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[CONTENTS]

24 COVER STORY

5G: A MOONSHOT FOR INDIA

As India is paving its way for next-generation 5G connectivity, here is a peek at the milestones it has crossed and the challenges that remain

[CONTENTS]

INDUSTRY SPEAK

08 The transformation game

11 The making of a tri-trillionaire

GUEST COLUMN

32 Accelerating 5G success in India

35 5G propels Digital India's watershed moment

ANALYSIS

38 Catalysing India's 6G game

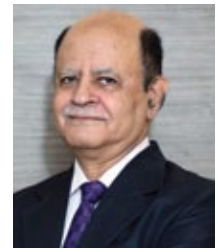
42 TSPs path to the data protection

TECHNOLOGY

60 Managing cloud migration challenges

64 Driving datacentres' sustainability goals

TELECOM TALK



14 Industry 4.0 and the connected society

Lt Gen Dr S P Kochhar

BROADBAND BYTES

44 A case for the non-competing CUG

TV Ramachandran

COMMENTARY

48 Enabling business India's IoT goals

INTERVIEW

52 "We are helping accelerate digital education in India"

Ganesh Lakshminarayanan

CASE STUDY

55 Unlocking the network matrix

TRENDS

66 Building a transparent digital marketing ecosystem

REGULARS **07** Opening Note **18** World News **70** News Bytes

[NEXT ISSUE]

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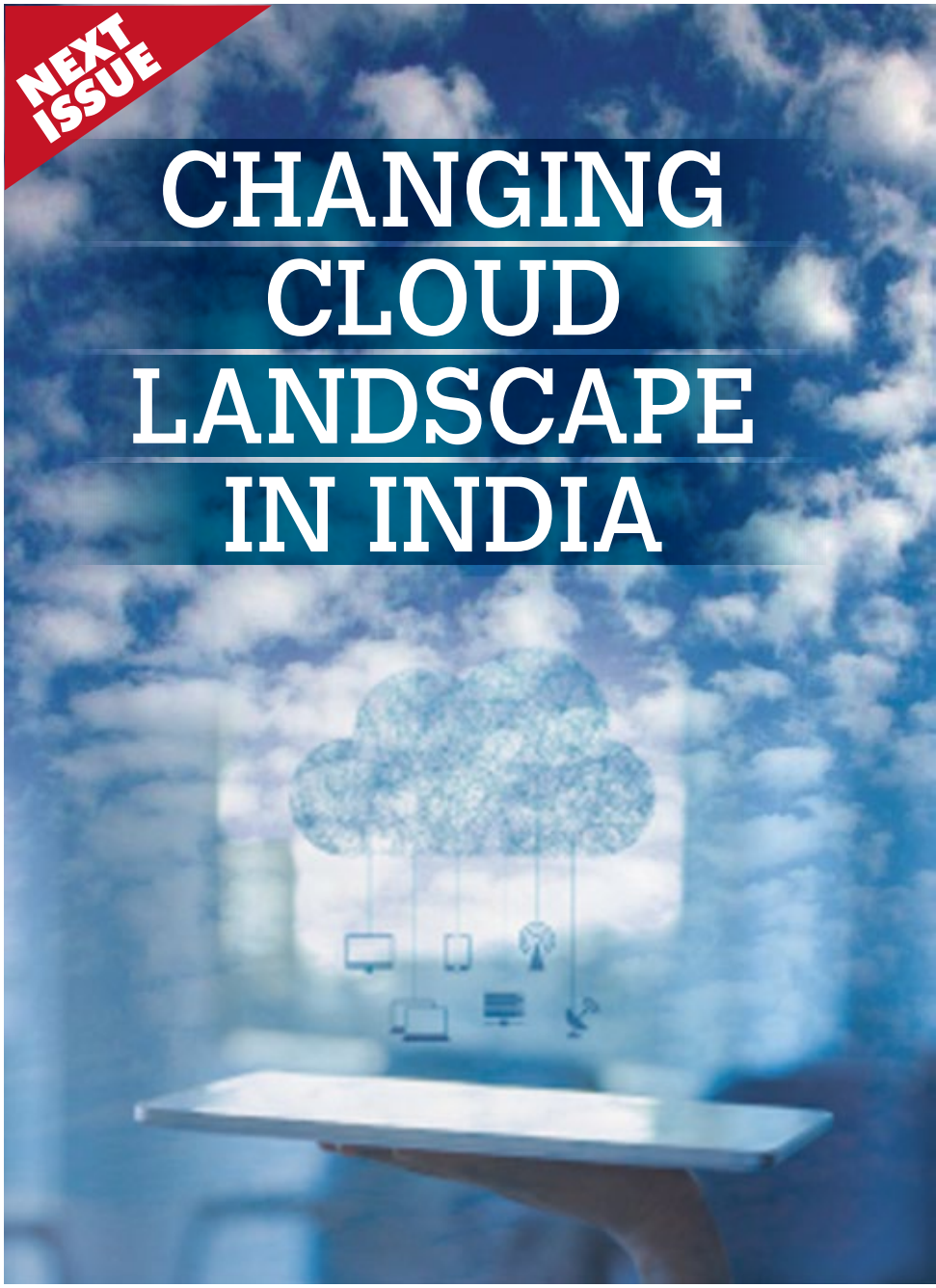

