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# PM WANI

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Tel: 0124 - 4822222 Fax: 0124 - 2380694

BENGALURU
205-207, Sree Complex (Opposite RBANMS Ground)
# 73, St John's Road, Bangalore – 560 042
Tel: +91 (80) 4341 2000, Fax: +91 (80) 2350 7971

MUMBAI
404 Trade Square, Mehra Industries, Compound Safed Pool,
Sakinaka, Andheri East, Mumbai – 400072
Mobile: 9969424024

INTERNATIONAL
Huson International Media
President, 1999, South Bascom Avenue, Suit 1000,
Campbell, CA95008, USA
Tel: +1-408-879 6666, Fax: +1-408-879 6669

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## The re-emergence of C-DoT as India's premier technology powerhouse — from 4G to IoT — a scan.

For any query: rajivp@cybermedia.co.in

GAJENDRA
UPADHYAY

# [OPENING NOTE]

## WiFi TO THE RESCUE AGAIN & CNPN

Mobile broadband coverage and 4G networks have brought high speed data to nearly every smart device in the country. But Internet access is still not ubiquitous in all parts of the country. It is here that the PM WANI framework for expanding WiFi based Internet access is going to play a major role.

For example, one of the world's largest suppliers of networking gear, Cisco is in talks to acquire a stake in one of the largest WiFi Hotspot Service Providers – FireFly. Firefly was formed as a JV between Airtel and Vodafone to set up Public hotspots. These are often located in areas with high footfalls — Malls, Metro Stations, Airports, Bus Depots, Airport lounges etc.

PM Wani envisages achieving access through public data office or PDOs which are expected to do what the public call office or PCOs did for telephone access thirty years ago.

Our cover story bridges the information gap on PM WANI and what it means for the country.

With 5G auctions being held on 26th of July, there is a lot of excitement and anticipation.

A new category of service provider is expected to emerge. This is the Captive Non Public Network or CNPN.

CNPNs can be a game changer in the sector. The Government has issued guidelines.

Telecom Service Providers (TSPs) with Access Service Licenses shall be allowed to provide CNPN as a service to Enterprises — by using their own network (and techniques like network slicing) on the public land mobile networks (PLMN).

TSPs with Access Service License have been allowed to establish isolated CNPN for Enterprises using 5G Spectrum acquired by them.

But the CNPN licensee is the Enterprise itself. Those who want to set up a high speed network for their factory, hospital or remote industrial township — be it in a mining area or in a large campus. A CNPN license under Section 4 of Indian Telegraph Act 1885 will have no Entry or License Fee.

A CNPN Licensee is allowed to establish an indoor or campus / isolated 5G network. However, the CNPN network cannot connect to the public network, meaning calls being made outside the campus will not be possible on a CNPN. For that, a separate connection on standard mobile / fixed line network will be required. In a sense, this will severely restrict users who will have to use multiple access devices. But rules can always change.

If a CNPN wants spectrum to be assigned directly to them, the guideline specifies that they will have to have a networth of at least Rs 100 crore. They will have to await the final terms to be decided by TRAI for grant of spectrum.

CNPN licensees can request equipment vendors to set up their CNPNs. Indigenous manufacturers of 5G equipment are likely to benefit as Enterprises with a CNPN License can ask them to set up captive 5G networks using indigenous technology.

Represented by VOICE (voice of Indian communications technology enterprises), this group has already demonstrated their capabilities in this area to the Minister of Communications at an event in Sanchar Bhawan recently.

But there is a twist. A whole set of new service providers can enter the sector. For example, the Adani Group has expressed its interest in bidding for Spectrum and has clarified that its focus is on the Enterprise. Cisco too recently applied for an Access Service License. Cisco may be interested in becoming a 5G service provider under the CNPN License regime. Others like Google, Facebook and Amazon are also interested in the CNPN segment.

More interesting times in Indian Telecom ahead.

*gajendrau@cybermedia.co.in*

# PM WANI is a Disaggregated, De-Regulated Wi-Fi Architecture

## It Is A Ubiquitous, Robust, Internet Access Infrastructure bringing Internet to the remotest, unconnected regions of the country

BY VOICE&DATA BUREAU

Opportunity to create at least 10 million hotspots in the country through entrepreneurs and retail outlets.

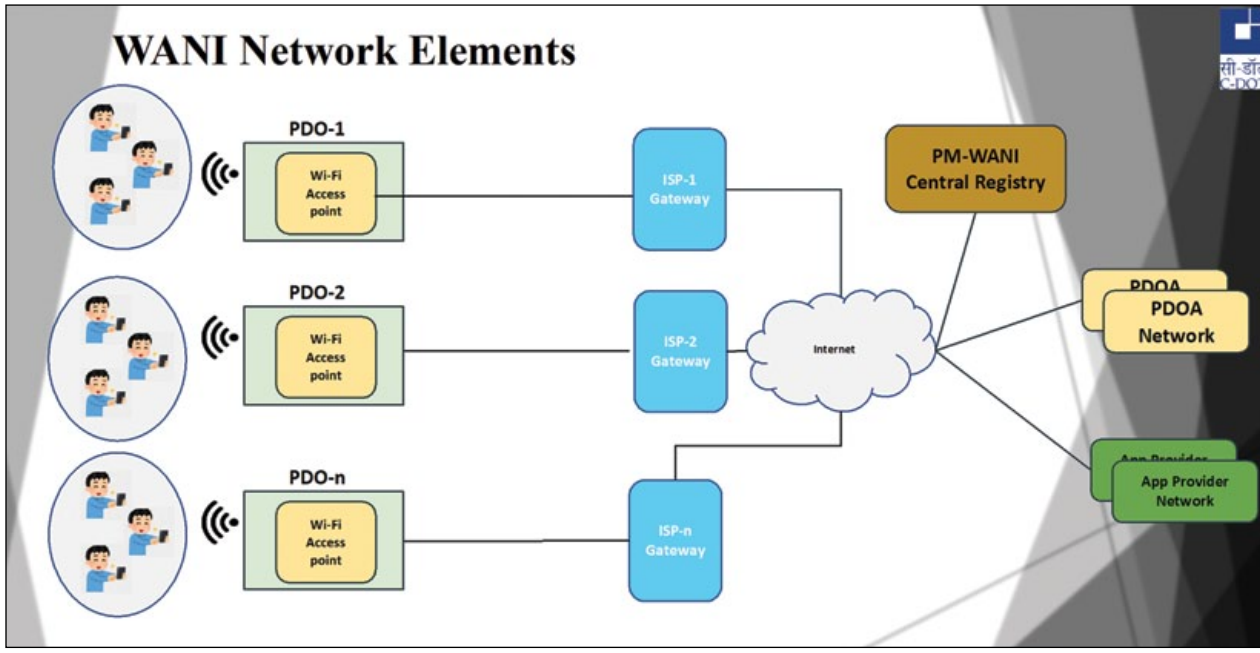
### Background

Broadband has become a necessity. Public broadband networks are being set up in every part of the globe – for economic as well as social growth.

On December 9, 2020, the Prime Minister approved the Wi-Fi Access Network Interface (PM-WANI) framework. Its goal was to expand public Wi-Fi networks and bring broadband services to all. It would facilitate transformation of India into a digital nation, beaming high-speed broadband Internet via WiFi networks into remotest areas.

In order to make it affordable, the initiative decouples the ecosystem of Wi-Fi operations and network deployment, thereby allowing multiple smaller companies and partners to participate. The end user can purchase coupons for broadband access in lower values, ranging from Rs. 2 to Rs. 20.

The components of the PM-WANI framework for creation of WiFi Hotspots are:



## Managed Hotspot Service Provider (MHSP) as Public Data Office Aggregator (PDOA)

- For provisioning of Broadband in rural areas an independent infrastructure provider, MHSP (registered as a Public Data Office Aggregator — PDOA) in partnership with Telco/ISP, can install a 5-meter-high pole/mast mounted with a 5 GHz Wi-Fi backhaul radio and a 2.4 GHz Wi-Fi hotspot with solar panels and Li-Ion/SMF batteries along with WLC, all in a box mounted on the mast.
- MHSP (or PDOA) appoints a VLE (Village Level Entrepreneur) to function as a PDO (Public data Office) for managing and monetizing the Hotspot.
- The VLE (or PDO) is given basic training by PDOA for maintenance and operation of Hotspot and provide Wi-Fi services to villagers
- VLE as franchisee of MHSP / PDOA, acts as the single point of contact for all Broadband related products, services and applications.
- VLE also undertakes the task of digital literacy (e-skilling) and assisted Broadband services (such as e-governance) to rural masses.
- VLE can use Wi-Fi infrastructure for generating extra revenue through other activities (such as mobile charging, providing rail-road ticketing, getting market prices of crops and assisting in doing business transactions, rural e-banking, getting e-medical services from urban health centers etc. to name a few).

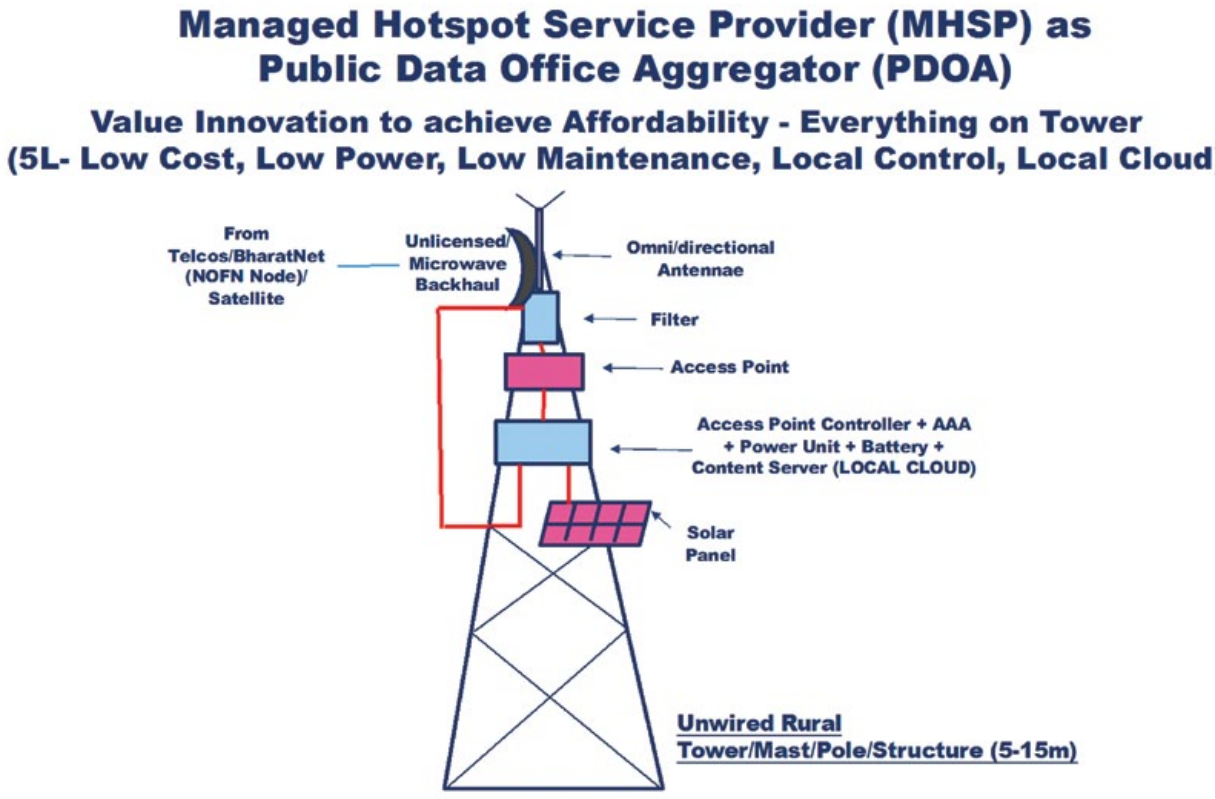
**Public Data Office (PDO):** This is the last mile to the customer, a customer touchpoint. It sets up, and runs WANI compatible Wi-Fi access points (AP), for subscribers to use the Internet.

**Public Data Office Aggregator (PDOA):** It will combine PDOs and carries out authorization and accounting tasks. PDOA is an aggregation service. It authorizes access to customers and provides accounting to PDOs (for usage and tariffs). It facilitates PDOs for providing services to the end consumer.

No licensing is required. PDOA does not pay any license fees to the Government. PDOA needs to register online in a simple process on Saral Sanchar Portal: (https://saralsanchar.gov.in/). And then they have to sign up at the Central Registry (https://pmwani.gov.in).

Any retailer, Kirana shop owner, or supermarkets with multiple shops, tea shops etc can become an aggregator by converting these shops into PDOs.

**App Developer:** This is the front end, application that allows users to sign up, open the app and find a WANI compatible Wi-Fi hotspot that is nearest to them. And then use those hotspots to access the Internet service. Any Android device, smart TV, tablet or smartphone can be used.




App helps 'discover', display PM-WANI compliant Wi-Fi hotspots in the proximity and also authenticates potential broadband users.

Startups and wallet providers can become app providers. App Provider need not pay any license fees. They have to simply register online on Saral Sanchar Portal (https://saralsanchar.gov.in/) and sign up on the Central Registry (https://pmwani.cdot.in).

The central registry (CR) keeps track of the information on app providers, PDOAs, and PDOs.

C-DoT is in charge of maintaining the Central Registry which is hosted at the Government's National Informatics Center (NIC).

CR is responsible for certification of PDOAs and App Providers.

### Who can be a PDO?

A PDO could be started by anyone, including a businessperson, a resident, a professional, a village level entrepreneur (VLE), etc. The greatest places to launch a PDO and provide internet access utilising Wi-Fi connectivity are places like neighbourhood markets, booths, tea stalls, Kirana stores, vegetable shops, restaurants, roadside houses, etc.

A PDOA can be any Internet Service Provider (ISP). Or an ISP can provide resources in your area to set up fixed-line broadband connectivity. Make contact with a PDO Aggregator to complete the business model and choose the best kind of Wi-Fi Access Point, and install the Wi-Fi access point and begin giving users internet access.

To become a PDO, one can arrange a fixed-line broadband connectivity from any Internet Service Provider or PDOA (PDO Aggregator) to finalize the business model and identify an appropriate type of Wi-Fi access point.

Home broadband connection can be used as a backhaul for the PDO.

An AP (or a WiFi router is a hotspot) can be deployed by the PDO for indoor or outdoor coverage.

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# WiFi in a Box – C-DoT's WAAS is helping Connect the Unconnected

## One of the ways to provide high speed broadband at an affordable price and serve the unconnected is through public Wi-Fi hotspots


BY DR RAJKUMAR UPADHYAY

The PM WANI (Wifi Access Networks Interface) project had its origins in the TRAI's recommendations for setting up public data offices or PDO. How has this concept evolved since 2016 and is now gathering momentum to change the Internet Access eco-system in the country.

A perspective by the Executive Driector C-DoT, who is driving innovation at the hardware level for rapid deployment of WiFi hotspots and ubiquitous Internet access in the country.

### Background

The state of public Wi-Fi in India has never been an inspiring story as compared to cellular uptake in the country. This was evident from the number of public Wi-Fi hotspots in 2016 which was in the range of thousands whereas the European and North American countries had millions serving their population.

At that time, the TRAI started consultation to understand the meager uptake of public Wi-Fi in the country and proposed a disintegrated architecture with the sole purpose of proliferation of public Wi-Fi through micro entrepreneurs in line with the 90's PCO (public call office) boom in the country. With lots of enthusiasm and participation from the industry, startup communities, academia etc. the WANI concept was tested as a Pilot and finally TRAI released its recommendations in 2017. These got approved on 9th of December 2020 by the Union Cabinet chaired by Honorable Prime Minister.

> The WANI concept is very novel in the sense it challenges the status quo of telecom connectivity where the complete value chain or ecosystem is controlled by a few big entities, like the telecom & internet service providers (TSPs/ISPs)

## VISION OF WANI

### Public Open Wi-Fi framework (Architecture & Specification)

The vision of this initiative is to establish an Open Architecture based WiFi Access Network Interface (WANI), such that:

- Any entity (company, proprietorship, societies, non-profits, etc.) should easily be able to setup a paid public WiFi Access Point.
- Users should be able to easily discover WANI compliant SSIDs, do one click authentication and payment, and connect one or more devices in a single session.
- The Experience for a small entrepreneur to purchase, self-register, set-up and operate a PDO must be simple, low-touch and maintenance-free.
- The products available for consumption should begin from "sachet-sized", i.e. low denominations ranging from Rs 1 or Rs 2 to Rs 10 or 20.
- Providers (PDO provider, Access Point hardware/software, user authentication and KYC provider, and payment provider) are unbundled to eliminate silos and closed systems. This allows multiple parties in the ecosystem to come together and enable large scale adoption.

**Mobile Internet**

India has witnessed significant progress in internet penetration in the last couple of years, primarily on the back of smartphone growth and falling data prices. Broadband connectivity is considered a key catalyst in the economic and social development of a country. The base of Internet subscribers in the country increased from a total of 238.71 million in 2014 to 829.30 million in 2021 registering a CAGR of around 20%.

The data usage per user per year in gigabytes, GB, has increased from 3.24 GB in 2014 to 179.64 GB in 2021. At the same time, the data cost to subscribers per GB in rupees drastically fell from Rs 269 in 2014 to Rs 9.90 in 2021.

Average monthly data usage per wireless subscriber is 14.97 GB with Average revenue realization per subscriber of Rs 9.91. While India has made significant progress in internet penetration over the years, there is still a large scope for growth in broadband speeds and connecting the unconnected or poorly connected.

**Connecting the Unconnected**

Offering Internet-based digital services to the masses is a key determinant of digital empowerment of the

citizens. It boosts entrepreneurship leading to new avenues of employment.

One of the ways to provide high speed broadband at an affordable price and serve the unconnected is through public Wi-Fi hotspots. Deployment of Wi-Fi hotspots can also provide an alternate mechanism to access the Internet on the move or as and when required without subscribing to a fixed plan.

The WANI concept is very novel in the sense it challenges the status quo of telecom connectivity where the complete value chain or ecosystem is controlled by a few big entities, like the telecom & internet service providers (TSPs/ISPs). These entities completely own the network, own the bandwidth and manage all related services.

They also dictate the business terms and exercise complete control on each component of the business. WANI will dismantle this strong monopoly on the value chain and allow different parts of the network to be managed by separate entities for example public data offices or PDO, PDO Aggregators or PDOA, applications or APP providers and a Central Registry operator (currently managed by C-DoT at its).

The WANI platform promotes innovation.

WANI is at a very nascent stage and is evolving in the form of technical standards as well as business models. It gives rise to new startups, and technology companies, which otherwise would not have been possible in the closed ecosystem.

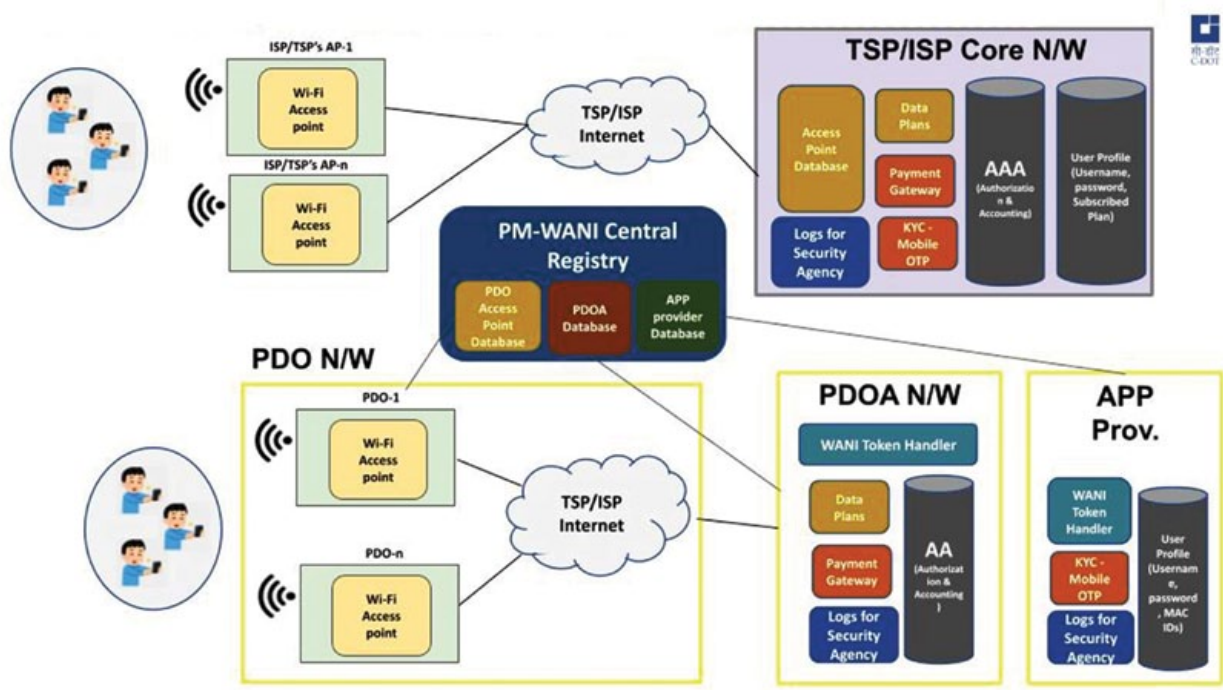
Today we have around 92 PDOAs and 49 App providers and around 1 lakh public Wi-Fi hotspots in the country. Both small players and big players have installed Public Wi-Fi hotspots under PM-WANI. As awareness increases this will proliferate faster. It will also evolve new business models, micro financing will be easier for setting up more PDO outlets.

