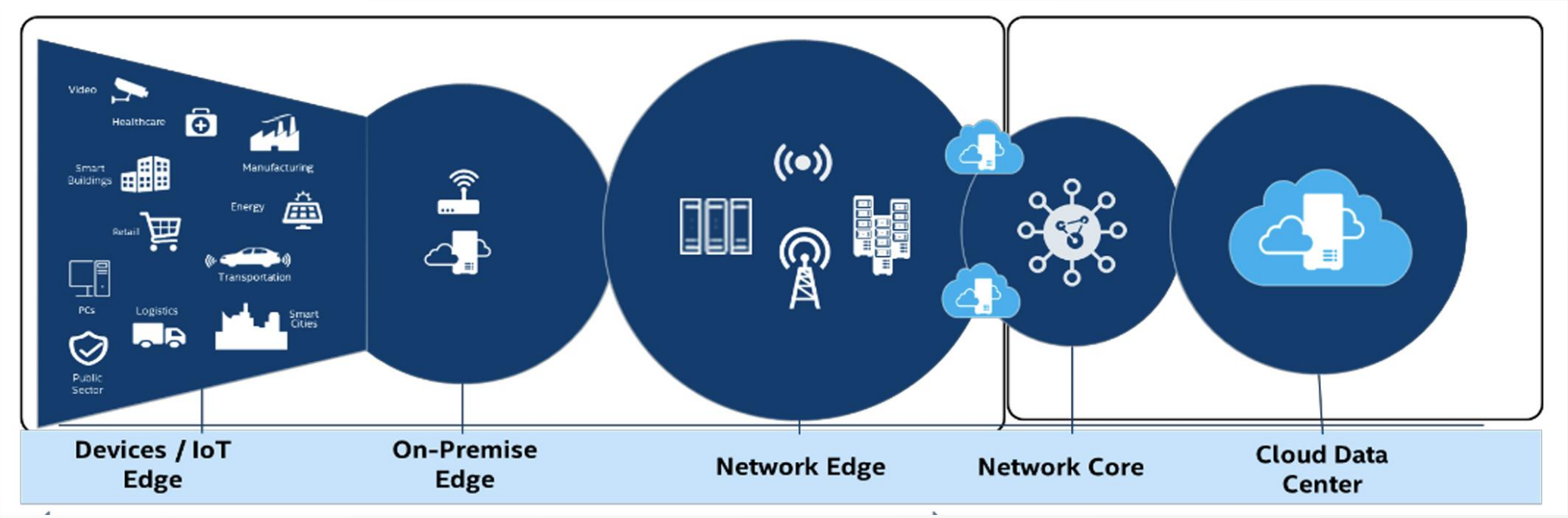
Jio 5G Core – Intelligence at the Edge



- Jio cloud-native 5G Core is operational at 40+ locations with ability to connect 100 Mn+ Consumers, Homes & Enterprises.
- Jio Edge Cloud planned to be deployed at 100+ locations to drive 5G services closer to customer.

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Jio's Journey to make India 'Atmanirbhar'

Atmanirbhar Bharat

Road to Self Reliance

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Jio's Journey to make India "Atmanirbhar"