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SHUBHENDU
PARTH

[OPENING NOTE]

Think sustainability before you leap

India is leading the digital revolution, both from the user perspective and infrastructure deployment. The June 2023 Ericsson Mobility report, indicates that since the launch of 5G services in October last, the country has been witnessing a rapid increase in 5G network deployment. By the end of 2022, 5G subscriptions in India had swelled to just about 10 million.

Moving further ahead, India recently set up the Bharat 6G Alliance (B6GA) aimed at driving the development of 6G standards in the world. The B6GA has been given an ambitious target of enabling 6G as a powerful force multiplier for India by 2030.

Now here comes the trickier part... it would be critical to evaluate how geared the telecom sector, the enterprise users and policymakers are to minimise the environmental impact and prioritise the long-term sustainability of their operations.

Like elsewhere in the world, the rapid growth of the digital ecosystem in India has raised concerns about its environmental impact. Digital technologies consume significant energy for network infrastructure, datacentres, and powering millions of devices. By focusing on sustainability, service providers can reduce their carbon footprint, optimise energy consumption, and shift towards renewable energy sources. This will not only mitigate environmental harm but also lead to cost savings and increased operational efficiency.

The transition to 5G and 6G will also result in a surge of e-waste due to the accelerated adoption of new devices and network equipment. The industry must establish effective e-waste management systems, ensuring responsible disposal and recycling practices. Partnering with recycling agencies, implementing take-back programs, and raising awareness among consumers will be key steps towards managing e-waste sustainably.

As telcos expand their network infrastructure to accommodate the demands of 5G, it becomes essential that they embrace green infrastructure practices. Utilising energy-efficient technologies, optimising cooling systems, and designing eco-friendly base stations can significantly reduce energy consumption and minimise the environmental impact of telecom networks. Collaborations with technology providers and government support can further accelerate the adoption of sustainable infrastructure practices.

Telcos have a unique opportunity to engage with local communities and leverage their expertise to address social and environmental challenges. Initiatives such as promoting digital literacy, supporting educational programmes, and bridging the digital divide can contribute to a more inclusive and sustainable digital ecosystem. By actively engaging with stakeholders, telcos can build trust and foster positive relationships while driving sustainable development.

The sustainability efforts of telcos should also extend to their supply chains. Ensuring ethical sourcing of raw materials, promoting responsible manufacturing processes, and monitoring the social and environmental practices of suppliers are crucial steps toward building a sustainable and socially responsible digital backbone. By incorporating sustainability criteria into procurement policies, telcos can encourage suppliers to adopt sustainable practices and contribute to a greener future.

While the country is still rolling out 5G and working to lead the 6G ecosystem, the partners in growth – industry, academia, and policymakers – must amalgamate SDGs at every step to lay a strong foundation for a hyperconnected but greener economy.