Innovations are already happening. For instance one of the PDOA runs a question or poll at its landing / captive page before the user starts surfing. This micro poll at the local level, gauges the mood, product preference, the possible market potential of specific consumers groups.

The analytics is sold to relevant companies and creates an alternate revenue stream. Some others are offering targeted, local advertisements. As the input costs are lower, these providers are able to provide Internet at Rs 1 - 2 per GB compared to Rs 9 + per GB of mobile data.

These direct/indirect revenue models contribute to sustainability of the model and in time to come roll outs

## Technical Framework of PM-WANI N/W vs Technical Framework in conventional ISP/TSP N/W



> The WAAS platform includes AAA (authorisation, accounting and authentication), OSS (operations support system) and BSS (business support system) functionality including User management, PDO Management, PDOA Management, Plan management, Security log management and integration with external SMS and payment gateways.

will increase. There is also the possibility to use the Public Wi-Fi infrastructure to unlock new opportunities in the form of supporting outdoor/indoor IoT networks and allowing cellular data offload.

Initially, WANI was meant to deliver public WiFi in remote areas but has now been extended in scope.

As of 2022, there are approximately 549 million Wi-Fi hotspots worldwide. However, these hotspots are not distributed evenly. In India, we have just around 0.5 million (5 lakh) Wi-Fi hotspots that's way below the global average. Provision of Wi-Fi hotspots through PM WANI can bridge the gap of hotspots in the country.

The National Digital Communications Policy (NDCP 2018) highlighted the importance of Wi-Fi hotspots in the country to accomplish the Objectives of provisioning of broadband for all by 2022. It envisages 10 million public Wi-Fi hotspots by 2022.

When WANI was proposed, the data per GB cost was very high (Rs 270/-). Internet was not affordable for large sections of society. Public Wi-Fi hotspots were almost non-existent. WANI aimed at affordable connectivity in both urban and rural areas.It proposed converting Kirana shops, tea shops, small offices, malls, residential complexes, Government buildings etc. into Wi-Fi hotspots.

By the time this framework got an approval, the data costs had reduced to Rs 10/- GB and cellular 4G coverage was ubiquitous. However, large areas of the country and people still remained unconnected or with poor network coverage. Pubic Wi-Fi hotspots can ensure affordable Internet to such unconnected areas.

Importance of the Internet was driven home during COVID. It became a lifeline. From education, to health and safety, daily groceries to social interactions everything relied totally on digital platforms and Internet connectivity.

The demand for high speed data has increased multifold. The application ecosystem has fueled the data consumption in the form of videos. This trend is not going to slow down. In fact, it will further fuel more and more activities moving online.

For low income segments affordability for high speed Internet access is still a challenge. We need high speed Public Wi-Fi at affordable rates to meet such demand. The Telco also need Wi-Fi networks to decongest their mobile networks and use of their precious spectrum – it is easy to send the data traffic to Wifi networks wherever possible.

Then there is the IoT ecosystem that needs to latch on to Wi-Fi access in public places in order to function. A one hour IPL match consumes more than 1 GB of data. Similarly, an online interactive school class for 45 minutes could consume more than a GB of data.

Thus, the concept of a WANI platform is needed by urban, semi-urban, and rural dwellers.

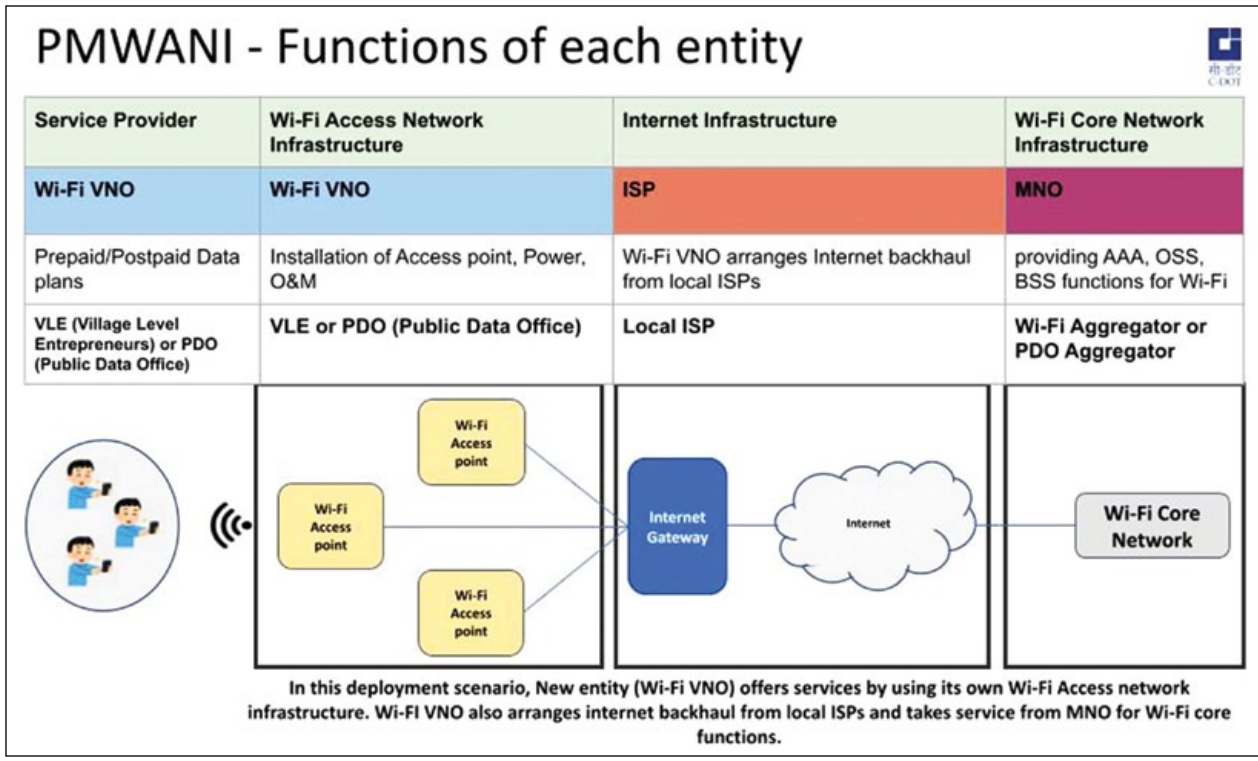
One PDOA who has focused on urban slums is quite successful in providing internet profitably through WANI (see case study).

Though, most of the PM-WANI deployments today are in urban areas rural areas or underserved regions will slowly also be covered on priority as the WANI framework proliferates.

### What are the salient features of the Open Architecture for PM WANI

The PMWANI architecture brings in both technical and regulatory innovations.

On the regulatory side, it spurs proliferation of highspeed Internet in the country by allowing any individual to sell Internet access over Wi-Fi under the WANI scheme. No license or any fee is required. Even PDOAs and APP providers need to just make a registration.




This creates millions of micro entrepreneurs who can set up Public Data Offices.

The technical innovation has enabled multiple players to function in the ecosystem, each performing an independent task adhering to the framework. This completely removes entry barriers and gives opportunity to fresh, new entrants in the ecosystem — startups, new technology companies, equipment suppliers and application developers.

The core purpose of the TRAI recommendations for WANI was to keep the costs of ownership in the last mile network very low and promote innovation through unbundling of the Wi-Fi ecosystem. Last mile is the PDO.

With unbundling/disaggregation, the cost of ownership for each player reduces. The cost of ownership and regulatory burden on the last mile connectivity provider is avoided. This reduces upfront investments.

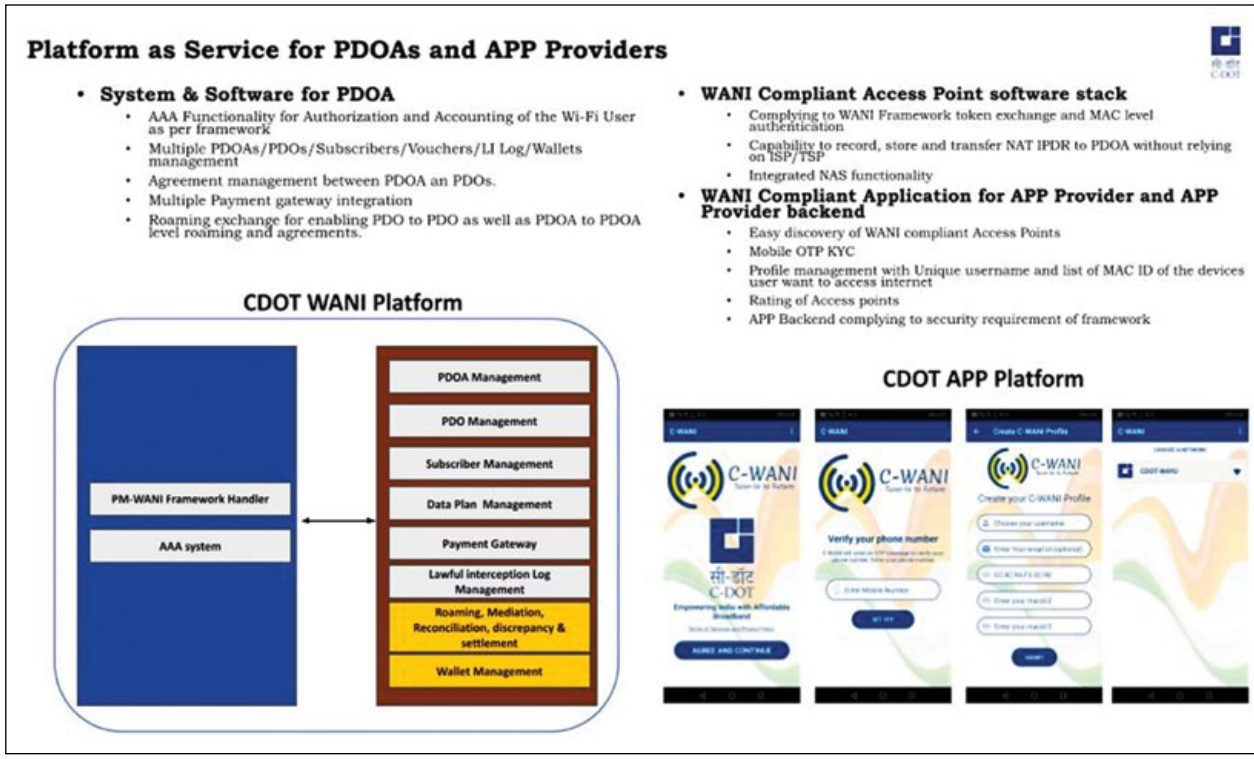
The complexity of creating and managing the Wi-Fi network is also removed from a PDO (local chaiwala/kiranawala/bakerywala) etc. and moved to the PDOA (which can be an ISP or an entity buying bandwidth from and ISP) and APP Providers. Authentication Credentials (username/password) resides with the APP Provider. Authorization & Accounting functions reside in the PDOA domain. When both APP Provider and PDOA come together, a user gets secure Internet broadband through Public Wi-Fi hotspots.

This is similar to a driver onboarding Ola/Uber platform with minimum investment and the rider / user getting multiple choices.

The architecture also enables shared economy i.e. the resource can be shared to sell extra capacity in the marketplace. The extra Internet time/capacity in home/office/shop can be sold through PM-WANI. The shared economy concept has not been realised fully under WANI so far but it is a key element of affordability.

## C-DoT is playing a critical role in the PM WANI project

C-DoT has been entrusted to act as an enabler for the WANI eco-system. It has developed and designed the Central Registry (CR) of the WANI framework, which enables interoperability among the components – like PDO, PDOAs and APPs. This ensures seamless user experience while meeting technical requirements in line with evolving standards and upgrades of software etc.




Certifications are also managed by C-DoT for WANI framework. In doing this, C-DoT has tried to evaluate the gaps in adoption and uptake by users. One of the key findings of this study was that smaller players were incapable of investing in technologies for a PDOA stack or for APP development.

Smaller players even find the cloud model expensive. Together with uncertainty of business, this is a great entry barrier.

Thus C-DoT felt that there was a need to make the PDOA stack as well as the APP as a white label platform to small players. For this, C-DoT created a cloud native platform called 'WANI As a Service (WAAS)'.

It offers a complete end-to-end solution for entrepreneurs at a nominal charge. It can be used by PDOA and APP Providers. As of today, over 70% of PDOA and APP Providers are using WAAS to rollout their services. C-DoT also solves other day to day problems on the field – which is reported by small players as they may not have technical capabilities.

The WAAS platform includes AAA (authorisation, accounting and authentication), OSS (operations support system) and BSS (business support system) functionality including User management, PDO Management, PDOA Management, Plan management, Security log management and integration with external SMS and payment gateways.

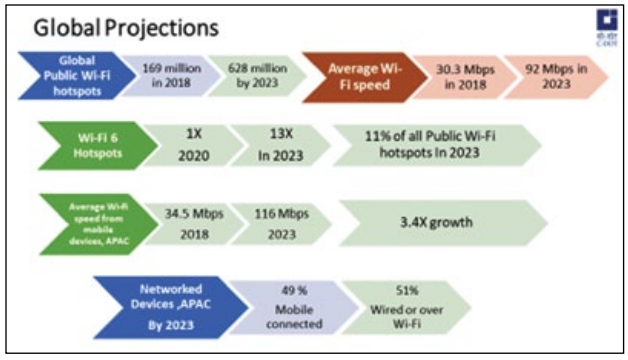
Among the other solutions, C-DOT has developed a range of indigenous Wi-Fi products and solution portfolios. These range from WiFi access points supporting 11n, 11ac and latest industry standard 11ax (WiFi 6).

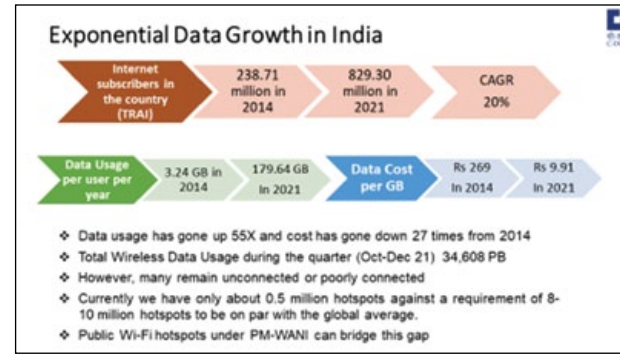
C-DoT is providing these at very cost competitive rates. They are high quality indoor and outdoor access points that support both 2.4 and 5 GHz radios – deployed through its technology partners.

Open-WiFi based C-DoT Wi-Fi 6 access points are also ready for deployment in PMWANI network and some of our partners are already deploying it on a pilot basis.

## Made in India

C-DoT systems are made in India, completely safe and manufactured indigenously by public/private partner companies in India. We feel there has to be easy availability of WANI compliant devices in the market. Vendors can be encouraged to seek TEC certification (non-mandatory). TEC certification for WANI compliance can facilitate off-the-shelf equipment for faster deployment.




## PM-WANI Ecosystem

### 3. App Provider

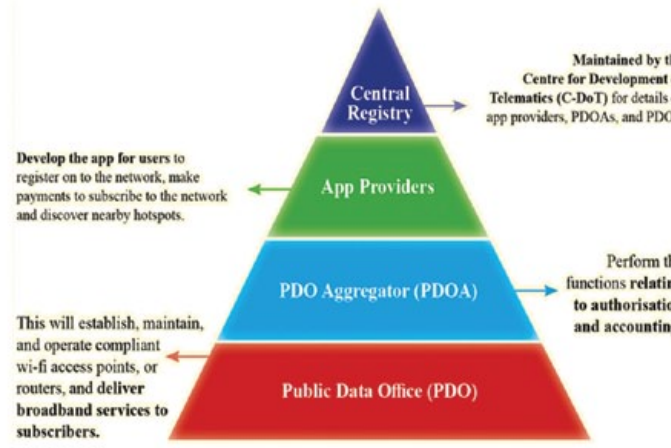
***Provides software application for:***

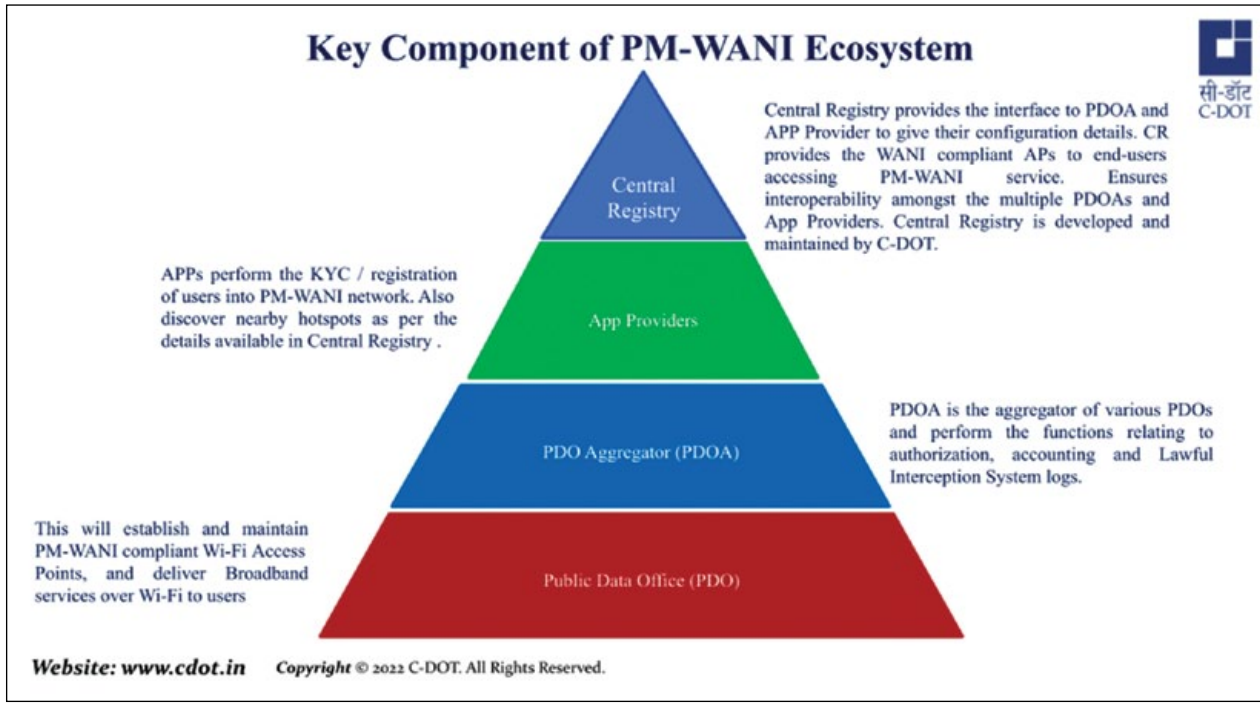
- Users to create a profile and do their KYC
- Backend authentication for users to signup
- Discover WANI compliant Wi-Fi hotspots
- Connect to Wi-Fi Hotspot using the App.