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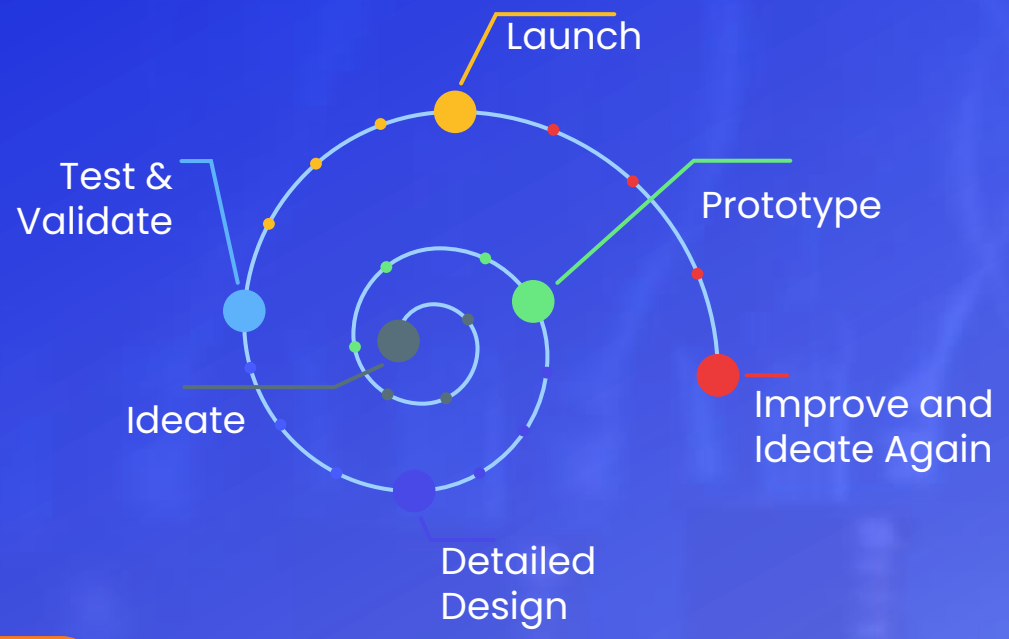
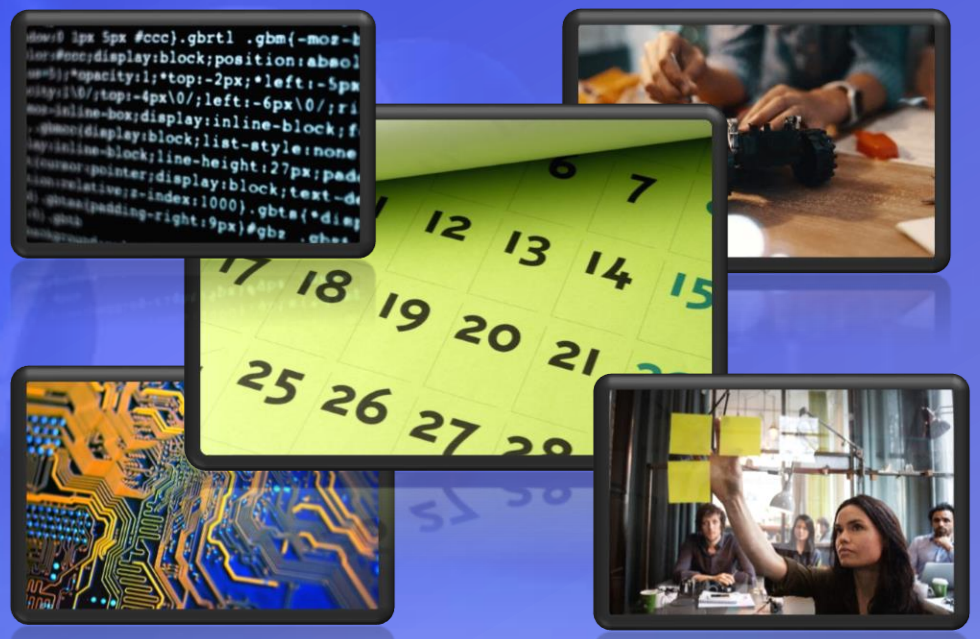
Innovation does not happen overnight,

it is an iterative process & requires perseverance.



Creating **World-Class** solutions take years of effort and a culture of innovation and excellence – in which people, processes, tools and training work in harmony.



Jio TRUE 5G

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Jio's Journey to make India "Atmanirbhar" started

16 Years Back

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What has materialized as the **"Indian 5G Stack"** today has roots to a small group of passionate engineers who got together with a vision of **"Self Reliant India"** in 2007.