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The transformation game

The transition to tech-cos requires a mindset shift for telcos – not just in terms of service offering, but also in how they get there

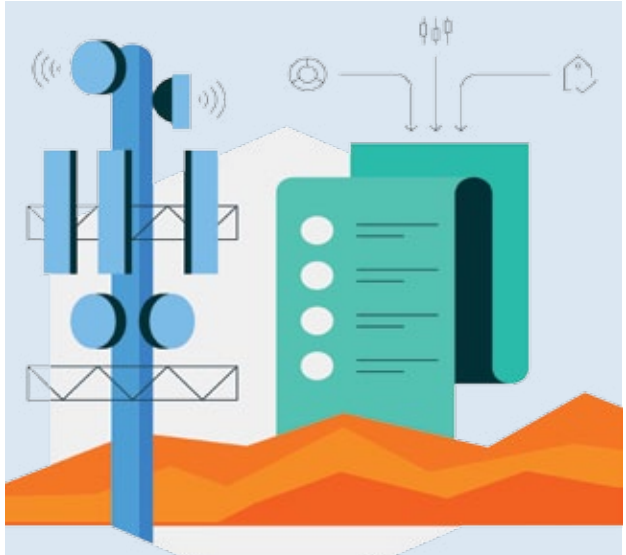
BY YILUN MIAO

With everything that has been said and promised about 5G over the years, it is easy to forget that the global rollout of the technology only began a matter of months before the pandemic. Despite all the challenges of the past few years, 5G is being adopted at a faster rate than 4G was at a similar stage of its lifecycle. And with its increased adoption, some of those 5G promises are starting to come to fruition.

For telcos, this cannot happen quickly enough. The traditional connectivity services market is brutally competitive. In India, for example, there are 84 mobile subscribers per 100 people. This level of saturation leads to price wars and high customer churn, which is a recipe for high acquisition costs, tight margins and low average revenue per user (ARPU).

The real drawcard of 5G for telcos is that it allows telcos to diversify. Accordingly, they will need to

Telcos can build bundles of tech services such as 5G connectivity, data, cloud services, cyber security and professional set-up services, using the XaaS model.



TRANSFORMATION STRATEGY

- Telcos need to diversify and improve connectivity to serve B2B customers with additional services and solutions, leveraging 5G technology.
- Bundles of B2B solutions represent a revenue lifeline for telcos, with the APAC market for public cloud services and SaaS expected to grow significantly.
- Telcos face three challenges: bolstering tech capability, establishing new commercial arrangements, and mastering the sales cycle for B2B services.
- The transition to tech-cos requires a mindset shift and strategic partnerships with cloud marketplaces to overcome challenges and create a business services marketplace.
- Successful implementation allows telcos to achieve growth, expand their services, and collaborate with third parties, offering a self-service approach to customers.

improve internet connectivity and reliability to serve B2B customers closer to the edge of the network with additional services and solutions. For example, they can build bundles of tech services such as 5G connectivity, data, cloud services, cyber security and professional set-up services, using an everything as a service (XaaS) model.

These bundles of B2B solutions represent a revenue lifeline for telcos. APAC's public cloud services market is set to exceed USD 153 billion by 2026, with a faster compound annual growth rate (CAGR) than in the US. Similarly, the software as service (SaaS) market is expected to exceed USD 58 billion by 2026, accounting for 40% of the APAC cloud services market.

So now the race is on in the telecom industry. But there are three challenges they must overcome first.

#1
BOLSTERING TECH CAPABILITY

Telcos have a lot of infrastructure, expertise and a bank of existing customers. This certainly works in their favour. But building a suite of new B2B services to resell and create a XaaS play requires integrating a multitude of vendors and systems. The integration process can become incredibly complex and time-consuming.

Integrating one vendor into a telco's back-office business support and operational support systems can take up to six months. TM Forum recommends that telcos will need to multiply these 20 to 30 times to achieve the critical mass of vendors required to make a compelling XaaS proposition.

2
ESTABLISHING NEW COMMERCIAL ARRANGEMENTS

To successfully integrate a wide range of vendors' technologies, telecommunication companies not only need technical expertise but also have to navigate complex contractual obligations when collaborating with third parties. Establishing mutually beneficial agreements is crucial in this process.