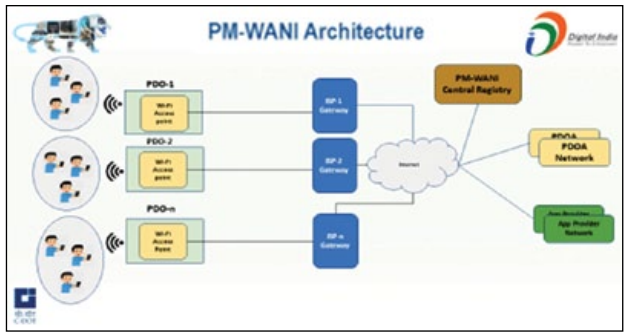
### 4. Central Registry (Nominated by Govt., CDOT)

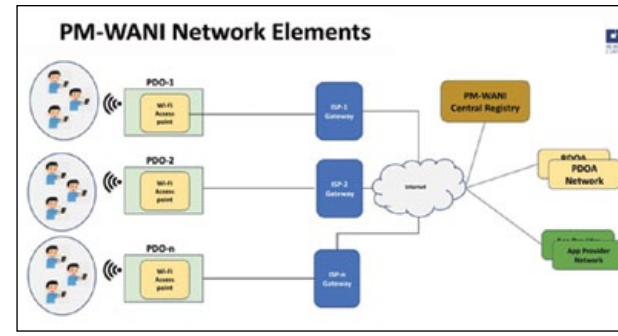
***Mantains information about:***

- PDOs, PDOAs, and App Providers







**As a facilitator of innovation in technology C-DoT's approach for encouraging more new players into this scheme has several parts:**

**Awareness**

Interacting with all stakeholders on a regular basis to facilitate technical understanding of the WANI framework.

Interfacing with Department of Telecom's (DoT) offices in Licenced Service Areas (LSAs) and arranging workshops. Participating in seminars organized by field units.

There is a critical need to create awareness amongst local entrepreneurs and citizens about benefits of this scheme.

C-DoT also closely works with State Governments in helping them design their Wi-Fi networks under PM-WANI.

**Technical support**

C-DoT is providing technical support to all players who require. C-DoT has helped BSNL, MTNL and Railtel to migrate their existing WiFi network to PMWANI architecture. C-DoT is helping other ministries to migrate their Wi-Fi hotspots into the PM-WANI framework.

**Platform**

C-DoT has developed a cloud native platform for any PDOA and APP provider to subscribe to enroll their WANI network very fast. The complexity of owning, deploying and maintaining the cloud/servers and developing software and applications from scratch is completely removed by the 'WANI Platform' of C-DoT. Today, 40 PDOAs use this complete end to end platform of C-DoT.

*Dr Rajkumar Upadhyay, Executive Director, Center for Development of Telematics.*

feedbackvnd@cybermedia.co.in

# Prime Minister's Wi-Fi Access Network Interface (PM-WANI)

This is probably the most ambitious initiative by Government of India to bring high speed Internet and data access within reach of every India. It is aimed at Digital Inclusion and reducing the Digital Divide

BY VOICE&DATA BUREAU

With widespread availability of mobile high speed 4G networks there are huge sections in the country that continue without coverage (for a variety of reasons). And it is here that the PM WANI framework could play a big role in ensuring equitable access to 21st Century technologies to every citizen in the country.

## Background

It was in 2016 that the TRAI embarked upon a concept of bringing Wifi coverage using a unique architecture to every part of the country – inspired by the huge success of the Public Call Offices (PCO) in the early 1990s that brought a telephone within reach of every common person, when phone calls were exorbitantly expensive and telephone connections almost impossible to get.

## Situation pre-intervention and background

Broadband has become a critical platform for economic growth, job creation, global competitiveness and improved way of life. World Bank's World Development Report observed that on an average a 10% increase in internet penetration, is likely to lead to a 1.4% growth in the GDP of an economy.

While significant progress in mobile telephony and mobile broadband has been made in our country over the last decade, delivering broadband (BB) to the last mile still remains a challenge.

4G mobile broadband today covers nearly 93% of our population. Measures to provide broadband services to the last unconnected or semi-connected residents in rural and remote areas is vital for economic progress.

## Prime Minister Wi-Fi Access Network Interface - PMWANI

However, there exist coverage gaps that need to be covered by any form of broadband. 'Wi-Fi hotspots' are used to fill this gap in cellular coverage. Proliferation of public Wi-Fi under the distributed architecture of PM-WANI framework is expected to create employment opportunities and also enhance disposable incomes in the hands of small and medium entrepreneurs who will be setting up WiFi Access Points. Taking these

> 4G mobile broadband today covers nearly 93% of our population. Measures to provide broadband services to the last unconnected or semi-connected residents in rural and remote areas is vital for economic progress.

possibilities into account, Union Cabinet approved the proposal of Department of Telecom (DoT) on 09.12.2020 to proliferate Broadband through Public Wi-Fi networks under the framework of PM-WANI.

To facilitate ease of doing business and encourage local shops and small establishments to become Wi-Fi providers, it has been approved that the last-mile Public Wi-Fi providers, Public Data Offices (PDOs) require no license, no registration and will not require to pay any fees to the Government. In fact, PDOAs, who will aggregate the PDOs will also not require any license. These PDOAs will only have to register, for which no fees is charged.

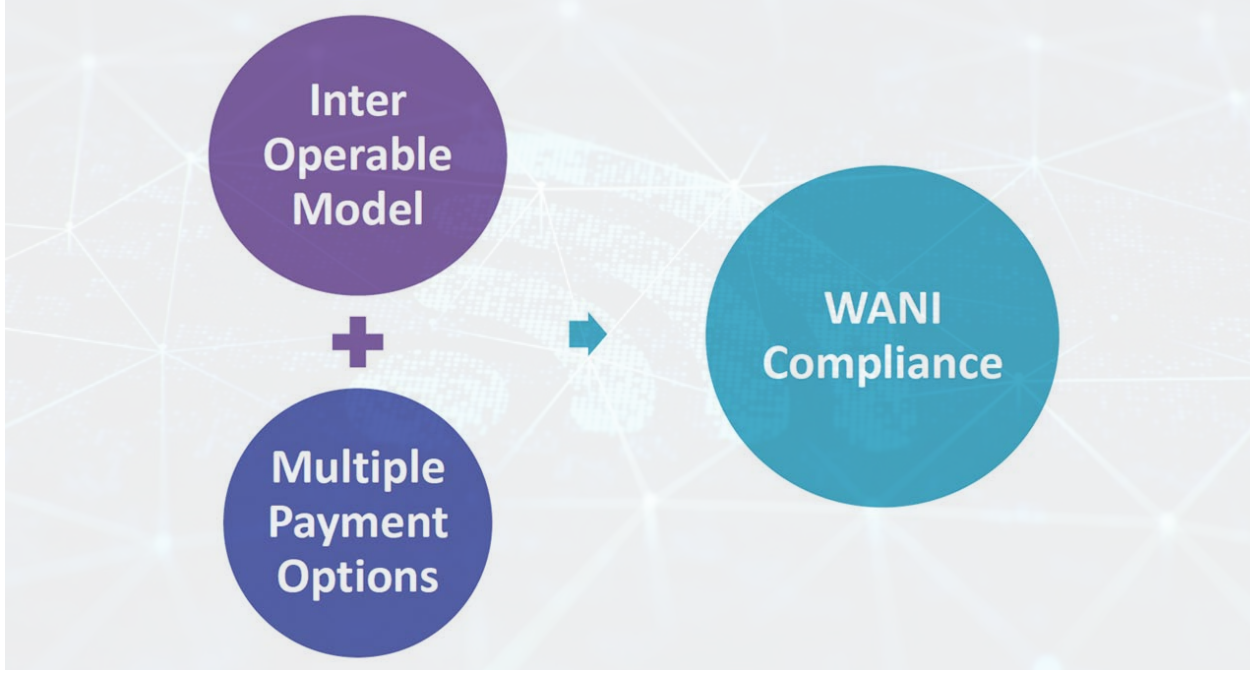
Further, WiFi Access Points have been included in the Production Linked Incentive Scheme (PLI) for promoting domestic manufacturing of Access point equipment – which will reduce prices.

### Progress so far

- Public Data Office (PDO), establish, maintain, and operate PM-WANI compliant Wi-Fi Access Points and provide last-mile connectivity to deliver Broadband services to subscribers by procuring internet bandwidth from telecom service providers and/ or internet service providers; 99,652 PMWANI HotSpots are live as on 6.7.22
- Public Data Office Aggregator (PDOA), provide aggregation services such as authorization and accounting to PDOs, thereby facilitating PDOs in providing services to the end consumer. As on date, 87 Public Data Office Aggregators are active
- App Provider, who will develop an Application to register users and 'discover' and display PM-WANI compliant Wi-Fi hotspots in the proximity for accessing the internet service and also authenticate the potential Broadband users. As on date, 41 App providers are active.

### Impact of Intervention

Number of access points has reached nearly 1 lakh with nearly 13.67 lakh unique users consuming about 24 Petabytes of data in June 2022. This indicates an unmet demand is being met.



INTERVIEW: K. RAJARAMAN

Opening Remarks: "Our Hon'ble Prime Minister has, since its launch in 2020, directed effective deployment and expansion of PMWANI to fill mobile coverage gaps enabling fulfilment of the national goals of Digital Inclusion, Financial Inclusion and Broadband for All," says Mr. K. Rajaraman, Chairman Digital Communications Commission & Secretary (Telecom) in an exclusive chat with Gajendra Upadhyay, Editor Voice & Data.

*K. Rajaraman is currently the Secretary, Department of Telecommunications, who is right in the midst of the 5G Spectrum auctions – an intensely busy time.*

*He is a senior Indian Administrative Service (IAS) Officer of Tamil Nadu cadre and holds a B. Tech in Electronics & Communications; a first class MBA and Master of Economics he started his career as a Design Engineer in BHEL, Trichy. During a rich and varied experience as an IAS Officer, he held various administrative positions in the areas of Investment Promotion, Foreign Direct Investment (FDI), Public Sector Undertakings, Industrial Infrastructure and VAT Administration.*

*He was MD of Chennai Metro Railways for nearly 4 years during its early construction phase, Commissioner for Commercial Taxes in Government of Tamil Nadu and Joint Secretary Expenditure in Government of India in the recent past.*

*He has also served as Additional Secretary, Investment, IER and Administration in the Department of Economic Affairs, Ministry of Finance.*

*Mr Rajaraman is known as a highly approachable, intensely focused and blessed with a very sharp and deep understanding of technology. He is creating the next generation, enabling framework for the Government's Aatmanirbhar initiatives in Telecom and 5G. He strongly believes in the capabilities of Indian entrepreneurs to build world class 5G networks with R&D and equipment made indigenously.*

*His aim is to help in fostering an eco-system so that the brightest minds in the country contribute in technology development – one shining example of this is the BSNL 4G and 5G networks powered by local R&D of C-DoT and involvement of TCS.*

*Despite all these pressures on his time, he agreed to share his thoughts on how WiFi can be a huge contributor to reducing inequities in Internet access and a deep dive into the PM WANI concept.*

### What are the key pain points in Digital India, that PM WANI would help address

The objective of PM WANI Hotspots is to provide Internet coverage in places where either the mobile signal is not available (indoors, buildings, or remote areas) or where the footprint of mobile is poor. It aims to fill these gaps in coverage and privde deprived sections with Data access and digital inclusion.

Public Wifi hotspots are mostly used in indoor locations like railway stations, tourist spots, remote villages or sparsely populated clusters, hospitals etc. There is need for alternate technologies to bring Internet here and PM WANI plays an important role in increasing proliferation of Broadband through the deployment of Public Wi-Fi hotspots.

### How does the PM WANI Policy Framework encourage private players?

It was with the aim of enabling broadband and Internet proliferation across every corner of the country that

the government, in December 2020, approved the PMWANI framework.

Under this framework we have enabled the setting up of public Wi-Fi networks by small and local Kirana or neighborhood shops to be known as Public Data Offices (PDO). They will not require any licensing or registration.

PMWANI is an aggregator model in which PDOs set up the last mile broadband connectivity and an aggregator known as PDOA does the role of Authorization, Accounting etc.

As such small shopkeepers can generate additional income both via Wifi as well by way of attracting customers due to Wifi Facility by installing PM WANI Hotspots.

As on date, 87 Public Data Office Aggregators are active and 41 App providers are live for providing customers the .

**What is the outreach plan for this proliferation and establishment of the large numbers of Wi-Fi hotspots?**

Department of Telecom (DoT) has asked all State / UT Governments to establish PM WANI hotspots at places such as bus stands, Ration Shops, Utility Service Centres, etc.

The Department has also approached Central Ministries responsible for Smart Cities, Hospitals, Tourist Places, Railway, Airports, Monuments, etc. for proliferation of Public Wi-Fi under PM WANI (Prime Minister's Wireless Access network Interface) frame work.

Railways has already initiated action to cover 6000 railway stations with Public WiFi under PM WANI. BSNL (Bharat Sanchar Nigam Ltd) has also established 35000 Hotspots across the country. Most of the hotspots of BSNL are working in rural areas thus enabling such areas with public Wifi. The total counts of WiFi hotspots under PMWANI is over 99,000.

Number of access points has reached nearly 1 lakh with nearly 13.67 lakh unique users consuming about 24 Petabytes of data. This indicates an unmet demand.

**Which are the States that are most successful in implementing this as of now – and how.**

As per the Hotspots data, Karnataka and Maharashtra have the maximum number of hotspots, i.e. 16791 and 12903 respectively. *(see Table for state wise Hotspots)*

**There is about the Viability and value for investors and Startups about this scheme, what are your thoughts on this**

The global Wi-Fi market is projected to reach about USD 25.2 billion by 2026. The advent of newer Wi-Fi technologies like Wi-Fi 6 and 6E this Wi-Fi market holds huge potential and there are no boundaries.

The beauty of PM-WANI is that it disaggregates the whole value chain and each component of this chain can be operated by different entities, thereby opening the opportunity for smaller players. PM WANI framework binds all these entities - PDO, PDOA and App providers - together by ensuring interoperability.

Therefore, the total investments to be made are also disaggregated. It is not an end to end full stack network. The requirement for investments for each entity operating only in a part of the value chain is therefore lesser and more manageable.

It is estimated that the total cost -- including capex and opex - for PDOAs will be in the range of Rs 35,000 to 40,000 per month. This will depend upon the model being followed.

In our estimates, PDOAs can get a whole stack developed by themselves with initial investment in a software stack development or can opt for an outsourced model.

The PDOA collects revenues by selling coupons to end users and it shares this revenue with the PDOs based on the usage of an access point. Based on various types of plans created by PDOAs for the users, a PDOA can break even if it is able to serve upto 100 PDOs.

As far as the PDOs are concerned, the ones who provide the last mile access, for them the fixed investments will be an affordable 10,000 to 15000 and a running cost of around 2000 per month for bandwidth and other charges.

This excludes opportunity cost for his own entrepreneurship. Such PDOs can recover their costs easily, depending upon usage by the PM WANI users. All these details are explained on the PM WANI website

As regards the end user, they are currently paying approximately Rs 10 per GB of data (average as per TRAI), to mobile data networks.

### STATEWISE BREAK UP OF HOTSPOTS

| State | No. of WI-FI Hotspots |
|---|---|
| Karnataka | 16794 |
| Maharashtra | 12945 |
| Delhi | 12133 |
| Uttar Pradesh | 6245 |
| Tamil Nadu | 6233 |
| Madhya Pradesh | 6121 |
| Andhra Pradesh | 5109 |
| Kerala | 3690 |
| Telangana | 3544 |
| Punjab | 3319 |
| Gujarat | 3030 |
| Haryana | 2900 |
| West Bengal | 2818 |
| Bihar | 2623 |
| Chhattisgarh | 2499 |
| Odisha | 1917 |
| Rajasthan | 1878 |
| Jammu & Kashmir | 1291 |
| Jharkhand | 747 |
| Uttarakhand | 670 |
| Arunachal Pradesh | 584 |
| Assam | 541 |
| Himachal Pradesh | 499 |
| Goa | 378 |
| Ladakh | 343 |
| Tripura | 293 |
| Chandigarh | 254 |
| Meghalaya | 140 |
| Puducherry | 63 |
| Nagaland | 27 |
| Andaman & Nicobar | 8 |
| Manipur | 7 |
| Sikkim | 7 |
| Lakshadweep | 1 |
| Mizoram | 1 |

Under the PM WANI PDOs are able to offer data services at Rs 1 to Rs 2 per GB of data – this is due to the lower input costs.

So the viability of these projects is robust and at par with any other Business opportunity, more so because data is the most integral part of all economic activity today, from education to entertainment.

PM WANI Hotspots can provide Internet in places where mobile signals are not available. Public WiFi works on free, unlicensed band spectrum where operators are not required to pay any fee for the spectrum. WiFi will complement the mobile technology in proliferation of Broadband in our country. This is also a global trend.

**How do you see WiFi reducing the Digital Divide**

BSNL has already established about 35000 WiFi hotspots in rural areas. Recently Government of UP has taken the decision to set up PMWANI compliant Wifi Hotspots in 58,000 Gram Panchayats. RailTel is expanding this across all and a host of private players.

BBNL has also signed agreements with ISPs who can provide internet services in rural areas using the Bharatnet Optical fibre infrastructure.

## GOVERNMENT INCENTIVISES COST OF HOTSPOTS TO IMPROVE VIABILITY

In 18 months, the PM WANI networks has spread across 100,000 Hotspots and the target is to double this in the next six months.

The Government is working feverishly to ensure this brings Internet to every corner of the country, driving digital inclusion and access to the data economy for all. One of the ways this will become rapidly attractive is through the WiFi Roaming concept. PDOAs are being encouraged to enable roaming through a range of technical solutions across all their own and other hotspots in the State or across States.

For example when a tourist visiting India Gate buys a coupon there, the person should be able to use it to access the hotspot at Red Fort or Qutub Minar later in the day. The hotspots at these locations may be operated by PDOs under a different set of PDOAs. But just as in mobile, irrespective of the network, the consumer gets a seamless call across networks, the PM WANI roaming concept will drive increased usage and adoption.

A number of PDOAs have been identified for roaming. And testing among these PDOAs is likely to commence soon. The technical solutions and platforms for roaming that have been identified are being tested too.

An interesting and important reason why Roaming across Hotspots will be important is for digital activity. At most tourist spots, the tickets and access passes are to be bought online – no queues at counters. A large number of tourists may end up buying the entry tickets at the location, and for this the availability of good high speed WiFi is important. There are other similar thoughts driving the roaming concept across Railway Stations and Bus depots in the country.

The Government is also aware that the PM WANI hotspots in rural areas with poor mobile coverage, will bring a large population online and ready to use the Internet. The Value of the product is likely to drive up demand for high speed networks like Fibre to the Home (FTTH) and this will further improve the BharatNet coverage and access in rural areas.

Another aspect that the Government is figuring out is a way to reduce the inputs costs for setting up PM WANI hotspots. The cost of Internet can be brought down for the the end subscribers with a reduction in the taxes for equipment deployed for PM WANI. Price of leased lines for Internet bandwidth could be another way to reduce the costs for PDOAs. For this though the TRAI would have to come in and conduct an exercise on pricing. Various other aspects are also being looked into by the Government. Finally there is a lot of thought being given to make PM WANI synonymous with Wifi in the country – improved branding and value will make it a generic reference for all WiFi.

Watch this space for more updates.

4th edition

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MS SUSHMA MISHRA

# BSNL – the largest WiFi network on the PM-WANI framework

BSNL has an open policy for public Wi-Fi partners. **Ms Sushma Mishra,** GM, Broadband Networks, Bharat Sanchar Nigam Ltd. shares the BSNL involvement in PM WANI scheme.

**BSNL's Wireless Broadband Infrastructure is probably the largest in the country – a consolidated network consisting of mobile, fiber, copper, WiFi, and national backbone**

- BSNL has WiFi access points present across states, these are provided to Enterprise customers like hospitals, schools, government departments, offices, businesses, the tourism ministry. It is also used for offloading the BSNL mobile traffic to ensure better quality when customers are not moving or inside buildings. WiFi access is also used in rural exchanges and of late it is used as access points or PDO of PM WANI, primarily in rural areas.

**BSNL WiFi network has been growing over the last few years**

- BSNL has been providing WiFi Hotspots for the last 5 years.
- It started with mobile data offload and later extended to covering Enterprise customers. Further, BSNL commissioned WiFi hotspots in Rural exchanges under DoT (USOF) funded project.
- Now BSNL has migrated these WiFi launched an Open Wi-Fi Policy, under PM WANI, which PDO can be opened in rural area.

**Transition of BSNL WiFi network to the PM WANI framework.**

- The objective was to move WiFi access to the masses.
- For adopting PMWANI framework, BSNL Registered itself as PDOA (in the Central Registry maintained by C-DoT).
- BSNL integrated its core equipment with the technical systems of CDoT (see story on C-DoT's PM WANI Framework).

**BSNL's PM WANI framework will reduce the Digital Divide significantly**

- The BSNL PM-WANI network will help in reaching a wider customer base which no other network in the country has today.
- For those who need to avail data services especially in rural areas, this is the best network.
- As per the Public WiFi Partners or PWP policy, local micro entrepreneurs in rural area can open PDOs with BSNL, to make available WiFi services at affordable rates to rural people.
- Public Data Office PDO, is the acronym used for Retail

Public Data Office PDO, is the acronym used for Retail Hotspot locations such as retail shops may be tea/coffee/groceries where good number of foot-falls are involved.