2007-2010
Technology Architecture, Blueprint Evaluations and Designs

2012
Built Jio Labs, A large playground for telecom ecosystem partners.

2015
Largest 4G LTE Network Design, Development, Validation and Assurance

2016
Built world class hyperscale 4G telecom products at par with tier 1 software providers

2018-23
End to End True 5G
Made in India

Jio TRUE 5G

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Creating a **Culture** for Innovation

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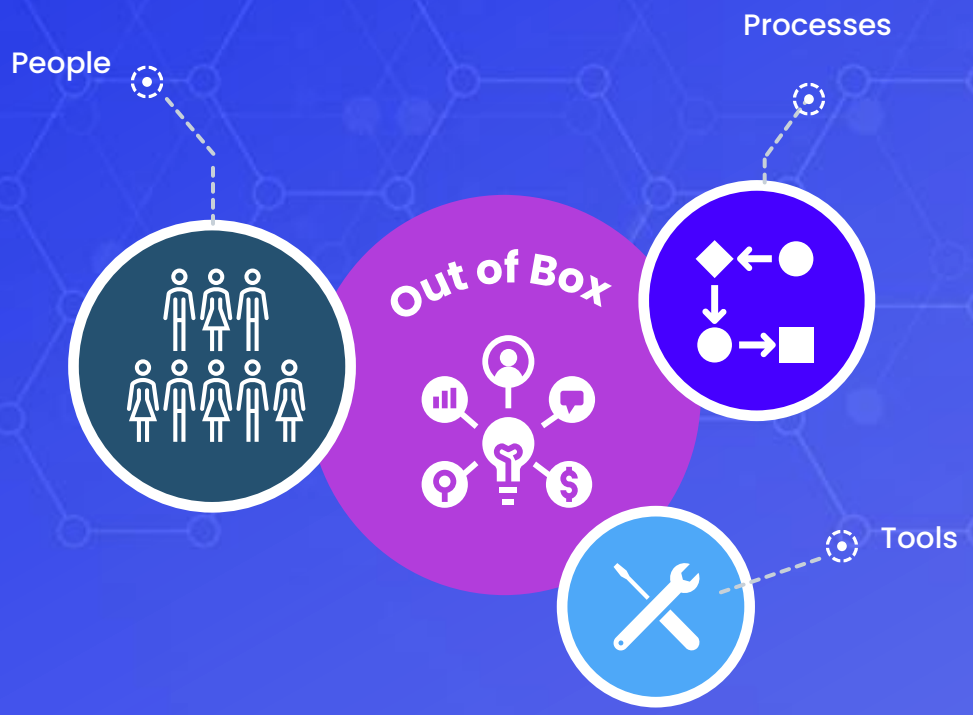
We cultivated a culture of innovation through people, processes, training as well as out of the box thinking.



Jio Labs is a facility where new bleeding edge solutions are developed and packaged as products. It is one of the largest labs globally.

Jio TRUE 5G

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Jio's **True 5G** Product Line