Overall, it can typically take telcos around six to nine months to finalise a contract with a vendor for reselling their services. Therefore, the ability to expedite this process and achieve speed to market is paramount for telcos aiming to transform into technology companies (tech-cos). Telcos that can effectively adapt to new commercial elements will be in the best position to thrive in this evolving landscape.

3

MASTERING THE SALES CYCLE

Telcos have well-established sales teams that excel at selling traditional connectivity services from SIM cards to broadband services. But selling B2B services is an entirely different ball game. It requires new skills, technical knowledge and a different outlook. Telcos cannot overlook this factor.

Going ahead, telecom service providers will need to adopt new processes, upskill sales teams and incentivise the right behaviours to complete the transition to a tech-co. Failing to do so can result in significant time and resources invested in a new service that remains idle or fails to generate a return on investment due to the sales teams' lack of tools and expertise required for successful selling.

THE PATHWAY TO SUCCESS

The transition to tech-cos requires a mindset shift for telcos. Not just in terms of service offering, but also in how they get there. Traditionally, telcos in the region have been able to hire en-masse to build systems and infrastructure from the ground up. There are two reasons this approach will not work this time around.

First, the tech skills shortage globally will make finding the number of people required to build these services in-house neither possible nor affordable. Second, they are starting from too far behind the global leaders to develop their market-competitive versions of all these business services.

Turning the B2B services dream into a reality requires telcos to form strategic partnerships with cloud marketplaces that have pre-integrated ecosystems, contractual solutions, and expertise in people and processes. These partnerships will help telcos overcome the three key challenges preventing them from successfully transitioning to tech-cos. Not only that, it allows them to create their own business services marketplace, offering a self-service approach, where customers can simply pick and choose the services, they require to create their service bundle.

If they do this successfully, telcos can create a virtuous circle of growth, growing their services and offering more third-party collaboration as they sell, cross-sell and up-sell B2B service solutions.

The author is the Managing Director of the Asia Pacific region at CloudBlue.
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The making of a tri-trillionaire

Apple's market capitalisation reached an impressive USD 3 trillion, surpassing other tech giants and even the combined value of top American companies

BY JAIDEEP GHOSH

It took 42 years for the first trillion. Apple accomplished an astonishing feat in August 2018 when its market capitalisation reached USD 1 trillion.

Surging past USD 2 trillion precisely two years later in 2020, Apple continued its impressive growth. The USD 3 trillion landmark came in January 2022, a remarkable achievement within just 16 months. Unfortunately, the company couldn't sustain that value. Nevertheless, on 30 June 2023, Apple closed at an astounding USD 3 trillion.

HOW LARGE IS USD 3 TRILLION?

To appreciate the magnitude of USD 3 trillion into perspective, it is comparable to the market value of all the stocks listed on the National Stock Exchange of India.

In the highly exclusive trillion-dollar club, which currently consists of only six members, Apple stands tallest alongside tech giants such as Microsoft, Alphabet, Amazon, and Nvidia. The sixth member of this elite group is the energy titan, Aramco. At a value of USD 3 trillion, Apple surpasses the next-largest company, Microsoft, by nearly USD 500 billion and is nearly twice as valuable as Alphabet.

Apple's worth is nearly equivalent to the combined value of Tesla, Meta, Berkshire Hathaway, UnitedHealth, and Visa, which are ranked as the sixth through tenth most valuable American companies. It is roughly 25 times greater than General Electric, 20 times larger than Intel, and approximately 14 times more than Reliance Industries. Further, Apple's worth exceeds that of all the world's cryptocurrencies combined.

WHAT FACTORS HAVE CONTRIBUTED TO APPLE'S SUCCESS?