The BSNL's WiFi Hotspots in rural areas have greatly benefited Students and small traders in these villages during Covid times when the dependency for all kind of activities had fallen on Digital communications.

Hotspot locations such as retail shops may be tea/ coffee/groceries where good number of foot-falls are involved.

### Rural and remote area coverage of the network

- The existing Wi-Fi network is primarily catering the Rural landscape.
- BSNL has more than 35000 access points, APs, under PM-WANI.
- As local entrepreneurs based on need and business case become BSNL's PDO, the reach will further improve.
- The BSNL's WiFi Hotspots in rural areas have greatly benefited Students and small traders in these villages during Covid times when the dependency for all kind of activities had fallen on Digital communications.
- BSNL has also commissioned WiFi in select paramilitary camps, where in there is no connectivity for our soldiers to communicate with their families.
- In some rural areas, which is far flung and has no communication facilities, the WiFi services has been of immense use for the people in general and students in particular.
- BSNL's WiFi service is available across the nation including Andaman and Nicobar Islands.

### Partnership with BSNL

- BSNL has open Public WiFi policy, which enables any one to become a partner to deliver last mile under BSNL (PDOA).

### As a supplier of bandwidth to other PDOAs under PM WANI

- BSNL offers special tariffs for backhaul to other PDOAs registered by DOT.
- BSNL's policy is adequately structured to meet the needs of partners willing to provide WiFi Services in general and under the PM-WANI scheme in particular.
- Affordability and pricing aspects of PM WANI scheme under BSNL.
- BSNL's WiFi tariffs are very affordable and based on market conditions, BSNL tariffs are always aligned to be the most competitive in the market.
- There are essentially 3 Models of Operation for Wi-Fi Services under Bulk and Retail Plans.
- Business Partners on boarded under three models: Model-I, Model-II and Model-III shall be termed as "Public Wi-Fi Partners" (PWPs).

| Model Name | Capex and Opex for Wi-Fi Core | Capex and Opex for Wi-Fi access point | Terminology of Wi-Fi Partner for Enterprise customer | Terminology for Retail Services | Sales and marketing of the Vouchers and level 1 mtce. of the Hotspot including housing & power under retail model only |
|---|---|---|---|---|---|
| Model I | BSNL | BSNL | NA | PWP | PDO |
| Model II | BSNL | PWP | PWP | PWP | PDO |
| Model III | PWP | PWP | PWP | PWP | PDO |

**Ms. Aruna Singh**
CMD, RailTel

# " RailTel is an integral part of the PM WANI project of Govt of India"

*Smt. Aruna Singh is currently handling the responsibilities as CMD of RailTel as an additional charge alongwith her role as Additional Member (Telecom), Railway Board. She is an IRSSE officer (batch of 1985) with over 35 years of experience in Indian Railways.*

*She has Bachelor's degree in Electronics & Telecommunication from Delhi College of Engineering, a Diploma in Public Policy from IIPA, New Delhi and has also done courses from Shanghai and Paris and a Management Strategies course from Carnegie Mellon University, USA.*

*In a quick chat with Voice&Data, CMD Railtel shares her views on the Wifi plans of the railways and its roll out under the PM WANI framework.*

**RailTel is playing a prime role in the PM WANI project. What is your plan in rolling this out?**

RailTel is an integral part of the PM WANI project of Govt of India. We are already a registered PDOA (Public Data Offices Aggregator) under the PM WANI scheme. We intend to continue to be a torch bearer for bridging digital divide by serving the underserved through its multi-dimensional approach by enabling its broadband service partners to establish Public Data Offices (PDOs) and penetrate internet to village level by all possible alliances.

RailTel has already provided public Wi-Fi at 6100+ stations across India. Out of these, 200 Railway Stations in 24 states & Union Territories having 2787 Wi-Fi hotspots are now complying to PMWANI. Presently android based Mobile App can be used to access Wi-Fi network; this would be in addition to access Wi-Fi at these stations through conventional method of selecting RailWire SSID.

**Can you kindly share the response to the WiDoT app and how passengers on stations are using it?**

Android based WiDoT Mobile App can be used to access Wi-Fi network; this would be in addition to access Wi-

RailTel has already provided public Wi-Fi at 6100+ stations across India. Out of these, 200 Railway Stations in 24 states & Union Territories having 2787 Wi-Fi hotspots are now complying to PMWANI.

> RailTel has played a crucial role in the Bhartnet project which aims to connect gram panchayats across country. We, as an executing agency, have laid 27421 KM of optical fiber cables and made 8021-gram Panchayats & blocks service ready under Bharatnet program so far.

Fi at these stations through conventional method of selecting RailWire SSID.

Conventional method of using public Wi-Fi is highly popular at present. Access through Mobile app will pick up as number of PM WANI compliant network increases.

**Have you seen an improvement in traffic for Internet access from the existing approx 1.2 million logins/month.**

In the pre covid times, even with lesser number stations, we had huge number of logins which declined drastically during the pandemic time. However, the numbers are now sharply rising and we are at 1.3 million logins/month.

With life coming back to normalcy, we are expecting to see the numbers going further up consistently.

**What percentage of your PM WANI users are paid customers after the free usage**

We have made 200 stations Wi-Fi PM WANI compliant very recently. It is too early to talk about numbers.

**Can the RailTel accounts that are recharged be portable to all the stations across the country.**

Yes, seamlessly across all 6102 Rly stations.

**What is the time frame for which a single recharge is valid. Are there any other details on tariffs that you may kindly like to share.**

Plans start with per day plan; have monthly validity plans also. Plan details are as follows

| Plan | 34Mbps 5 GB/ Day | 34Mbps 10GB/ day | 34Mbps 10GB/ 5days | 34Mbps 20GB/ 5 days | 34Mbps 20GB/ 10 days | 34Mbps 30GB/ 10 days | 34Mbps 60GB/ 30 days |
|---|---|---|---|---|---|---|---|
| Base Tariff | 10 | 15 | 20 | 30 | 40 | 50 | 70 |
| Tariff with GST | 11.80 | 17.70 | 23.60 | 35.40 | 47.20 | 59.00 | 82.60 |

**What is the concept of "roaming" in the PMWANI framework, how can it work and what is the technical requirements for this.**

Every technology and solution evolves over a period of time and PM-WANI framework will also evolve; the benefits will multiply once all WiFi networks can virtually be consolidated to enable seamless roaming across all PDOAs' networks, the way National Roaming works for Mobile Networks, so that paid WiFi works across PDOAs public Wi-Fi network instead of recharging separately with each PDOA.

Roaming tie ups between every PDOA to PDOA is practically not feasible and WiFi roaming solution can be deployed by someone appointed by DOT (like a mobile clearing house in the mobile sector), that will enable seamless roaming across all PDOAs. It will also act as a payment and settlements, clearing house between PDOAs.

**Can the RailTel Wi-Fi hotspots be connected on a seamless roaming platform for users to avail of it across multiple stations and how will it work out**

PMWANI enables free usage of Wi-Fi across PDOAs however for paid product usage across PDOAs, Wi-Fi roaming bridge is required as explained earlier. RailTel offers seamless usage of its free and paid Wi-Fi products across 6102 Railway stations spread in entire Bharat.

**RailTel is one of the biggest partners of BBNL for the BharatNet roll out, what is the status of this now.**

RailTel has played a crucial role in the Bhartnet project which aims to connect gram panchayats across country. We, as an executing agency, have laid 27421 KM of optical fiber cables and made 8021-gram Panchayats & blocks service ready under Bharatnet program so far.

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# 5-P Model (People-Panchayat-Public-Private Partnership) to take PM-WANI to the hinterland (or Bharat)

## Existing service providers are unable to reach or have no incentive to deliver public Wi-Fi in remote areas. A new breed of smaller local entrepreneurs is required

BY DR. SATYA N. GUPTA

In India, access to data is still limited due to poor coverage of fibre/telecom and unaffordable pricing of cellular data, especially in rural areas.

In this background, Public Wi-Fi hotspots hold significant place in the last-mile delivery of broadband access to users in cost-effective manner.

In rural areas, Wi-Fi based access is cost-effective, sustainable and scalable than adding new Long-Term Evolution (LTE) base stations, due to unrecoverable costs. Also WiFi Hotspots bolster connectivity inside buildings, airports, Railway stations and other public places and activity centres. where LTE penetration may be limited. It allows for offloading data access from telecom networks to ease congestion and can be crucial when the next billion IoT devices come online. Yet, there are only 3 Lakhs public Wi-Fi hotspots in India, compared to 13 million in France, and 10 million in the United States of America.

Proliferation of broadband across the length and breadth of the country is an essential ingredient of Digital India. Towards this objective, it is envisaged to leverage public Wi-Fi access network for delivery of broadband services. This is envisaged and facilitated by PM-WANI (Prime Minister – Wireless Access Network Interface)

> DigiGaon Job Factory Foundation with its value innovation is trying to prove the success of its business model with its two PM-WANI based Proof-of-Concepts in partnership with RailTel at Chandauli and Saiyadraja railway stations. In Western UP.

framework of Govt. and infrastructure for the broadband access and services being provided under distributed architecture and unbundling of infrastructure to improve performance by new players.

The Covid-19 pandemic has necessitated delivery of stable and high-speed broadband internet (data) services to an increasingly large number of subscribers in the country to enable WFA (Work From Anywhere). These include areas which do not have 4G mobile coverage. PM-WANI framework takes forward the goal of National Digital Communications Policy, 2018 (NDCP-2018) of creating a robust digital communications infrastructure.

As the existing service providers are unable to reach and have no incentive to deliver public Wi-Fi in remote areas, a new breed of players specially the smaller local entrepreneurs are required to be facilitated to be part of the Public Wi-Fi ecosystem in remote and rural areas.

The detailed architecture showing various players in the PM-WANI framework is depicted below:

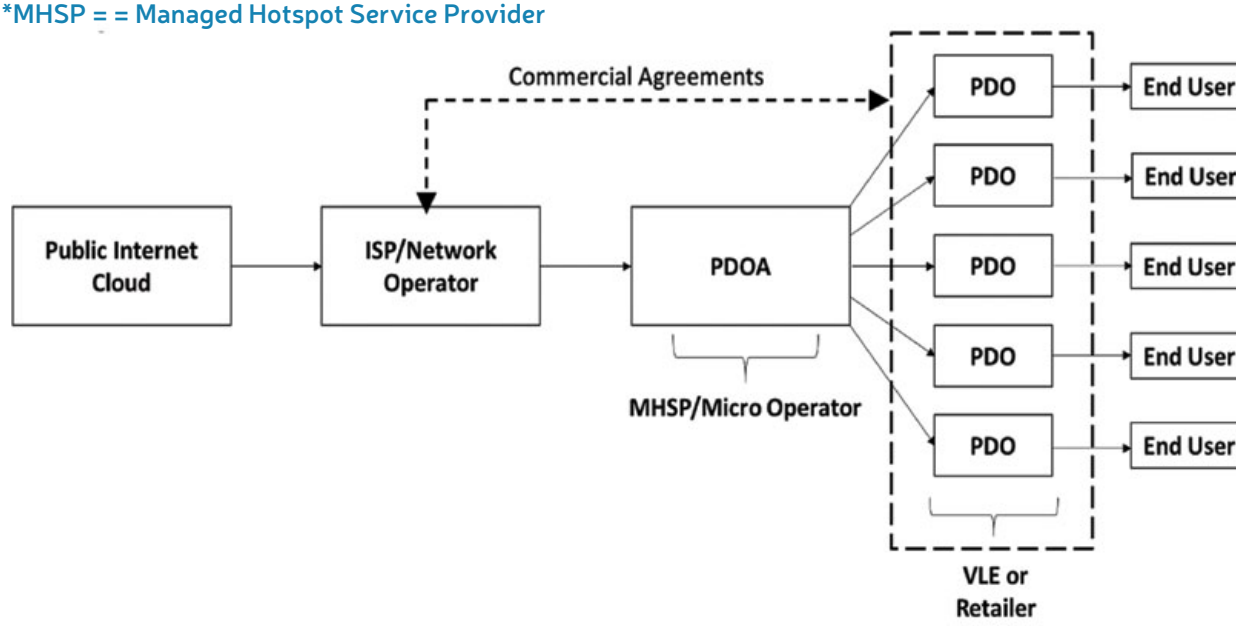
India's appetite for data appears to be insatiable, with the country now having over 800 million broadband connections. However, the growth potential is still very high. Probably over 500 million more to be connected, especially in rural areas.

The main objective of PM-WANI framework, apart from creating connectivity, and access for all is also job creation. With this policy, the government has outlined the vision of creating 4 million additional jobs in the telecom sector.

And when we look at the kind of potential that WANI platform and the public data office and data office aggregator concepts alone represent. We can, indeed unleash huge employment potential, if we are able to put in place this architecture and make it available for people across the country.

The PM-WANI will allow small entrepreneurs such as tea shops, to set up and maintain Access Points. Whereas, device manufacturers, payment companies, ISPs/Telcos

*MHSP = = Managed Hotspot Service Provider



and Consumer Internet companies can provide the remaining pieces to set up Public Data Offices (PDOs).

### DigiGaon Job Factory - Business Model Innovation

As the time and cost are two critical elements for the implementation, the key question is how we can rollout the broadband connectivity to the rural areas in the quickest and most cost-effective manner. The government is keenly looking forward to the speedy implementation of broadband connectivity for the success of its 'marquee' Digital India programme.

The concept of "PM-WANI" framework, enables, the creation of a public hotspots for use of the local entrepreneurs to enable them to provide much needed broadband access to rural masses as a business case without any perpetual subsidy.

The solution leveraged by DigiGaon in PM-WANI makes use of an innovative rural access technology based on 5L principles of value innovation namely; Low cost, Low Power, Low Maintenance, Local Control, Local Content.

Also, for early adoption and deep penetration of Broadband in rural areas it is necessary to have technical solution that is easy to be managed and operated by the local communities/entrepreneur and making use of existing backbone connectivity of main national/ regional networks of telecom operators (TSPs) / ISPs including PSU Telcos. The local communities/entrepreneur needs to be involved in the whole gamut of operation, maintenance, marketing, sales support and application etc. to take the overall ownership for the business at local level.

DigiGaon Job Factory Foundation with its value innovation is trying to prove the success of its business model with its two PM-WANI based Proof-of-Concepts in partnership with RailTel at Chandauli and Saiyadraja railway stations. In Western UP.

Considering the multi-faceted nature of the problem in ensuring affordable rural access to Broadband infrastructure, devices and content, partnerships among organizations with different vision, expertise, capacities and profit goals appear to be a key to improve access and affordability. Collaborations serving as critical mechanisms for improving rural Broadband access can take the form of partnerships within the public sector, negotiated public-private partnerships (PPP), private agreements among stakeholders in the telecommunications sector, and extending it further to stakeholders at the community and village level with 5Ps (People-Panchayat-Public-Private Partnership) concept.

Thus, the involvement of a local entrepreneur/ local cable operator and community (Gram Panchayat) under

**A Big Nation-building Opportunity - Digital India Mission of Govt.**

***"To create an inclusive knowledge society through proliferation of affordable and high quality Broadband services across the Nation"- Broadband for All***

Digital India
Power To Empower

- NOFN (National optical Fiber Network), named 'BharatNet' plans to connect 2.5 Lakh Gram Panchayats with 100 Mbps connectivity by Dec. 2016 ( Moved to Dec., 2022→)
- 1.80 Lakh Gram Panchayats connected upto March,2022.(Wifi Hotspots- 1Lac)
- Govt. sanctioned the connectivity to 3.5 Lakhs leftover villages at a Budget of 19,000 Cr. in PPP mode, tenders were out (July 21),but deffered.
- Missing link is "Home/Hand Delivery" of Broadband access to Rural masses.

## Rashtriya Broadband Abhiyan' Opportunity to create 10 Mn. Hotspots

| National Digital Communications Policy (NDCP-2018) | |
|---|---|
| **GOALS 2020** | **STRATEGIES** |
| i. Provide Universal broadband coverage at 50 Mbps to every citizen | • Establishing a 'National Broadband Mission – Rashtriya Broadband Abhiyan' to secure Universal Broadband Access |
| ii. Provide 1 Gbps connectivity to all Gram Panchayats of India by 2020 and 10 Gbps by 2022 | • Implementation of the following broadband initiatives, to be funded through USOF and Public Private Partnerships:<br>i. BharatNet – Providing 1 Gbps Gram Panchayats upgradeable to 10 Gbps<br>ii. GramNet – Connecting all key rural development institutions with 10 Mbps upgradeable to 100 Mbps<br>iii. NagarNet – Establishing 1 Million public Wi-Fi Hotspots in urban areas<br>iv. JanWiFi – Establishing 2 Million Wi-Fi Hotspots in rural areas |
| iii. Enable 100 Mbps broadband on demand to all key development institutions; including all educational institutions | • Implementing a '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: |
| iv. Enable fixed line broadband access to 50% of households | • Facilitating Fibre-to-the-Tower programme to enable fiberisation of at least 60% base stations thereby accelerating migration to 4G/5G/Wi-Fi |
| v. Achieve 'unique mobile subscriber density' of 55 by 2020 and 65 by 2022 | |
| vi. Enable deployment of public Wi-Fi Hotspots; to reach 5 million by 2020 and 10 million by 2022 (Currently only 0.5M) | |
| vii. Ensure connectivity to all uncovered areas ( Broadband for All on Demand) | |

People-Panchayat-Public-Private Partnership (5Ps) for sustainability of Broadband business in the rural areas is being made use of by DigiGaon.

For making delivery of high-speed broadband access in the hands/homes of rural people some very low cost, low power & low maintenance technical solution is needed which can reduce the cost to affordable level by making use of existing infrastructure and unlicensed spectrum which is free.

Also in many villages of rural India there is acute shortage of grid power supply which is also highly unreliable, a low cost hybrid power solution is required. In addition, there is unavailability of suitable indoor space for installing the network equipment's and keeping it safe and secured.

Due to all the above challenges there is a perceived lack of a business case for rural broadband access and that is why not many players are venturing into it. DigiGaon is also trying to bring out an innovative concept which can lead to a sustainable business model for hand/home delivery of broadband access to rural masses.

The traditional business case to provide Broadband services does not sustain in rural areas where the population densities are lower and the cost of deploying and managing a Broadband access network exceeds potential revenues. To provide affordable Broadband service in rural areas, it is necessary to carve out a sustainable model that makes the business case viable in the long run, DigiGaon with its Proof-of-Concepts is trying to create one such model.

DigiGaon business innovation calls for innovative partnerships between various stakeholders and balancing between various judicious mix of technologies & tariff plans which PM-WANI with innovative PDOA business model provides.

The Public Data Office Aggregator (PDOA) regime based on PM-WANI architecture provides lot of scope for innovation, when it comes to the adoption of a business model. Moreover, it uses unlicensed technology in form of Wi-Fi, which again happens to be a win-win considering the rural setup of India. This model is innovative and sustainable and has advantage over conventional resale-based business as it uses low-cost setup, makes use of existing infrastructure on revenue share basis with wide scope for local partnership in terms of 5Ps.

*Dr. Satya N. Gupta, Chairman, Bluetown India and Evangelist DigiGaon Job Factory*

feedbackvnd@cybermedia.co.in

# Reliance JIO – A New (& Younger) Era Dawns as Next Gen Takes Over

Akash's elevation comes at a time when Reliance Jio is gearing up for the 5G spectrum race and an initial public offering (IPO). There are many new challenges ahead but experts point to the massive success Jio over the last 6 years

BY JOSE JN, AANCHAL GHATAK & VOICE&DATA BUREAU

In June 2022, when the Reliance Board approved the appointment of Akash Ambani, as Chairman of Reliance Jio Infocomm Ltd and accepted the stepping down of Mukesh Ambani from the post it ensured handing over the reins of the nearly $12 billion (Rs 80,000 crores) Reliance Jio in a seamless and smooth manner to the next generation of leaders.

For close watchers of the Group, this offered a bit of a flashback to the year 2002, twenty years ago, when Dhirubhai Ambani, the founder and visionary of Reliance Industries Limited (RIL) had passed away.

A dispute arose between both his sons Mukesh and Anil Ambani, primarily over the rights of inheritance and control of the best parts of the Reliance Empire – then primarily a Petrochemical and Oil giant which had started to take make strong entries into Telecommunications, Life Sciences and other emerging areas.

> According to global investment firm Alliance Bernstein, the JIO subscriber base is expected to grow at 2% CAGR over FY22 to FY24 and ARPU is expected to improve to Rs 189 from the current Rs 153 by FY 23 driven by more customers and potential tariff hikes.