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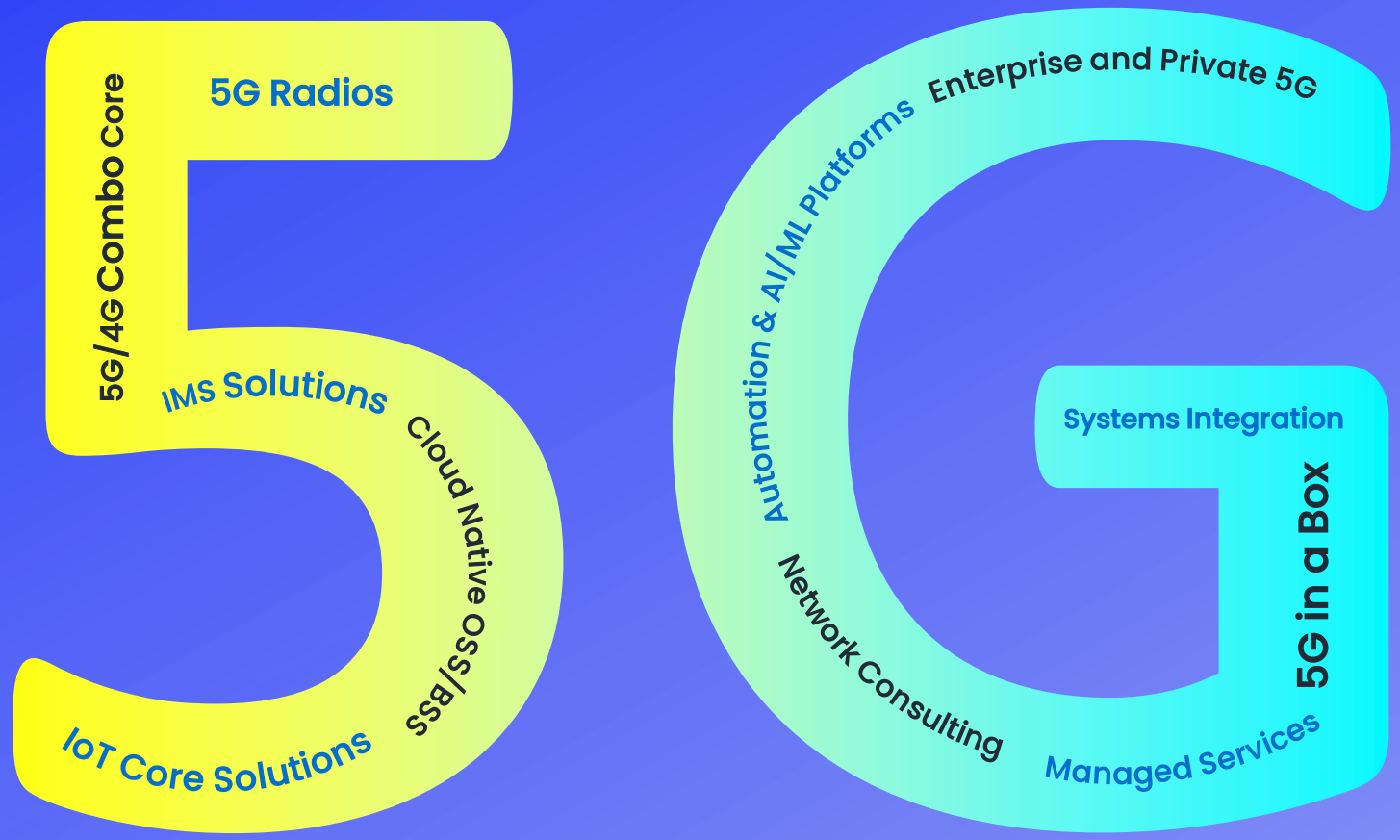
The only Indian Tech Company which offers of end-to-end 5G technology

- Cloud Agnostic Solutions
- Composable and Flexible
- Simple, Secure and Smart 5G