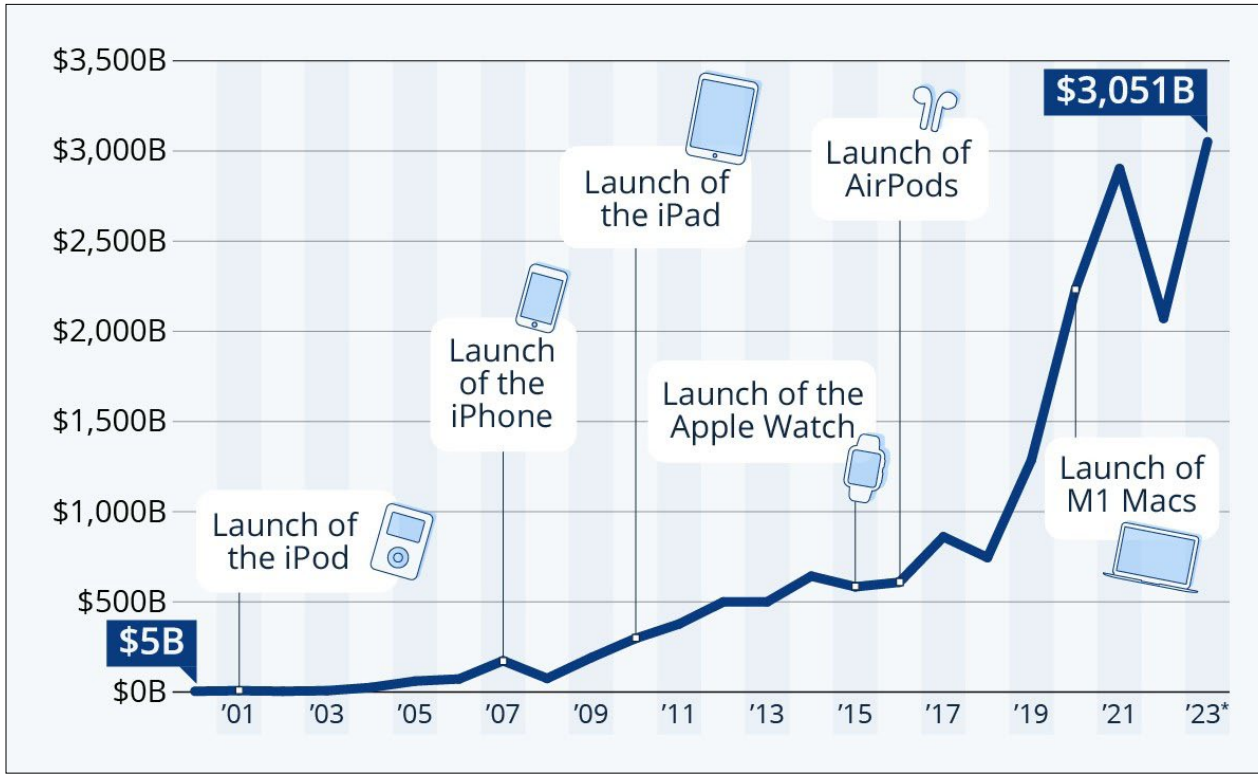
While it is challenging to pinpoint the exact reasons behind Apple's continuous triumph, there are several indicative factors related to its superior market and financial performance.

Apple has followed a consistent strategy based on the core principles of its mission, which aims to provide the best user experience to customers through innovative hardware, software, and services. This approach has propelled Apple as the top-ranked global brand.

Some key elements of Apple's strategy include its priority on consumer experience over business needs

> In 2023, Apple's shares have surged nearly 50%, outperforming the growth of the Nasdaq Index, which has grown by approximately 30%.

Apple's Road to USD 3-trillion market cap



* As on 30 June 2023 at the closing of the market.

Source: Wolfram | Alpha Knowledgebase, Yahoo Finance; visualised by Statista.

Apple's market capitalisation at the end of each year from 2001 to 2023; from a struggling USD 5-billion company in 2000 to becoming a world-beating powerhouse in 23 years.

and emphasis on design over product engineering. The company also made substantial investments in research and product innovation; approximately USD 98 billion between 2018 and 2022. All this, while maintaining its financial strength, e.g., cash reserves exceeding USD 50 billion that enable instant investments, acquisitions, and share buybacks to reward investors.

It has also been focusing on efficiently managing complex operations and supply chains across multiple continents and leveraging on ancillary businesses such as services, content, and financial services to generate additional sales and maintain customer loyalty within the ecosystem. For instance, products like Apple Wallet, savings accounts, and credit cards complement the iPhone and contribute to the overall revenue.