The next generation is thus stepping into senior leadership positions at the $300-billion + (₹20 lakh crore) RIL empire.

### JIO & AKASH

According to industry sources, Akash, 30, who is the eldest son of Mukesh and Nita Ambani, was actively involved in conceptualising the idea of Jio, and over the last several years, in building up Reliance Jio Infocomm in his role as a Board member and non-executive director.

An alumnus of Brown University in Rhode Island, USA, Akash has majored in Economics. In 2020, he was made the non-executive director of the company. Subsequently, he led the key deal between Reliance Jio and the social media giant, Meta (then Facebook), where the latter picked up a 9.99 per cent stake in Jio Platforms, the holding company of JIO, for a whopping $5.7 billion. Akash was also closely involved with conceptualising and launching Jio Phones, which quickly gained traction in the market.

"In 2021, Akash played a very key role in Google's $4.5-billion investment in Jio Platforms for a 7.73 per cent stake. Currently he is helping JIO in its 5G journey," said a source.

Akash's elevation comes at a time when Reliance Jio is gearing up for the 5G spectrum race and an initial public offering (IPO). There are many new challenges ahead of him but experts point to the massive success Jio has had over the last 6 years.

## Mukesh Ambani Steps Down from RJIL Board – Akash Ambani New Chairman.

In a filing to both the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE), Reliance Jio Infocomm (RJIL) Limited announced that the RJIL Board on 27th June had approved the reconstitution of the Board.

While Mukesh Ambani, the current Chairman, stepped down, the Board approved the appointment of Mr Akash M. Ambani as the Chairman of the Board of Directors of the Company.

The Board also approved the appointments of Raminder Singh Gujral and Mr K.V. Chowdary as additional directors of the Company designated as Independent Directors for a period of five years, subject to approval of shareholders.

Additionally, Pankaj Mohan Pawar has been appointed as the Managing Director (MD) of RJIL for a period of five years. Pankaj Pawar has been associated with the RIL group for over 23 years in different capacities heading the Regulatory and the Business operations of the technology, mobility and retail arms of the company. He was part of the first team in RIL that had set up Reliance Infocomm's CDMA-based mobile networks in 2000. He steered the introduction and launch of the Monsoon Hungama tariff offer which changed the shape of mobile services in the country forever. The Dhirubhai Ambani Pioneer Offer (DAPO) of July 2003 is now a case study in many international business schools. He is an integral part of the team that launched Jio's 4G data services later in 2016. The leadership changes mark the beginning of a fresh era for RJIL and the RIL group as a whole.

> India's digital market opportunity is slated to grow 4-5x to $1trillion by FY25, as per a MeiTY study. The Covid-19 pandemic has further accelerated data consumption due to virtual working, virtual classrooms and adoption of digital apps.

## Disrupting telecom

In 2016, JIO played a disruptive role in the telecom space. Until then access to broadband was limited to top tier users. Since Jio's launch, India's mobile broadband subscriber base has crossed over 700 million and data consumption has skyrocketed to over 17 GB per user per month. A combination of innovative services, cheap tariffs and bundling of affordable handsets has catapulted Jio as the largest operator in the country.

This comes at a time when India is charging ahead on the digital roadmap. From government services to banking, e-commerce, e-learning to entertainment, Indian citizens are using digital tools to access services and products.

With over a billion mobile subscriptions, India is one of the largest markets globally. Smartphone penetration is also on a steady rise, led by the availability of affordable phones with best-in-class features. The current smartphone base stands at 600 million while the total number of internet users, as per TRAI, has risen to 765 million. This large base of smartphone and internet users provides a platform for rapid growth in digital services and potential opportunities for telcos to move up the value chain.

India's digital market opportunity is slated to grow 4-5x to $1trillion by FY25, as per a MeiTY study. The Covid-19 pandemic has further accelerated data consumption due to virtual working, virtual classrooms and adoption of digital apps. Telcos are eyeing this opportunity and have been collaborating with other digital ecosystem players/ digital apps to expand their offerings, and hence, strengthen consumer stickiness. "Jio clearly leads other telcos in the effort to monetise digital opportunities due to:

a) its large +416 million telecom subscriber base and stakes in some of the largest consumer digital platforms;

The Adani Group is building its own digital platforms, encompassing super apps, edge data centres, industry command and control centres.


b) network effects due to a large number of apps, which increases subscriber stickiness within the ecosystem and enables cross-selling of solutions; and

c) an efficient business structure that clearly allows for the demarcation of the core connectivity business and the additional digital businesses.

In addition, Jio's B2C approach provides a wider moat to monetise this huge digital potential given there is no exclusivity in the partnership-based B2B2C business model followed by other telcos," say analysts at JM Financial in a research report.

## The Road Ahead

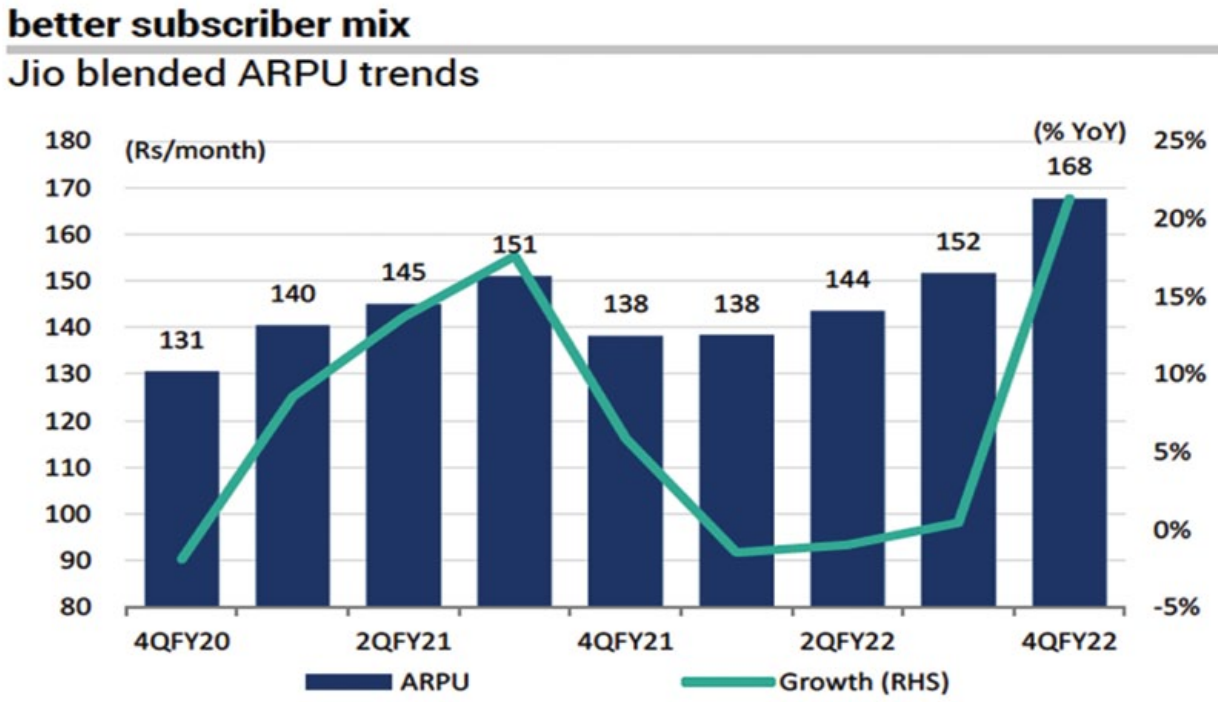
Reliance Jio Infocomm is one of the four key growth business segments of Reliance Industries (RIL), the others being retail, Oil to Chemicals (O2C) and new energy (which includes renewables like solar, wind and the most recent Hydrogen).

According to the report by global investment firm Alliance Bernstein (AB), dated 29 June 2022, Reliance Industries is expected to outperform in all its segments. A focused look into Reliance Jio, is where we will get to see the acumen of Akash at work. According to Bernstein, the JIO subscriber base is expected to grow at 2% CAGR over FY22 to FY24. ARPU is expected to improve to Rs 189 by FY 23 from the current Rs 153, this driven by high data demand, 4G upgrades and potential tariff hikes. Broadband subscriber base is expected to grow at 48% between FY 22 and 24, driven by strong demand for high speed internet, led by increasing availability of fibre connections.

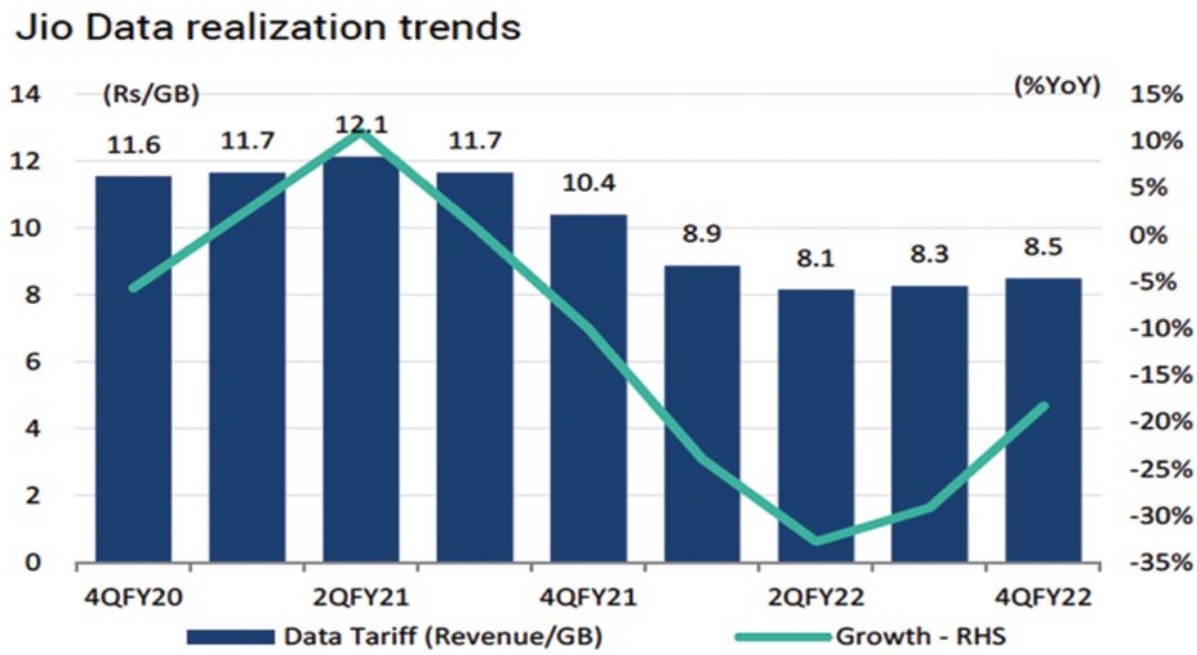
So while the Jio momentum is likely to continue, new factors will emerge in the rapidly changing digital and mobile sectors that won't make it smooth sailing yet, for Akash.

One such unexpected factor has just emerged in the high speed mobile 5G Networks and Services race

## ARPU HAS INCREASED DUE TO TARIFF HIKES IN LAST 2 QUARTERS




## TARIFF HIKES HAVE RESULTED IN IMPROVED DATA REVENUES OVER LAST 2 QUARTERS




Source: Jefferies, company data

Graphs: Jefferies Report on Indian Telecom

> RIL had done several tuck-in acquisitions to increase its capabilities in AI/IoT like Radysis (open source telecom solutions enabling next-generation technologies) and Haptik (conversational AI platform). Currently, these are being used forB2B applications.

with the Adani Group throwing its hat into the ring. "As India prepares to roll out next generation 5G services though this auction, we are one of the many applicants participating in the open bidding process," said a Media Statement released by the Adani Group.

The statement further continued, "We are participating in the 5G spectrum auction to provide private network solutions along with enhanced cyber security in the airport, ports & logistics, power generation, transmission, distribution, and various manufacturing operations." The Statement also clarified, that "if we are awarded 5G spectrum in the open bidding, it will also align with our recent announcement of significantly increasing the Adani Foundation's investments in Education, Healthcare and Skill Development in rural areas, each of which stands to benefit from 5G technology."

The Adani Group is building its own digital platforms, encompassing super apps, edge data centres, industry command and control centres – which mirror and even rival those of Reliance Jio in many areas.

For these and other new digital businesses, the statement says: "will require ultra-high quality data streaming capabilities through a high frequency and low latency 5G network across all our businesses."

Analysts though, expect that Adani may still be able to offer commercial services by applying for a unified access

## COAI – "do not allow back door entry to big tech in 5G Private Networks"

"We are happy to note that companies wanting to use 5G spectrum have made applications for open bidding of the spectrum through a transparent auction process, which ensures that level playing field is maintained and all interested parties bid for the spectrum required by them," said- Lt. Gen. Dr. SP Kochhar, DG, COAI.

COAI in its statement has strongly favoured India's structured licensing framework that has helped orderly growth of the digital connectivity landscape over the decades. "The opening up of access to spectrum to enterprises directly disturbs the level playing field," it said.

Spectrum should not be provided on administrative basis as it leads to no business case for those who are setting up 5G networks based on auctions.

If independent entities set up private captive networks with direct 5G spectrum allotment by DoT, it will diminish the revenue so much that there will be no viable business case left for the TSPs and there will not remain any need for 5G Networks rollout by TSPs.

Gen Kochchar emphasised: "It is important to understand that licensed access service providers are fully capable of providing these services most competitively and economically compared to private companies. Allocation of spectrum for such networks is fundamentally against principles of level playing field and effectively provides a backdoor entry to big technology players to provide 5G services and solutions to enterprises without equivalent regulatory compliance and payment of levies that TSPs are subjected to."

> RIL's 4G foray started in 2010 after its takeover of Infotel Broadband which held an ISP license and had acquired 2300MHz spectrum in the 2010 4G spectrum auctions.

license in the future. According to analysts at brokerage firm Jefferies, Adani could take out a leaf from Jio's entry in telecom some years ago.

RIL's 4G foray started in 2010 after its takeover of Infotel Broadband which held an ISP license and had acquired 2300MHz spectrum in the 2010 4G spectrum auctions.

In 2013, the Govt. opened fresh applications for new unified licenses. RIL applied for this by paying a Rs 17 billion (1700 crore) fee and was granted this license in late 2013. This enabled Jio to offer interconnected voice services on any spectrum including the 2300MHz band.

It launched its network three years later in 2016. "While Adani intends to buy spectrum in auctions only for private use, they can offer commercial services in the future by obtaining a unified License, as the services an entity can offer depends on the license held. RIL also had to obtain a Unified License in 2013 to be able to offer full connectivity services," says a report from Jefferies.

### New players on the horizon

In addition to Adani group's potential entry into the 5G space, the other major challenge for Jio and Akash would be to retain the Enterprise businesses and the private network space. Alongside the 5G spectrum auction for telcos on 26 July, 2022, the government has issued guidelines for any Enterprise to set up their own Captive Non Public Network (CNPN). The CNPN License itself will not require any payment of License Fee or Entry Fee. Setting up the captive network, however will require Spectrum, which can be used by the Enterprise by leasing out from a mobile operator who has that Spectrum or request the operator to build them a network.

CNPN Licensees can also obtain their own frequencies at terms that are yet to be determined by the TRAI. One way or another both these options would eat into Jio's 5G revenues – as Enterprise customers constitute almost 40% of a Telcos revenues.

Furthermore, the allocation of direct 5G spectrum for private networks allows other global, large technology companies like Amazon, TCS or Google to enter into the enterprise services segment.

Analysts expect Jio to navigate through these challenges – primarily because it is way ahead in the game today. Jio has evolved from a pure-play telecom provider to a tech enabler, through its Jio Platforms play. Currently, Jio Platforms (a standalone entity) houses the Enterprise and consumer suite of apps as well as the infrastructure business of Jio's payment app (design, development and operation of the app).

The Jio platform currently has two major Video-on-Demand (VOD) platforms, namely JioTV and Jio Cinema. JioTV is a content aggregator app for Live TV channels while Jio Cinema aggregates movies. Also, Jio Fibre users have access to JioTV+, an app that aggregates content across OTT platforms. At present, Jio does not charge for these apps and they are being used to give additional benefits to Jio customers so as to retain them. Jio has already aggressively positioned itself in the carriage space, with its captive user base and investment in leading Cable TV companies (Den, Hathway and GTPL Hathway).

Even in the content space, Jio has invested in content producers such as Balaji Telefilms, EROS and Roy Kapoor Films and has also signed non-exclusive content deals with marquee Indian and foreign players.

RIL had done several tuck-in acquisitions to increase its capabilities in AI/IoT like Radysis (open source telecom solutions enabling next-generation technologies) and Haptik (conversational AI platform). Currently, these are being used forB2B applications; for example, the Haptik chatbot was used by the Governments' Corona helpdesk earlier during the peak of the Pandemic.

However, many of these acquisitions could be leveraged for consumer applications, giving Jio an edge in consumer IoT.

All in all, Akash Ambani has a great runway for take-off and though he will encounter air pockets of turbulence in the Digital Game, the momentum and deep knowledge within the Group (not least of which is handling hundreds of millions of customers) will be a huge tailwind to propel Jio into the next era.

*feedbackvnd@cybermedia.co.in*

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TELECOM MAN: B K SYNGAL

# "The future will be upon us before we realize it, and we will be left in the past"

"In June 1998, I was named as one of 'The 50 Stars of Asia' by the BusinessWeek International magazine. But that same week, I was fired with immediate effect, by fax."

BY SANDIPAN DEB

Some day, when a fair history of India's telecom revolution is written, Brijendra Kumar (BK) Syngal would perhaps be the biggest hero in that tale. BK, who passed away on 9 July, was Chairman and Managing Director of the erstwhile Videsh Sanchar Nigam Limited (VSNL), and later chairman of Reliance Infocomm (the earlier version in 1999) and vice-chairman of BPL Communications. His career is the story of how India has progressed from the days when we had to wait eight hours for a "trunk call" to go through to today's Digital India.

He also brought the Internet to India. Only the third country in the Asia to have commercial Internet (much before China). BK was fondly called "the father of Indian Internet". (Disclosure: I have always called him "Sir", but in this article, for reader convenience, even though I feel uneasy about it, I am referring to him as BK)

His achievements are truly astonishing.

All of us 1.4 billion Indians owe something, a little bit, to him. But, like many visionary pioneers who worked selflessly for India, BK did not get the honours and acclaim that he deserved.

BK, who did his BTech from IIT Kharagpur, was one of the first 50 electronic engineers that India produced. He joined the Indian Telecom Service (ITS, which was then called the Indian Telegraph Engineering Service) in 1964. Unlike most of his batchmates, he chose to work in "projects" rather than a desk job. "Projects" entailed actual laborious engineering work, often in inhospitable regions. But BK did not want to push paper. He wanted to work with his hands.

He spent most of the next two decades all over India, connecting the country. In the jungles of Assam, where a cheetah lurked near his tent, he set up microwave towers. In the deserts of Rajasthan, where sandstorms would often erase the road his jeep had been travelling on within minutes, he laid cables that would prove invaluable to the Indian army during the 1971 war against Pakistan. He climbed mountains in Kashmir to repair repeater stations and literally connected the Valley to the rest of India by introducing long-distance direct dialing services.

"For me, building something and seeing it being constructed every day, meeting the deadlines, solving all sorts of unexpected problems, enjoying the camaraderie of the teamwork, when you had only one another to rely on—that was more satisfying than anything else," he told me. "And the indescribable joy when you see that your project is complete, that you've done your job—you've created something that will serve the people for years, impacting their lives, maybe even for decades." These are the men who selflessly built the India of today.

He was rewarded for his work—the government sent him off for a cushy three-year stint in Hungary. But when he returned, he pushed for the toughest assignment available—setting up the grid of earth stations for India's INSAT satellite project. Thirty-five earth stations had to be set up on a meagre budget of

> He was never afraid to differ and delve into unknown, new technological areas. The Joke went: 'Syngal writes dissent notes in reports of committees that he is chairing because he is too futuristic'. BK Syngal's logic always was: if you don't start thinking about the future now, the future will be upon us before we realize it, and we will be left in the past.

Rs 40 crore within three years. And this was a prestige project for the government. If it failed, it would be a huge embarrassment for the nation. The developed world was already looking at this sky-high ambition of a Third World country with derision.

It seemed an impossible task. So, BK volunteered.

His boss was aghast. "Kambal tumhe chhorta nahin hai," he said, "aur tum kambal ko chhorte nahin ho (The blanket doesn't let you go and you don't let go off the blanket)! What is this madness? You will regret this." But BK was undeterred.