Jio TRUE 5G

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Jio's True 5G Product Line

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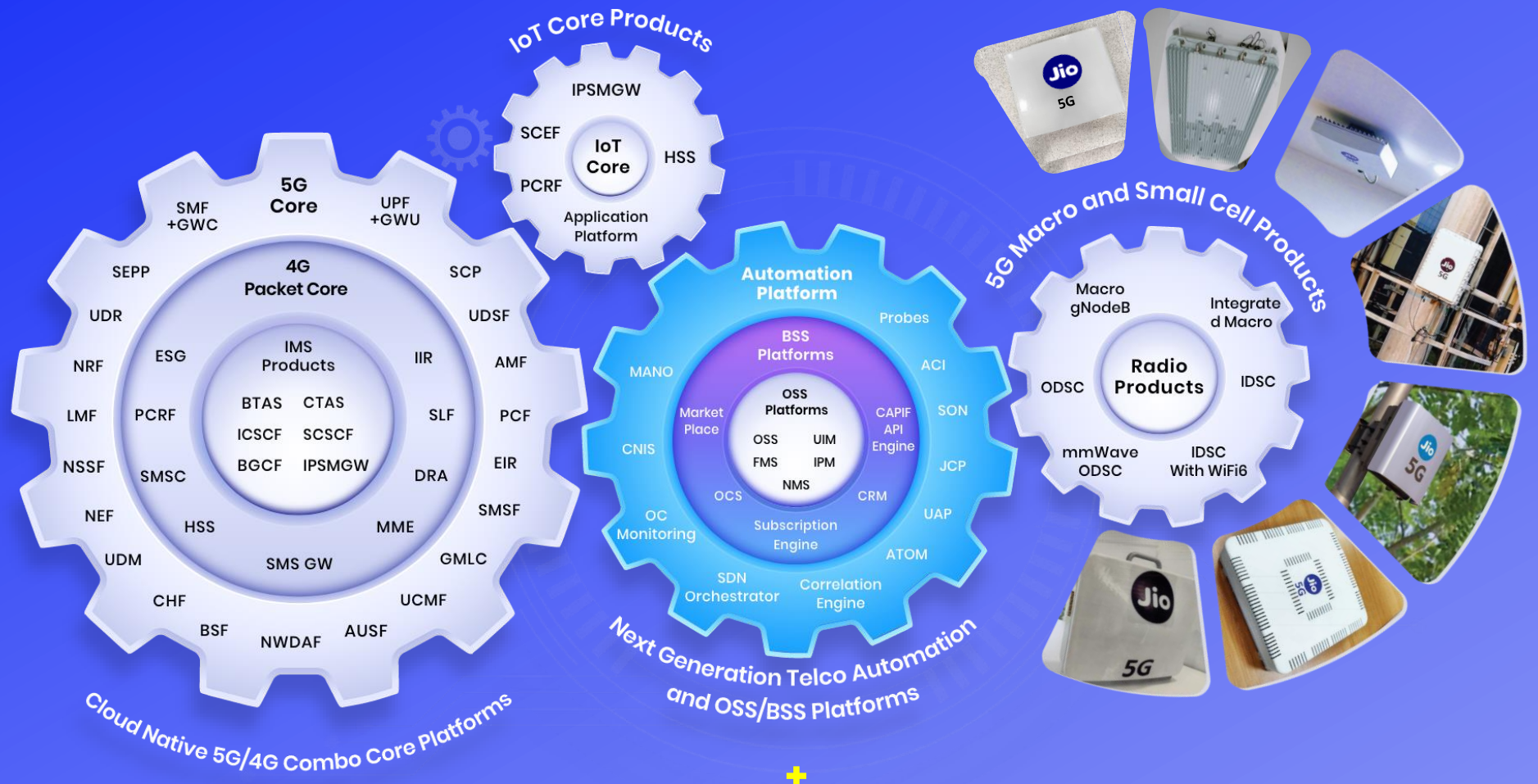
Puts India on the Global Technology Map, as only the 5th Country to have end to end indigenous 5G capabilities



+

Enterprise and Private 5G Offerings

+

Next Generation MEC Centers

Jio TRUE 5G

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JPL's 5G Blueprint

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Powering the world's largest digital connectivity infrastructure – primed to replicate anywhere

- **Jio's comprehensive 5G blueprint** is poised for adoption by multiple CSPs worldwide. The CSPs can focus on monetizing the benefits of 5G while entrusting the complete **technology transformation** to providers who own the proven, state-of-the-art 5G solutions.
- JPL's 5G blueprint conforms to **globally recognized open standards**, enabling it to power the **largest 5G SA rollout** for even the most complex and heterogeneous networks, such as Jio's.
- Global CSPs can leverage the same 5G Blueprint to **mitigate the risks** associated with their 5G launch. The blueprint includes a thorough analysis and solution architecture of **"doing 5G right".**

Deployment Scale of 5G Solutions

Avoids Network Transformation

Globally Esteemed and Award-Winning Portfolio

People, Processes, and Training Based on a Platform Model

Readily Available 5G Blueprint as a Service

Nimble and Field-Proven Products

De-risk Your 5G Launch

Standards Compliant and Open API-Based Solutions

Adds AI/ML Capabilities to the Network

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Thank You

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