Working against tremendous odds, he set up the stations within deadline and budget, from Ladakh to the Andamans. But it was more than just an engineering achievement. Because on the way, BK had to deal with various ministries, departments, government committees and experts with differing opinions. Being BK, he always kept pushing for more. "One of the jokes that circulated at that time was 'Syngal writes dissent notes in reports of committees that he is chairing because he is too futuristic'," he told me. "But my logic always was: if you don't start thinking about the future now, the future will be upon us before we realize it, and we will be left in the past."

BK spent nine years in London at the international satellite agency Inmarsat. Then in 1991 came the chance to head VSNL. VSNL was at that time the monopoly international phone service provider, a stodgy and lazy monopoly which provided little service. Making an international call from India was a nightmare. One had to dial for hours to get through to Berlin or Boston. Even Bangladesh actually had better international phone services.

The seven years that BK headed VSNL should have had spawned a dozen Harvard Business School case studies. Hardly has an Indian manager ever faced so many battles on so many fronts and emerged triumphant. The work culture was abysmal—there was sloth all around and zero customer focus. The technology that VSNL used was totally outdated. Neither the politicians nor the bureaucracy saw any reason to allot any extra money to VSNL. It was a total mess all around.

BK had also made a big financial sacrifice when he accepted the job. In London, he had been earning a nice tax-free salary and enjoying a comfortable worry-free life, taking holidays around the world and watching cricket at Lord's. VSNL offered a fraction of that money, and India could hardly give him that lifestyle. Yet, BK accepted. Because he wanted to do something for his motherland.

> He laid cables that would prove invaluable to the Indian army during the 1971 war against Pakistan.

# IN HIS OWN WORDS

## From BK Syngal's Biography – Telecom Man – Why Write a Memoir?


As the Chairman and Managing Director (CMD) of Videsh Sanchar Nigam Ltd (VSNL)—later privatised and renamed Tata Communications—it was my good fortune to be the man who brought the internet to India in 1995. We became the third country in Asia to offer the telecommunication network as a commercial service to its citizens. India's information technology (IT) industry was worth $181 billion in 2018-19. Its exports were valued at $137 billion. The IT industry would have bloomed late, if at all, without VSNL's high-speed data services that connected Indian software engineers with their clients and sites all over the world. Just like a father is proud of the first steps of his child, I take immense pride in the great strides we have made in the last three decades as 'the father of internet and data services in India'.

I was a well-placed NRI, with a tax-free salary in London, working on cutting-edge satellite-satellite-communication technology for ship-to-shore communications. But I came back to India. This is the story of an ordinary Indian who couldn't refuse the call of his motherland, left his secure career behind and returned home to provide the world's best telecom services to his people. I was seven years old when my family was displaced from Lahore during the Partition. And I was one of the first electronics engineers to graduate from the prestigious Indian Institute of Technology (IIT), Kharagpur, in 1961.

All through these years, I had to fight the bureaucracy; manage my political masters—three governments, five telecom ministers—through strategy, tactics, guile and plain stubbornness; and battle the corruption inherent in the system. I had to face constant media scrutiny and false charges, which were often paid for by international rivals. Essentially, I had to walk a tightrope, while always keeping India's best interest in mind. I was also Chairman of the Commonwealth Telecommunication Organisation of some forty-nine commonwealth nations for two consecutive years.

In June 1998, I was named as one of 'The 50 Stars of Asia' by the BusinessWeek International magazine. But that same week, I was fired with immediate effect, by fax, for not bowing down to pressure from my political masters. Within fifteen minutes, Anil Ambani was on the phone. He invited me for coffee the next morning. And before the coffee had turned cold, I had a new job as the Chairman of Reliance Telecomm, the first non-Ambani family member to hold the designation in a Reliance company. During my two-and-a-half years at Reliance, I led a team that created the blueprint of the required infrastructure for a converged society. My initiatives resulted in defining the vision and the strategy in the area of telecom for the entire group. As a result, the Reliance group decided to invest $4 billion in the next two years to create the necessary infrastructure. About 25,000 kilometres of optical fibre was laid to provide access network for about five to ten million homes to deliver voice, data and video services seamlessly.

Efficiencies can be elevated and costs can be cut down through smart vendor management, contract management and collections.

> "I had a new job as the Chairman of Reliance Telecom, the first non-Ambani family member to hold the designation in a Reliance company. During my two-and-a-half years at Reliance, I led a team that created the blueprint of the required infrastructure for a converged society."

In his seven years at VSNL, BK transformed an inefficient public sector corporation into a nimble future-focused organization. From an overseas switched-voice company, VSNL became an internationally recognized telecom company, offering a full range of basic and value-added services.

Without any financial support from the government, VSNL boldly invested in the world-girding submarine telecom cable SEA-ME-WE2. Once the system became operational, India got a 10x jump in global connectivity.

Today, India's IT exports are more than what Saudi Arabia earns from selling its oil worldwide. But our IT giants would be nowhere near where they are today without BK. In addition to easy voice connectivity, he introduced high-speed leased data lines for Indian software companies so that they could work real-time with international clients. This was the tipping point. When BK arrived at VSNL, the turnover of the Indian software industry was $60 million. By the time he left VSNL in 1998, it had soared more than 300 times to $2 billion.

Under BK, VSNL executed the largest global depository receipt issue till then to be listed on the London Stock Exchange (LSE) out of India. By 1998, VSNL was one of the top 10 companies by market capitalization and other parameters on the BSE and the NSE. It was ranked in the top 30 in the LSE. During BK's tenure, VSNL's revenues grew from $125 million to $1.6 billion, and profits from $32.5 million to $240 million.

"Father of the Indian internet": BK launched Internet services on 15 August 1995 with much fanfare. It was a disaster. There were so many technical glitches and so much consumer dissatisfaction that within a month questions were being raised in Parliament. BK called a press conference. And, unmatched in the history of the public sector, he told the media: "I goofed up. Give me 10 weeks' time and you'll get a system that India will be proud of." He fulfilled that promise. There never was a braver man.

In 2020, India had 750 million internet connections. But it all began with BK.

In June 1998, the American magazine BusinessWeek named BK as one of the "50 stars of Asia" along with Dhirubhai Ambani and Deepak Parekh of HDFC. Said the magazine: "Unofficially, the 58-year-old Syngal is known as 'Bulldozer', for his ability to crash through one bureaucratic barrier after another. India could use more managers like Syngal…Syngal is a tough boss: He posts notices chastising employees for a videoconferencing glitch or for losing a lucrative contract. But his employees know that in India's state sector, they are working for the guy who gets things done."

A few days after the BusinessWeek issue hit the stands, BK was sacked via a fax message late in the evening. BK would tell the sacking story very happily. His explanation was: one, his incorruptibility; and two, tremendous American pressure to take him down—US telecom companies that had been gouging the India market for decades were facing a situation where VSNL was making terrific profits and was the dominant partner in the dealings.

Post-Syngal, VSNL's performance declined sharply. In 2002, it was sold off to the Tatas and was renamed Tata Communications.

I first met BK in 2002 when I was writing a book on IITs and IITians. I spent two hours with him and I came away with one simple thought: This man wears his nationalism on his sleeve. BK was pleased when I wrote that in my book. "That's what I am," he told me. "I have spent my life trying to work for India." He was a proud son of India and India should be proud of him.

Wherever you are now, Sir, I am proud to have known you and your affection.

*Sandipan Deb, co-author of Telecom Man, A Biography*
feedbackvnd@cybermedia.co.in

# PM-WANI a STEP towards "Aatma-Nirbhar Bharat"

Hema Malini speaking at the inaugural ceremony of the PM Wani Project said that this is just the beginning of a long Journey in making Aatmnirbhar Bharat successful

BY PRERNA SINGH

Albert Einstein rightly said "In the middle of difficulty lies opportunity."

PM-WANI is an ambitious scheme of the Government of India. This scheme is designed to create opportunities like improvement in education and skill development for local people and students to gain knowledge.

Increased Wi-Fi access will bring more unconnected populations into the rapidly growing digital economy. Promising Indians is a Not for Profit organisation which realised that WiFi access will be as essential as food, clothing & shelter.

A robust and reliable broadband network is critical for successful implementation of some of the key social sector schemes and programmes for rural areas as envisaged in '2019 Digital India Framework' – covering e-governance, e-education and e-health etc.

Shri Somesh Ranjan from ONGC who is the pioneer of many innovative CSR projects originally came up with the idea of PM-WANI project under CSR project,

making ONGC an early mover for Digital India and making the dream of Hon'ble PM Shri Narendra Modi Ji of AatmaNirbhar Bharat come true.

Promising Indian Society (PIS) collaborated with ONGC for this ambitious project. Prerna Singh founder of Promising Indian Society supported by ONGC said she has taken an oath to create 10 lakh Entrepreneurs from PM-WANI Projects on a PAN India basis till 2024.

She has submitted proposals to Public Sector Undertakings, Corporates and organisations to join hands together and take this project to next level. She has already submitted and received approvals for 200 hotspots in the states of Gujarat, Rajasthan, Uttarakhand, Uttar Pradesh and Bihar.

The society has already successfully inaugurated PM-WANI project in Ahmedabad on 24th June, 2022 and Mathura on 8th July 2022 by Hon'ble Member of Parliaments.


Inauguration of PM-WANI project in Ahmedabad as a CSR initiative by ONGC in slum area of jivrambhatt chawl nr. Popatia Vad on 24th June, 2022.

The Event was inaugurated by Dr. Kiritbhai Solanki- Member of Parliament/ Chairman of Parliamentary Committee on welfare of SC/ST also Panel Speaker Lok Sabha, Prajwal Duwarah CGM. (HR)- ONGC, Members from Department of Telecommunication and Prerna Singh Founder of Promising Indian Society an implementing Agency for PM WANI project.


Hon'ble member of Parliament Smt. Hema Malini speaking at the inaugural ceremony of PM Wani Project said that this is just beginning of a long Journey in making the dream of an Aatmnirbhar Bharat successful


The PM WANI Mathura event was inaugurated by Smt. Hema Malini - Member of Parliament Lok Sabha, Shri Somesh Ranjan from ONGC, Directors from Department of Telecommunication, Shri Anunay Jha IAS- Municipal Commissioner Mathura and Prerna Singh Founder of Promising Indian Society an implementing Agency for PM WANI project in addition to other Ward councillors of Mathura.

The Promising Indian Society would initially create 10,000 Entrepreneurs and after implementing PDOs (Public Data Operators) would replicate the pilot model on PAN India basis.

The society under the leadership of Prerna Singh has taken a step closer to making India a self-reliant mission.

*Prerna Singh Founder President- Promising Indian Society*
feedbackvnd@cybermedia.co.in

[CASE STUDY]
**PM-WANI**

# Wi-DOT SMART HUB

Tess and Tera intends to create a digital eco system, where the rural public will get "free access and free internet" services on WiFi


BY TESS AND TERA TECHNO SOLUTIONS

TTTS is India's First 100% compliant PM-WANI PDO Aggregator & App provider powered by C-DOT, Ministry of Communication in August' 2021.

SVV Sanjeeva Kumar is the CMD of TTTS with 25 Years of experience in the Telecom and Technology sectors.

He has successfully launched green field and brown field projects of OFC/MW transport deployment and LTE/GSM/CDMA RAN domain. Successfully launched the advanced services 4G LTE/ FTTX/ Wi-FI/ CCTV/ Smart City IOT deployments.

TTTS key focus is to create new foot print of internet coverage through PM-WANI Public Wi-Fi.

TTTS is making "a platform to create rural centric smart evolution" through the "Wi-DOT SMARTHUB".

With all the above unique efforts TTTS is bringing the value to the data users "Single Point Solution" (SPS) where user can facilitate with ease; affordable; and quick business solutions for all their day to day needs. TTTS has collaborated with C-DOT for the PM WANI project.

India's first PM-WANI experience centre & business promotion platform is demonstrated in DOT APLSA premise in Hyderabad, Telangana. TTTS has successfully launched the PM-WANI services in enterprise as POC.

## Case Study

Tess & Terra is focusing on fulfilling the key objectives of

India's first PM-WANI experience centre & business promotion platform is demonstrated in DOT APLSA premise in Hyderabad, Telangana. TTTS has successfully launched the PM-WANI services in enterprise as POC.

PM WANI. Towards this it identifying and understanding the shortfall of Basic Internet Services in Rural / Urban / Tribal zones and prioritizing the network roll out in uncovered areas.

TTTS is generating employment opportunities by helping create micro and small scale entrepreneurs and:

- Surplus income source for existing micro-small traders.
- Rural empowerment and the transformation of digital India

How does it provide value to users?

- Most of the mobile network covered villages are suffering with low internet speeds.
- Records says 5-10% rural are uncovered with mobile network.
- Almost 80% of the tribal village/ hamlets are uncovered with mobile coverage as on date.
- Dense urban and metro's also suffering with low internet speeds.

It is difficult to the mobile operator to launch mobile macro network due to infra issues as well as ROI concern. PM-WANI will provide ultimate solution with low cost and rapid rollout and operation.

"Wi-DOT SMARTHUB" will complement for the creation of Digital India. It will facilitate converge of all the digital transformed services to the rural public.

Ultimately "a platform to create rural centric smart evolution". An accurate and precise public data base of the nation captured categorically for the better e-governance.

Tariffs are highly subsidized at a minimum of Rs 1/- per day.

In general PM-WANI will facilitate to sell 50% cost of the existing TSP tariff plans.

Tess and Tera is intended to create digital eco system, whereas the rural public will get "free access and free internet" services soon.

## Long term plans

Just not the internet, every village to be brought up as "digital smarthub" [brand named as Widot-smarthub] and self-sustained & standalone revenue generation hub in the nation.

TTTS has 75 years of collective experience in telecom sector 2G through 5G. And undertakes the following:

- introduction of PM-WANI framework and creating the awareness/ training camps thru physical and digital campaign to establish the PDO services all across the nation.
- Feasibility study and market survey for market segmentation/ create market demand/ adopt feasible business/ revenue models.
- Build the last mile to all the possible unconnected urban, rural and tribal zones through ofc media. Provide alternative and advanced backhaul media extensions to the problematic rural & urban.
- Demarcate the problem and identify challenges to adopt innovative solutions to meet the market demand.
- Guiding and mentoring the PDOs/ distributers/ franchise/ other (b2b) business partners to proliferate the PDO Wi-Fi services in all the possible business domains and drive them profitable way.
- Collaborate with the R&D/OEMS/ application platforms/ other service partners to deploy the most advanced network infrastructure to realize the vision of PM-WANI and digital Bharat.

*Sanjeeva Kumar is Managing Director at Tess and Tera Techno Solutions [TTTS] Private Limited is creating a new paradigm for PM WANI*

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[CASE STUDY]
**PM-WANI**

# WiOM – A torch bearer for PM WANI

## Wiom was started as an incubation at IIT Delhi


BY SATYAM DARMORA

Satyam has served on the Board of many companies including BASIX- SubK, Labournet, Kinara, Sonata, Arohan and IntelleGrow. He worked with American Express, managing new products and portfolio risk in various international markets including Japan, Hong Kong and Germany.

He has served on various GOI appointed committees, including the National Skill Development Corporation (NSDC).

He was also the Director of the Michael & Susan Dell Foundation's Family Economic Stability portfolio managing an investment portfolio of 15+ high impact companies in the area of livelihoods for poor.

Among the private WiFi operators that have successfully set up WiFi networks, Wiom is one of the largest and fastest growing public data aggregators PDOA, in the country.

Wiom is catering to the needs of middle- and lower-income localities.

Wiom was started as an incubation at IIT Delhi.

Its founders have a strong IIT – IIM background. Satyam Darmora, Nishit Aggarwal, Ashutosh Mishra, Natraj Akella and Maanas Dwivedi have worke in companies like Microsoft, American Express, IBM and Airtel.

Wiom started with an objective of providing affordable Internet to masses. Using cutting edge technology that reduces cost drastically, and shared economy principles, Wiom has over the years created a unique business model that is highly scalable and profitable.

While all internet delivery interventions in the past have been using a pipe approach, where the ISP owns the infrastructure and the customer, Wiom created a model with a platform approach, where the focus is on demand supply match than being an infrastructure player.

Since most of the PDO partners of Wiom come from low income areas and are distributed in various parts, the internet bandwidth is procured from the existing ISPs in the area. Wiom's Wi-Fi management platform has been created especially for the Indian context. Hence, it can work with normal broadband connection and does not require leased lines. Also, there is no need for any integration with different ISPs. Since Wiom is able to create more demand in bulk, it is able to get discounted rates from ISPs which are generally 25% lower than the standard market rates.

## Kusumpur Pahadi Context

With the advent of PM WANI, we picked up an area called Kusumpur (in Delhi) as a pilot market and set up ~180 PDOs in the first phase.

Kusumpur is a low income locality close to Vasant Vihar metro station. It has approximately 5,000 households and 25,000 residents. Most of the families have adults engaged in daily labour or blue collar jobs. In this phase, Wiom had to pick up the entire cost of setting up PDO – including the internet and Routers.

Users could buy coupons from neighbourhood shops for internet access. These were.

- Rs. 5: Unlimited internet for a day. Eligibility on 1 device only.
- Rs. 20: Unlimited internet for 5 days. Eligibility on 1 device only.
- Rs. 50: Unlimited internet for 20 days. Eligibility on 1 device only.

Wiom also provided basic marketing support to these shop owners (pink danglers in image below) to help market the PDO model.

## Benefits to the consumer on connecting to the shop's Wi-Fi

Consumers would buy coupons from shop-owners and would use the coupon codes to get access to internet on hotspots.

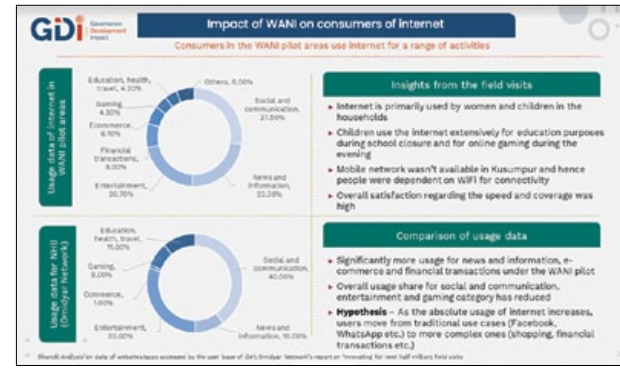
If a customer brought a coupon from one shop and wanted to use internet at some other hotspot location, he was able to do so.

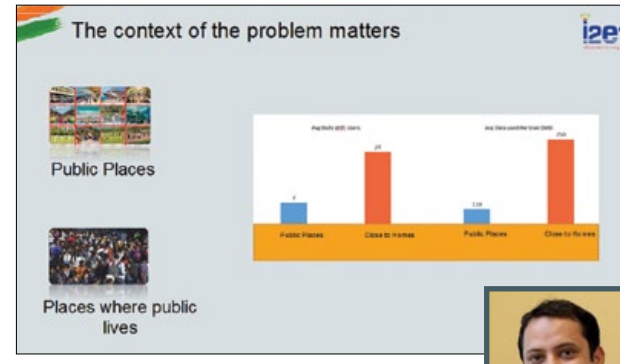
Consumers with houses in close proximity to these shops could also access the shop's WiFi signal from homes and enjoy internet at home

## Key learnings

- 4G is not sufficient and High demand of unlimited data
- More and more people wanted better accessibility of WiFi signals at homes.
- Only 10% homes in the neighborhoods had broadband access

Wiom also carried out a third-party independent assessment and its findings are also attached.




*Satyam Darmora, Founder, i2e1 (WiOM)*
feedbackvnd@cybermedia.co.in

# 5G Rollout: A paradigm shift for Telecom Networks

## The economic impact of 5G rollout is expected to be very significant


BY PROF. MILIND GANDHE

On May 30th, 2022, the Union Minister for Communications Shri Ashwini Vaishnaw announced in parliament that India has started the groundwork for 5G spectrum auctions slated to take place later this year. All leading telecom operators are already conducting trials for their 5G networks. Once the auction is completed, commercial service is expected to be rolled out by the end of the year.

The economic impact of 5G rollout is expected to be very significant. PwC expects that 5G rollouts would have an impact of US$ 525 billion on the world economy this year, rising to US$ 1.335 trillion in 2030. In India alone, PWC expects that the impact will rise from US$ 5 billion in 2022 to US$ 42 billion in 2030. The major sectors expected to be impacted by 5G include healthcare, smart utilities, consumer and media applications, industrial

> According to India Brand Equity Foundation, India's 5G subscriptions will have 350 million subscribers by 2026, rising to 500 million subscribers the following year.

One way to increase the size of the cell is by deploying surfaces which can reflect mobile signals, in the same way that a mirror reflects visible light. There are a number of technical challenges in deploying these "Reconfigurable Intelligent Surfaces", and researchers are working to resolve these.

manufacturing and financial services. According to India Brand Equity Foundation, India's 5G subscriptions will have 350 million subscribers by 2026, rising to 500 million subscribers the following year. This would mean that two out of five in the next five years of Indian subscribers would be shifting to 5G. In order to facilitate this transition, India is expected to require over 22 million skilled professionals in the 5G-focused sectors like cloud computing, IoT, AI, and robotics.

The most significant feature of the new standard is a movement away from proprietary implementation of "radio access networks" -- a fancy term for all the hardware and software behind the mobile towers that dot our urban landscape. Traditionally, this market has been dominated by a small set of companies from Europe, Korea and China. Geopolitical tensions over the last couple of years have highlighted the security risks of dependence on mobile infrastructure that could be tapped or otherwise tampered with. The new 5G standard addresses this risk by enabling development of Open Radio Access Networks (O-RAN) based on a new "Commercial-Off-The-Shelf" (COTS) hardware, much like assembling a PC based on a motherboard. Complementing this COTS hardware is open source software, which provides transparency into the implementation of the network functionality. We expect that O-RAN based access networks would enable Indian companies to compete aggressively in the network equipment vendor space.

The second major area where we will see changes in the mobile networks due to 5G is in the area of network planning. A mobile network is designed as a series of overlapping "cells". At the centre of each cell is a transmission tower. In a traditional network, all cells are homogenous, that is, the system implementing the cell is same in all cells. This network architecture breaks down in 5G. As we saw, higher bandwidth in 5G is enabled by new spectrum in higher frequencies (3.3 – 3.675 GHz and 24.25 – 28.5 GHz).

We will see changes in the mobile networks due to 5G in the area of network planning. A mobile network is designed as a series of overlapping "cells".

While the higher frequency spectrum enables better bandwidth, it also requires higher transmit power. Since transmit power cannot be increased very much, this results in smaller cells in 5G. This will result in a massive increase in the number of mobile cells required to be deployed by an operator. One way to increase the size of the cell is by deploying surfaces which can reflect the mobile signal, in the same way that a mirror reflects visible light. There are a number of technical challenges in deploying these "Reconfigurable Intelligent Surfaces", and researchers are working to resolve these.

The mobile signals are also not very good at going through concrete, as anyone who has been frustrated by poor cellular reception in a multi-storeyed building will attest. This problem is exacerbated at higher frequencies. The new standard aims to handle this by creating a new category of cells called "nano-cells".

Nano-cells are similar to the Wi-Fi routers that dot our homes today – they provide wireless coverage over a very small area, and usually have a broadband connection to the outer world (backhaul). The new 5G network will be a mixture of regular mobile cells and the newer nano-cells, which could be deployed and removed at short notice. This will make network planning both challenging and somewhat ad-hoc. Operators will need to find new ways to handle these ever changing networks.

Indigenous development of 5G technologies to address these challenges is the need of the hour.

*Prof. Milind Gandhe is CEO, International Institute of Information Technology Bangalore COMET Foundation. IIITB COMET Foundation*

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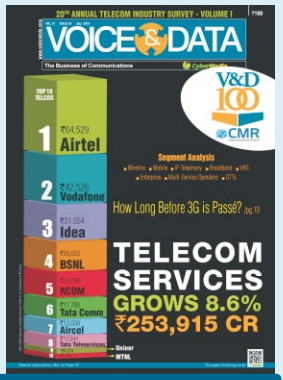


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# 5G in Europe — Policies and standards

5G-PPP is a joint initiative between the European Commission and European ICT industry (ICT manufacturers, telecommunications operators, service providers, SMEs and researcher Institutions)

BY DINESH CHAND SHARMA

5G is evolving fast across Europe and the rest of the world. There have been several initiatives announced by the EU Commission that aim to maximize the potential of 5G. This is a short report that outlines all the major initiatives and their aims.

### Public Private Partnership on 5G (5GPPP)

The European Commission identified 5G opportunities early, established a public-private partnership on 5G (5G-PPP) in 2013 to accelerate research and innovation in 5G technology.

5G-PPP is a joint initiative between the European Commission and European ICT industry (ICT manufacturers, telecommunications operators, service providers, SMEs and researcher Institutions). The 5G-PPP is now in its third phase where many new projects were launched in Brussels in June 2018. The 5G PPP will deliver solutions, architectures, technologies and standards for the ubiquitous next generation communication infrastructures of the coming decade. The challenge for 5G-PPP is to secure Europe's leadership in the particular areas where Europe is strong or where there is potential for creating new markets such as smart cities, e-health, intelligent transport, education or entertainment & media.

The 5G-PPP initiative will reinforce the European industry to successfully compete on global markets and open new innovation opportunities. It will "open a

> In July 2020, the European Commission adopted Regulation on small-area wireless access points, or small antennas (cells), crucial for timely deployment of 5G networks for delivering high-capacity and increased coverage as well as advanced connection speeds.

platform that helps us reach our common goal to maintain and strengthen the global technological lead".

### 5G Action Plan for Europe

In 2016, European Commission (EC) launched a 5G Action plan for Europe with the objective to start launching 5G services in all EU Member States by end 2020 at the latest, followed by a rapid build-up to ensure uninterrupted 5G coverage in urban areas and along main transport paths by 2025. The action plan set out a clear roadmap for public and private investment on 5G infrastructure in the EU.

To achieve that, the Commission proposed the following measures:

- Align roadmaps and priorities for a coordinated 5G deployment across all EU Member states, targeting early network introduction by 2018, and moving towards commercial large scale introduction by the end of 2020 at the latest.
- Make provisional spectrum bands available for 5G ahead of the 2019 World Radio Communication Conference (WRC-19), to be complemented by additional bands as quickly as possible, and work towards a recommended approach for the authorisation of the specific 5G spectrum bands above 6GHz.
- Promote early deployment in major urban areas and along major transport paths.
- Promote pan-European multi-stakeholder trials as catalysts to turn technological innovation into full business solutions.
- Facilitate the implementation of an industry-led venture fund in support of 5G-based innovation.
- Unite leading actors in working towards the promotion of global standards.

### Gigabit Society

In 2016, the Commission launched the Gigabit Society. It sets out a vision for connectivity in the EU over the next decade. Major targets include 100 Mbps speed networks for all households and gigabit speeds for key businesses and institutions. 5G can help in achieving these speeds through technologies such as fixed wireless access (FWA).

The initiative also sets 5G specific targets such as uninterrupted 5G coverage in all urban areas and major

## EU 2025 Connectivity objectives

- 100 Mbps networks reaching all European households by 2025
- Gigabit connectivity connecting all main socio-economic drivers - such as schools, universities, research centers, transport hubs, hospitals, public administrations, and enterprises relying on digital technologies
- Uninterrupted 5G coverage should be available in all urban areas and all major terrestrial transport paths to connect people and objects
- Access to mobile data connectivity everywhere, in all places where people live, work, travel and gather.

transport paths and access to mobile data everywhere by 2025.

### European 5G observatory

To monitor the progress towards the EU's 5G policy goals, the Commission launched the European 5G Observatory in 2018. The European 5G Observatory provides updates on all of the latest market developments, including actions being undertaken by the private and public sectors, in the field of 5G.

The 5G Observatory currently is in its third phase.

In its first phase it assessed movement towards the policy goals set out in the 5G Action Plan, most of which have been achieved. The key goal was to foster a coordinated EU approach to 5G with the release of the 5G pioneer spectrum bands (700 MHz, 3.5 GHz and 26 GHz) and commercial launches by 2020.

This has happened in most member states, but not all. 5G observatory continue to assess progress in this area.

However, the main focus of the 5G Observatory in its third phase is the EU policy goals contained within the Digital Decade initiative and the 5G Security Toolbox.

These include:

- 5G coverage of all populated areas by 2030
- Pan-European deployment of 5G corridors
- Multi-country 5G initiatives
- Leveraging EU recovery funds for 5G projects
- Improving the security of 5G networks
- Limiting any dependency on a single 5G vendor
- Stimulating the EU's capabilities as a 5G equipment manufacturer
- To monitor these goals it examines issues such as 5G coverage; spectrum awards; and public policies to stimulate 5G's growth.

The adoption of 5G by new vertical industries like factories and agriculture is a particularly important topic because the Digital Decade initiative sees 5G verticals as key to digital transformation for businesses.

The Observatory focuses on 5G developments in Europe, along with major international developments (USA, Japan, China, and South Korea) that could impact the European market.

### EU toolbox for 5G security

Announced in 2021, the EU toolbox for 5G security is a set of measures that aim to secure 5G networks in the

> Multi-access Edge Computing (MEC): offers to application developers and content providers cloud-computing capabilities and an IT service environment at the edge of the network.

EU. The toolbox strengthens security requirements for mobile networks, assess the risks posed by suppliers and limits any dependency on a single vendor.

The objectives of this toolbox are to identify a possible common set of measures which are able to mitigate the main cybersecurity risks of 5G networks, and to provide guidance for the selection of measures which should be prioritised in mitigation plans at national and at Union level.

It does this in order to create a robust framework of measures with a view to ensure an adequate level of cybersecurity of 5G networks across the EU and coordinated approaches among Member States.

### EU Digital Decade

On 9 March 2021, the European Commission presented a vision and avenues for Europe's digital transformation by 2030. The Commission proposes a Digital Compass for the EU's digital decade that evolves around four cardinal points:

ICT skills;

- Business transformation;
- Secure and sustainable digital infrastructures; and
- Digitalisation of public services.

5G is key to this vision: the Digital Decade sets a goal for coverage of all populated areas by 2030 and regards 5G verticals as digital transformation enablers for businesses.

The Path to the Digital Decade is the Commission's proposal to set up a governance framework to ensure Europe reaches its 2030 Digital Decade objectives. This governance framework will be based on an annual cooperation mechanism involving the Commission and Member States. The Commission would first develop projected EU trajectories for each target together with the Member States, which would in turn propose national strategic roadmaps to attain them.

### Regulation on Small cells

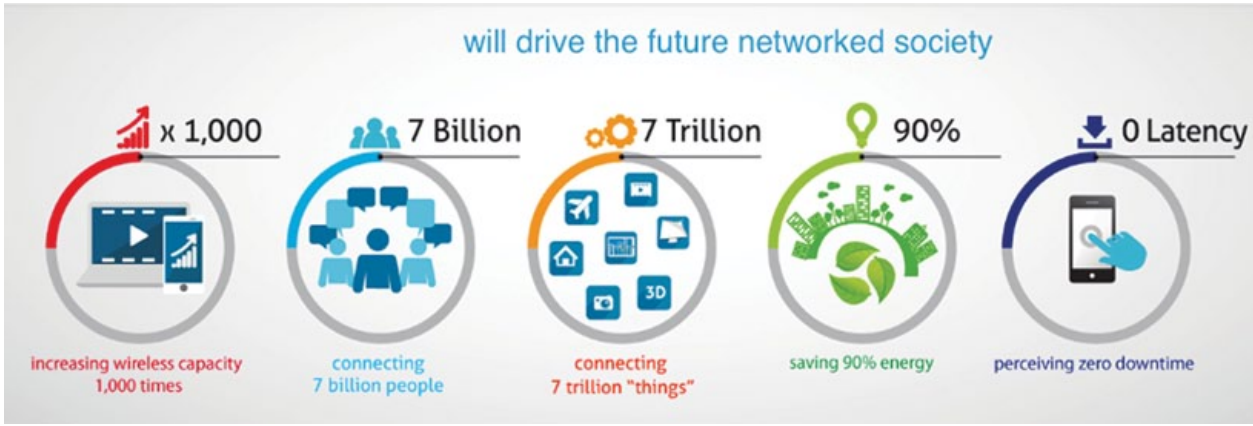
In July 2020, the Commission adopted Regulation on small-area wireless access points, or small antennas (cells), which are crucial for timely deployment of 5G networks and for delivering high-capacity and increased coverage as well as advanced connection speeds.

The Regulation:

- Specifies the physical and technical characteristics of small cells for 5G networks;
- Aims to help simplify and accelerate 5G network installations, which should be facilitated through a permit-exempt deployment regime, while ensuring that national authorities keep oversight;
- Lays out the specifications for a coherent and integrated installation, while providing national authorities with the means to oversee deployment of small cells;
- Provides that small antennas should be exempted from any individual town planning permit or other individual prior permits.
- Permits may still be required for deployment on buildings or sites protected in accordance with national law or where necessary for public safety reasons;
- Allows for broader national measures in support of straightforward small cell deployment.

### 5G standardization: EU

The European Commission identifies 5G standards as one of the five priority areas under the Digitising European Industry initiative. 5G Standardisation started in early 2016 under the umbrella of the 3rd Generation Partnership Project (3GPP), the key standardisation body for global mobile communication systems. The first phase and the second phase of 5G standardisation have now been completed, with the publication of 3GPP Release-15 and Release-16 set of specifications.




This first phase focused on enhanced mobile broadband while also supporting ultra-reliability and low latency.

Release-16 provided the basis for 3GPP's IMT-2020 submission for an initial full 3GPP 5G system, and work on 3GPP Release-17 is ongoing.

Release 16 takes into account a number of functionalities needed for 5G deployment by vertical industry, as called for by the EU 5G strategy. This includes: Integrated access and backhaul (IAB), easing deployment where fiber is not accessible; NR in unlicensed spectrum, multi factories applications; Features related to Industrial Internet of Things (IIoT) and ultra-reliable low latency communication (URLLC); positioning; intelligent transportation systems (ITS) and vehicle-to-anything (V2X) communications with additional use cases taken into account.

Release-16 delivered key standards for use-cases such as those related to industrial applications, and transversal needs such as lawful interception and lawful access to retained data. The availability of standards promoting open innovation and opportunities for start-ups is also key.

Stage 3 work on Release 17 has reached maturity - with Rel-17 functional freeze achieved in March 2022. In Release 17, 3GPP delivered important updates to 5G specifications to broaden their range of commercial applications and improve the efficiency of networks. 3GPP is now starting standardization of Release 18.

Several ETSI's Technical Bodies (TBs) and Industry Specific Group (ISG) are providing input to 3GPP and/or collaborating with 3GPP.

ETSI itself has a number of component technologies which will be integrated into future 5G systems: Network Functions Virtualization (NFV), Multi-access Edge Computing (MEC), Millimetre Wave Transmission (mWT) and Non-IP Networking (NIN).

- **Network Functions Virtualization (NFV):** Founded in November 2012 by seven of the world's leading telecoms network operators, ETSI ISG NFV became the home of Network Functions Virtualisation (NFV).

- Almost seven years and over 100 publications later, the ISG NFV community has evolved through several phases, its publications have moved from pre-standardization studies to detailed specifications. The early Proof of Concepts (PoCs) efforts have evolved and led to a series of interoperability events (NFV Plugtests).

- **Multi-access Edge Computing (MEC):** offers to application developers and content providers cloud-computing capabilities and an IT service environment at the edge of the network.

- **Millimetre Wave Transmission (mWT):** Deployment of 4G, future needs of 5G and the number of connections required for massive Machine Type Communications in the Internet of Things are making unprecedented demands on radio access networks and backhauling. Millimetre wave technologies are expected to be a major enabler of future mobile communications.

- to standardize a digital communications technology fit for the 21st century.

*Dinesh Chand Sharma, Director – Standards & Public Policy (SESEI)*

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# Getting to Cloud – Faster, better, and certainly cheaper

Extracts from the Deloitte-CII report on Cloud Infrastructure anchored by Monojit Mazumdar, Partner Consulting, Deloitte India

The market for moving applications to cloud has always been there and will continue to thrive even further. Per a recent study, cloud migration market is projected to reach US$515.83 billion by 2027, growing at a CAGR of 24.8 percent from 2020 to 2027.

In the past few years this migration to cloud has moved beyond the traditional application lift and shift opportunities to redesigning core capabilities in the cloud. Organisations are looking to take full advantage of cloud platform offerings to enhance their existing capabilities. In the post pandemic world, we will see renewed interest in migrations to the cloud, particularly from organisations that need an efficient, cost-effective way to move their rigid yet essential core assets. There would be an upsurge in creative approaches for financially re-engineering the application modernisation business case. These business cases would largely fall in three key bucket areas, which include the following:

- **Operate and transform –** Many organisations will look for arrangements with their system integration partners to modernise their applications to cloud-native platforms in a few years, keeping organisational operating expenses low. This can be done by designing creative operateto- transform agreements, wherein an organisation's systems get modernised to cloud-native platforms in a few years while operating expenses stay neutral.

- **Value for money –** In the past few years, system integrators have been able to work on creating/ improving their proprietary cloud transition tools, which have simplified the cloud migration process manifolds. This simplification will compel a business case for migrations and modernisations by keeping them cost neutral or even cost effective.

- **Application rationalisation –** Technical debt accrued over the years in the form of monolithic legacy, hard wired applications and assets can be reduced by moving them to cloud and this transition will beget a concomitant estate optimisation exercise to eliminate redundant liabilities and dependencies. Sunsetting a few unhealthy applications or consolidating them with healthy ones can lower costs and thus, would act as a catalyst for the entire application modernisation business case.

These business cases would get support from large cloud hyperscalers (such as AWS, Google Cloud Platform, Microsoft Azure, Oracle Cloud Infrastructure, etc.) in the form of funding for migration to cloud. System Integration (SI) partners might also not hesitate in chiming with some investments provided these investments bring long-term rewards in the short term. Deferment of upfront fees post value realisation or commercial share in some other organisation initiative can be a form of long-term reward for the SI players. For organisations, i.e., clients these arrangements would provide faster access to the value levers of cloud while the hyperscalers would be able to create stickiness for their cloud and thus, host more client workloads in the future. On ground these business cases would be implemented with the help of new improved tools and techniques that can help revitalise legacy applications including the following:

- **Improved Low Code (LC) platforms –** LC platforms have evolved over the years by becoming more powerful and capable. Using these LC tools from systems designers and application architects can carry out complex tasks and integrations through pointand-click rather than having to write code. LC vendors are making their platforms increasingly intuitive and adding functionalities, such as visual debugging, visual business logic design, user interface templates, etc., to their product roadmap to make them more intuitive for developers and testing community.

  LC platforms are proving to be game changers in the space of cloud-based application modernisation and their power cannot be ignored – no wonder NASCCOM predicts India's LC market to touch US$4 billion by 20254.

- **New-age code scanning –** Legacy code assessment and business rule extraction for reuse of a legacy code, for the purpose of application modernisation, has been a steep challenge for the past few years, but not anymore. Today, improved mining technologies and approaches make it possible to peer inside legacy code regardless of language and extract its business logic with less effort and high fidelity. New-age enterprise code complexity analysis tools provide features, such as exposure of hidden and convoluted connections between applications, business rules visualisation, complex business rule extraction that too accompanied with AI/ML features to automate aspects of code extraction process. This code scanning and business rule extraction can help application teams to bolster their modernisation business case by identifying essential business logic and either refactoring the code or replacing the entire application with a microservice.

- **Piecemeal modernisation –** With the help of a new technique called core mapping, a legacy application can be visualised as a connected graph of constituent parts. Application architects can then identify and use these logical subgroupings to divide legacy interfaces, replacing them with modern Application Programming Interfaces (APIs) and service-based techniques.

So where exactly is this entire application modernisation leading towards? Well, the destination seems to be cloud native architectures. Organisations are understanding the benefits of modernising their applications to make them cloud native. However, a key question is what is cloud native. The seven key characteristics that define a cloud native application include the following:

01. **Multiple components:** What looks like a single application to the end user is delivered by a set of cooperating services

02. **Loosely coupled:** Locates and communicates with other services dynamically at runtime; and is independently deployable and replaceable

03. **Elastic and responsive:** Scales-up or scales-down independently enabling automatic scaling on-demand and updated & deployed frequently and independently, with zero downtime

04. **Built on open standards:** Extensively leverages open-source components and community support

05. **Infrastructure agnostic:** Decoupled from infrastructure constraints and free to move as required

06. **Composable:** Designed to be a part of other applications and comprises uniform and discoverable APIs

07. **Resilient:** Runs reliably, securely, and predictably despite transient issues in the cloud involving network, variable loads, and capacity

Cloud native applications come with newage design patterns, such as:

01. **Event sourcing:** It is a pattern that leverages events as inputs and outputs of transactions. Events can be published and subscribed to by other services and are immutable.

02. **Caching:** It is a process of storing copies of files in a cache, or temporary storage location, to access them quickly.

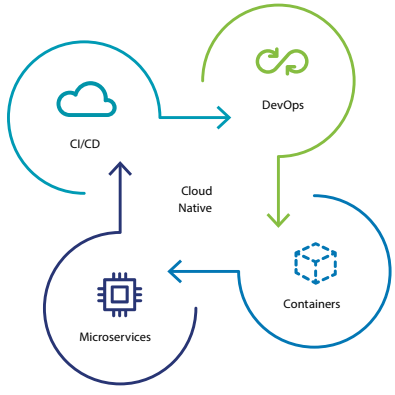
03. **Load balancing:** By distributing network traffic and information flows across multiple servers, a load balancer ensures no single server bears too much demand. This improves application responsiveness and availability.

04. **Sharding:** It is a method for distributing a single dataset across multiple databases, which can then be stored on multiple machines. This allows for larger datasets to be split in smaller chunks and stored in multiple data nodes, increasing the total storage capacity of the system.

05. **Auto scaling:** It is a method used in cloud computing that dynamically adjusts the number of computational resources in a server farm—typically measured by the number of active servers—automatically based on the load on the farm.

06. **Serverless deployment:** Cloudnative development model that allows developers to build and run applications without having to manage servers. Developers can simply package their code in containers for deployment.

**What makes "It" cloud native**




These cloud native design patterns help organisations across the world to reap some of the many benefits provided by cloud including:

01. **Scalability:** Cloud native apps. modify and adapt per business requirements and allow frequent software updates per customer feedback.

02. **Cost efficiencies:** With open-source systems and tools such as serverless systems that adopt a pay per use model, costs are driven down considerably.

03. **Avoid lock-ins:** Cloud native avoids vendor lock-in by allowing the usage of services from multiple cloud providers.

04. **Experience improvement:** These applications help take a mobile-first approach, thereby targeting majority of millennial audience.

05. **Flexibility:** Cloud native apps. allow organisations to work on multiple cloud platforms, such as public, private, or hybrid without introducing additional requirements.

06. **Reusability:** These applications use serverless platforms to upload portions of the code saving cost and time for development teams.

07. **Ease of troubleshooting:** Troubleshooting and tracing the origin of the issue is much easier with entire application being divided into microservices and containers.

08. **Enhanced security:** Enable multiple layers of security, such as multi factor authentication, restricted access, etc.

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# Indian Space Association announces National Advisory Committee and a new office in New Delhi

The Indian Space Association (ISpA), the industry association of space and satellite companies in India, announced the formation of the National Advisory Committee(NAC) to boost cooperation amongst the stakeholders and build a 360-degree perspective in shaping the contours of the private space industry ecosystem in India. The Committee would be headed by the Chairperson, Dr Arvind Gupta, Director of Vivekananda International Foundation (VIF).

The NAC would initially comprise 9 members coming from varied backgrounds which include Academia, Bureaucracy, Defence, Tech, and Space Industry. More additions to the NAC are likely, with addition of experts from Industry, Academia and Space Technology.

Dr. Pawan Goenka, Chairman, IN-SPACE, inaugurated the Indian Space Association's first office at the United Service Institution of India (USI) building, located in Shankar Vihar, New Delhi.

The inauguration ceremony witnessed in the presence of Gov Shri Shekhar Dutt, Sena Medal, Chief Mentor of ISpA (Former Governor of Chhattisgarh); Mr Jayant Patil, Chairman of ISpA; Lt Gen AK Bhatt, DG of ISpA, founding and other members of the association along with prominent industry leaders from across the Indian space ecosystem.

The initial list of members of NAC will include, Air Chief Marshal RKS Bhadauria (Retd.) (Former Chief of the Air Staff), Amb Arun K Singh (Distinguished Fellow VIF & Former Ambassador to US, France & Israel; Former Member NSAB), Dr. Shailesh Naik (Director of NIAS & Member IN-SPACe, & Former Secretary MOEFCC), Lt. Gen. VG Khandare (Retd.) (Senior Advisor, MoD & Former Military Advisor NSCS, Former DG DIA & DCICS(Int)), Prof. Kamakoti (Director OF IIT Madras), Dr. Siddharth Shekhar Singh (Associate Professor of Marketing at ISB), Maj. Gen. Siva Kumar (Retd.) (Director iNiF IIT Tirupati & Former Head of NRDMS DST & CEO NSDI; Former President Geospatial Solutions, IIC Technologies), Gp. Capt. Ajay Lele (Retd.) (Senior Fellow in the Manohar Parrikar Institute for Defence Studies and Analyses).

Additionally , Mr Amit Kumar Ghosh, IAS (Additional Secretary, MoRTH GoI) will be a special invitee to the

NAC. Lt Gen AK Bhatt (Retd.), Director General, ISpA and Wg. Cdr. Satyam Kushwaha (Retd.), Director, ISpA will support NAC as Convener and Secretary respectively.

Mr. Jayant Patil, Chairman, Indian Space Association said: "The collaboration with VIF and the inauguration of our first office here in Delhi, both are a steppingstone for our organization to move forward in a positive direction along with other industry stakeholders. With the creation of the National Advisory Committee, ISpA aims to bring in the expertise to provide strategic direction in the formation of policy, regulations and building ecosystem in public private partnership in Indian space Industry."

Dr Pawan Goenka, Chairman, IN-SPACe said: "The space sector here is at the cusp of a major revolution and our space offering needs to become more competitive along with strong expertise in what we offer to come at par with the global space economy. Given the size of the global space sector and how India is a very small player currently, ISROs ability to provide technology and infrastructure to the private sector and added interest from start-ups is a very major signal for the growth in time to come."

"Space is an intense and technologically complex area, every stakeholder has to work together with perseverance and the vision of a long-term and sustainable public-private partnership. I am confident that the way this sector is moving forward with support from the existing private industry large players and the new start-ups which are coming up along with the support from ISRO and government ensures that we will make strides in the space sector," he added.

# Customs tax evasion by Oppo India worth Rs 4,389 billion claims DRI

Instead of employing proprietary technology, "Oppo India had remitted provisions for payment of "royalty" and "licencing fee" to serve global corporations, including those based in China."


Oppo India was issued a Rs 4,389 crore show cause notice by the Directorate of Revenue Intelligence(DRI) on July 8 for supposedly evading customs duty by improperly claiming exemption privileges.

Searches by DRI during the investigation at Oppo India's office locations and the homes of key management personnel, resulted in the recovery of incriminating evidence indicating wilful misdeclaration in the description of some items imported by Oppo India for use in the manufacture of mobile phones, according to a PIB statement release.

"Oppo India improperly claimed duty exemption benefits totaling Rs 2,981 crore due to this misstatement," stated the release issued on Wednesday.

"In contravention of Section 14 of the Customs Act of 1962, the aforementioned "royalty" and "licencing fees" paid by Oppo India were not included in the transaction value of the commodities they imported. The mobile manufacturer evaded taxes on this account to the tune of Rs 1,408 crore," claimed the release.

Instead of employing proprietary technology, "Oppo India had remitted provisions for payment of "royalty" and "licencing fee" to serve global corporations, including those based in China," added the statement.

A voluntary deposit of Rs 450 crore has been made by Oppo India as partial differential customs duty short paid by them. Once the inquiry was complete, Oppo has been sent a show cause notice asking for the payment of customs duties of Rs 4,389 crore.

The aforementioned notice also suggests appropriate fines for Oppo China, Oppo India and its employees under the 1962 Customs Act.

The statement explained that, "senior management staff and domestic suppliers of Oppo India were among those questioned. In their voluntary statements, they admitted to submitting a false description to the customs authorities at the time of import."

Oppo India produces, assembles, wholesale trades, and distributes mobile phones and accessories all throughout the country. It is the Indian subservient of a Chinese company, handling numerous brands including Oppo, OnePlus and Realme.

# IBM expands Power10 server line, introduces mid-range and scale-out systems

The new servers join the popular Power10 E1080 server introduced in September 2021 to deliver a secured, resilient hybrid cloud experience.


IBM announced a significant expansion of its Power10 server line with the introduction of mid-range and scale-out systems to modernize, protect and automate business applications and IT operations. The new Power10 servers combine performance, scalability, and flexibility with new pay-as-you-go consumption offerings for clients looking to deploy new services quickly across multiple environments.

Digital transformation is driving organizations to modernize both their applications and IT infrastructures. IBM Power systems aim at the demanding and dynamic business environments, and these new systems are optimized to run essential workloads such as databases and core business applications, as well as maximize the efficiency of containerized applications. An ecosystem of solutions with Red Hat OpenShift also enables IBM to collaborate with clients, connecting critical workloads to new, cloud-native services designed to maximize the value of their existing infrastructure investments.

The new servers join the popular Power10 E1080 server introduced in September 2021 to deliver a secured, resilient hybrid cloud experience that can be managed with other x86 and multi-cloud management software across clients' IT infrastructure. This expansion of the IBM Power10 with the new mid-range and scale-out servers brings high-end server capabilities throughout the product line. The new systems support critical security features such as transparent memory encryption and advanced processor/system isolation, along with leveraging the OpenBMC project from the Linux Foundation for high levels of security for the new scale-out servers.

Highlights of the announcements include:

- **New systems:** The expanded IBM Power10 portfolio, built around the next-generation IBM Power10 processor with 2x more cores and more than 2x memory bandwidth than previous Power generations, now includes the Power10 Midrange E1050, delivering record-setting 4-socket compute1, Java2, and ERP3 performance capabilities. New scale-out servers include the entry-level Power S1014, as well as S1022, and S1024 options, bringing enterprise capabilities to SMBs and remote-office/branch office environments, such as Capacity Upgrade on Demand (CuOD).

- **Cloud on premises with new flexible consumption choices:** IBM has recently announced new flexible consumption offerings with pay-as-you-go options and by-the-minute metering for IBM Power Private Cloud, bringing more opportunities to help lower the cost of running OpenShift solutions on Power when compared against alternative platforms. These new consumption models build on options already available with IBM Power Virtual Server to enable greater flexibility in clients' hybrid journeys. Additionally, the highly

anticipated IBM i subscription delivers a comprehensive platform solution with the hardware, software and support/services included in the subscription service.

- **Business transformation with SAP:** IBM continues its innovations for SAP solutions. The new midrange E1050 delivers scale (up to 16 TB) and performance for a 4-socket system for clients who run BREAKTHROUGH with IBM for RISE with SAP. In addition, an expansion of the premium supplier option is now available to provide more flexibility and computing power with an additional choice to run workloads on IBM Power on Red Hat Enterprise Linux on IBM Cloud.

"Today's highly dynamic environment has created volatility, from materials to people and skills, all of which impact short-term operations and long-term sustainability of the business," said Steve Sibley, Vice President, IBM Power Product Management. "The right IT investments are critical to business and operational resilience. Our new Power10 models offer clients a variety of flexible hybrid cloud choices with the agility and automation to best fit their needs, without sacrificing performance, security or resilience."

The new systems with IBM Power Virtual Server also help clients operate a secured hybrid cloud experience that delivers high performance and architectural consistency across their IT infrastructure. The systems are designed so as to protect sensitive data from core to cloud, and enable virtual machines and containerized workloads to run simultaneously on the same systems. For critical business workloads that have traditionally needed to reside on-premises, they can now be moved into the cloud as workloads and needs demand. This flexibility can help clients mitigate risk and time associated with rewriting applications for a different platform.

"As organizations around the world continue to adapt to unpredictable changes in consumer behaviors and needs, they need a platform that can deliver their applications and insights securely where and when they need them," said Peter Rutten, IDC Worldwide Infrastructure Research Vice President. "IBM Power continues its laser focus on helping clients respond faster to dynamically changing environments and business demands, while protecting information security and distilling new insights from data, all with high reliability and availability."

# India, Japan discuss enhancing cybersecurity

The two parties discussed the crucial areas of their bilateral cyber cooperation and went over the developments in cybersecurity and Information and Communication Technologies (ICTs), including 5G, to date.

The fourth India-Japan Cyber Dialogue took place on Thursday, during which the two countries addressed cybersecurity cooperation. The two parties discussed the crucial areas of their bilateral cyber cooperation and went over the developments in cybersecurity and Information and Communication Technologies (ICTs), including 5G, to date.

Muanpuii Saiawi, Joint Secretary, Cyber Diplomacy Division of Ministry of External Affairs(MEA), led the Indian delegation, and Yukata Arima, Ambassador in charge of Cyber Policy, Ministry of Foreign Affairs(MoFA), led the Japanese delegation.

Senior representatives from the MEA, the Ministry of Home Affairs, the Ministry of Defense, the National Security Council Secretariat, the Ministry of Electronics and Information Technology , the Department of Telecommunication, the Indian Computer Emergency Response Team, and the National Critical Information Infrastructure Protection Centre made up the Indian delegation.

Senior representatives from the MoFA, Ministry of Internal Affairs and Communication, Ministry of Defense, National Centre of Incident Readiness and Strategy for Cybersecurity (NISC), Ministry of Economy, Trade and Industry, and Ministry of Foreign Affairs were part of the Japenese delegation. The next India-Japan Cyber Dialogue will take place in 2023, as agreed by both parties.

*(With IANS inputs)*

# C-DoT signs partnership with Galore Networks to develop indigenous 5G RAN products and solutions

Mobile towers are installed either by Telecom Service Providers (TSP) or Infrastructure Providers (IPs). People are requested to verify authenticity by visiting the websites of TSPs or IPs before accepting any offers for tower installation.

Zoom Video Communications (NASDAQ: ZM) today unveiled the latest evolution of its communications platform with the introduction of Zoom One, a new offering that brings together persistent chat, phone, meetings, whiteboard, and more into secure and scalable packages. Additionally, Zoom also launched an all new translated and multi-language captions feature.

Greg Tomb, President, Zoom said, "Simplicity is at the core of everything we do. As the Zoom platform has evolved from a meeting app to a comprehensive communications platform, it was clear that introducing new packaging like Zoom One was the next step in the company's evolution, by bringing together chat, phone, meetings, whiteboard, and more in a single offering, we are able to offer our customers solutions that are simple to manage, so they can focus on business issues that matter most."

"Businesses continue to realize the time and cost saving a single provider can offer. According to Omdia's latest end user survey, 40% of organizations are prioritizing investments around eliminating multiple cloud-based UC solutions that may be deployed within their organizations," stated Brent Kelly, Principal Analyst, Omdia Research. "The need to simplify business operations is a market trend that we see as being increasingly important, and Zoom One's tiered bundles and common management console aligns well to this customer demand." he added.

Purpose-built to work together, Zoom One's intuitive experience offers customers the choice between six tiered offerings according to their business needs.

- Zoom One Basic provides free 40-minute Zoom Meetings for up to 100 attendees, persistent Zoom Chat for team messaging, limited Zoom Whiteboard for synchronous and asynchronous work, and real-time transcription.

- Zoom One Pro provides everything Zoom One Basic offers without Meeting time limits, plus cloud recording.
- Zoom One Business provides everything Zoom One Pro offers, plus Zoom Meetings for up to 300 attendees and unlimited Zoom Whiteboards.
- Zoom One Business Plus provides everything Zoom One Business offers, plus Zoom Phone Pro with unlimited regional calling and Zoom's all-new translation feature.
- Zoom One Enterprise and Zoom One Enterprise Plus are similar to Zoom One Business, with larger meeting capacity and additional features, like Zoom Webinars, to help modern businesses scale. Unlimited Regional Calling is an optional add-on feature for Zoom One Enterprise and Enterprise Plus.

Zoom One Basic, Pro, Business and Business Plus plans are available for purchase online today. To purchase Zoom One Enterprise or Enterprise Plus, customers can speak to an account executive directly.

Rob Kerr, chief information officer at Cooley, a global law firm said: "If you provide a complete suite of reliable and easy-to-use communication tools that people can use to do their jobs, they are less likely to be using one-off solutions outside of our offerings which in turn simplifies our support and delivery model. Zoom's secure

portfolio of unified video, chat, whiteboard, and telephony solutions aligns our global teams and allows Cooley to better serve its clients."

### Translated & multi-language captions

Launching first in Zoom One Business Plus and Zoom One Enterprise Plus packages, Zoom's translated captions will allow users to view captions translated into the language of their choice. At launch, translations will be available between English and 10 additional languages, or from any of the 10 languages to English. The ability to translate directly to and from English is known as bi-directional translation. Translated captions display at the base of the screen while in a Zoom Meeting.

The bi-directional translations are available in the following languages: Chinese (Simplified), Dutch, English, French, German, Italian, Japanese, Korean, Russian, Spanish, and Ukrainian.

To access the translated captions feature, Zoom One customers must upgrade to either the Zoom One Business Plus or Zoom One Enterprise Plus packages (in applicable countries).

Zoom also extended its automated captioning – the ability to caption in real-time what a speaker is saying in the same language as the one spoken – to include 10 additional languages. Automated captions previously were supported in English, but now can be displayed in the additional 10 languages referenced above. Multi-language automated captions are available in Business Plus, Enterprise, and Enterprise Plus packages with additional support for other plans coming soon.

# Telecom Industry Alerts Public Against Mobile Tower Installation Fraud

Mobile towers are installed either by Telecom Service Providers (TSP) or Infrastructure Providers (IPs). People are requested to verify authenticity by visiting the websites of TSPs or IPs before accepting any offers for tower installation.

The telecom industry, represented by DIPA and COAI, the apex representative bodies of telecom infrastructure providers and telecom service providers respectively, have cautioned the public against the fraud related to the installation of mobile towers on their properties.

The public is cautioned against certain companies, agencies, or individuals who are fraudulently approaching people and asking them to deposit money in their personal or company accounts in the name of government tax for leasing their premises for installation of mobile towers. The same individuals are additionally offering fake "No Objection Certificates" from the Ministry of Telecommunications and Information Technology for the installation of towers. Mobile towers are installed either by Telecom Service Providers (TSP) or Infrastructure Providers (IPs). People are requested to verify authenticity by visiting the websites of TSPs or IPs before accepting any offers for tower installation.

Mr. T R Dua, DG, DIPA, said, "The mobile towers are installed by the Telecom Infrastructure providers like Indus Towers, American Tower Corporation, Summit Digital Infrastructure, Ascend Telecom, Tower Vision. IPs are taking several steps to caution the public about the frauds and have devised various modes to collect the information about potential locations through various channels such as toll-free number, website, e-mail etc. Besides this, as a responsible association, DIPA has also been publishing public notice in newspapers for alerting public about the tower frauds."

"Mobile towers are quintessential to ensure uninterrupted connectivity, support various critical services and maintain communication across the states. The public suffers gravely owing to the fraud related to mobile towers. This is causing a trust deficit and a sense of insecurity towards the team personnel working on the ground to build robust communication network. The telecom industry remains committed to providing the best quality of services to its customers. Hence, we have collaborated with DIPA to build the required robust infrastructure. Also, we are issuing notices on various platforms to ensure that consumers are aware of these fraudulent practices." said Lt Gen SP Kochhar, Director-General, COAI.

# Google's purchase of 1.28% stake in Bharti Airtel approved by CCI

This investment by Google comes following a 4.5 billion dollars investment in Jio Platforms Ltd. the digital division of Reliance Industries Ltd, in July 2020. Both the investments are made through 'Google for India' Digitization fund

The Competition Commission of India (CCI), India's antitrust watchdog, on Thursday authorized Google's purchase of 1.28 percent interest in telecom company Bharti Airtel (Airtel). According to the agreement signed between two companies, Google will buy a 1.28% stake in Bharti Airtel for 700 million dollars and invest 300 million dollars over the next five years in commercial arrangements in the areas of affordable mobile devices, 5G network and cloud technologies. Google LLC intends to purchase a non-controlling minority position in the Indian telecom operator, stated the press statement from CCI.

"The acquirer(Google) and target(Airtel) have executed an Investment Agreement (IA) per which the acquirer proposes to acquire a minority and non-controlling stake of 1.28% of equity share capital in the target. Along with the IA, the acquirer and the target through their affiliates have also entered into certain commercial deals. The parties also intend to enter into certain other commercial arrangements in future. The Commission approved the proposed combination on the basis of modifications offered by the acquirer." stated the press statement from CCI.

Google had stated earlier this year that it would invest 700 million dollars to purchase a 1.28 percent stake in Airtel at a cost of Rs 734 per share and up to 300 million dollars towards potential multi-year commercial agreements. Airtel's shares on Thursday shrunk 3.60% percent on BSE to finish at Rs 683.90 per share.

The partnership aims prioritize making smartphones widely accessible at reasonable prices, and it will keep exploring ways to build on its current partnerships to potentially co-create network domain use cases for 5G and other standards that are specific to India and speed up the cloud ecosystem for companies all over the country.

The most recent action by Google comes following a 4.5 billion dollars investment in Jio Platforms Ltd. the digital division of Reliance Industries Ltd, in July 2020. Both the investments are made through 'Google for India' Digitization fund.

Google will also spend an additional 300 million dollars through various other business deals in industries including the production of inexpensive smart phones and investing in cloud adoption. Google hopes that by making this investment, India's digital infrastructure will advance, creating demand for Google's goods and services, including cloud computing, mobile technology, apps and online advertising.

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