The company has also been working on delivering a consistent and superior in-store experience at its iconic branded stores, as exemplified by the excitement surrounding the recent opening of Apple-owned stores in India. Besides, it has been adopting a contrasting approach to workforce management compared to other major tech companies. While many others in the trillion-dollar tech club have implemented layoffs in recent months, Apple has only slowed down its hiring pace.

Apple has made substantial investments in research and product innovation, approximately USD 98 billion between 2018 and 2022.

APPLETASTIC TRIUMPH

- Apple's success can be attributed to its focus on user experience, innovative products, and design, along with substantial investments in research and product innovation.
- The company efficiently manages operations and supply chains globally, leveraging ancillary businesses like services and financial services to boost revenue.
- Apple has effectively mitigated geopolitical risks, shifting manufacturing to India and Vietnam and achieving exceptional performance in India's mobile phone export market.
- Despite a forecasted drop in revenues, Apple's valuation is expected to rise by another 25% over the next 12 months, potentially approaching USD 4 trillion.

MITIGATING GLOBAL RISKS

Apple has demonstrated its ability to manage geopolitical risks effectively. Unlike some Western tech companies, the company has been less affected by geopolitical tensions in China and has faced largely encountered operational constraints due to strict COVID control policies and workplace-related issues.

To mitigate various challenges, Apple has started to shift its manufacturing from China to India and Vietnam. Supported by a buoyant domestic market and production-linked incentives, Apple has achieved exceptional performance in India, with monthly iPhone exports surpassing USD 1 billion. Apple alone accounts for half of India's mobile phone exports.

Apple's growth has been extraordinary with its existing product and services portfolio. With the recent launch of the Vision Pro Mixed Reality headsets, Apple is venturing into a new market with numerous competitors, notably Meta Platforms. While the Vision Pro is unlikely to yield significant revenue in the near term, Apple's entry will mark the start of mainstream adoption in this emerging market. Apple also plans to tap into the mobile advertising market, further adding to its value.

HOW HIGH CAN APPLE'S VALUATION SOAR?

Despite Apple's recent forecast of a drop in revenues for the current quarter, a combination of its existing business and the anticipation of 'what comes next' (including the iPhone15) is likely to drive a higher valuation.

Since the beginning of 2023, Apple's shares have surged nearly 50%, outperforming the growth of the Nasdaq Index, which has grown by approximately 30%. Even after this meteoric rise, research analysts predict that Apple can achieve another 25% increase over the next 12 months.

If this projection materialises, Apple's market value would approach USD 4 trillion.

The author is a former Partner at KPMG in India.
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LT GEN DR S P KOCHHAR

INDUSTRY 4.0 AND THE CONNECTED SOCIETY

Despite India's notable advancements in IT and communications technologies, it still needs to overcome the challenges of a fully connected world

The fourth industrial revolution, widely known as Industry 4.0, is transforming societies around the world. It promises a future where digital, physical and biological systems interconnect and interact in unprecedented ways, leading to transformative changes in how we live, work and interact. Let us examine the concept of Industry 4.0 and its implications for the connected society, focusing on the case of Japan and understanding the implications for India.

THE CASE OF JAPAN: SOCIETY 5.0

In Japan, the concept of the connected society is shaping the lives of its citizens and the direction of its economy. It is characterised by the widespread use of information technology to create networks of connectivity between individuals, communities, institutions, and things.

Being an influential player in the realm of technological advancements, Japan is proactively steering towards the realisation of Society 5.0. This initiative is aimed at

> A connected society is characterised by the widespread use of IT to create networks of connectivity between individuals, communities, institutions, and things.

transcending the boundaries of Industry 4.0 by integrating cyber and physical systems to create a human-centric society that balances economic advancement with the resolution of social problems.

Society 5.0 is the fifth stage in the evolution of societal structures. The concept builds on the preceding stages, namely: hunting societies (Society 1.0), agricultural societies (Society 2.0), industrial societies (Society 3.0), and information societies (Society 4.0). Society 5.0 represents a shift from a society of mass consumption to one that is oriented towards personalised services, addressing diverse consumer needs, and solving pressing societal challenges.

In the context of Society 5.0, technology is not merely a tool but an integrated part of society, enhancing human capabilities and fostering well-being. Society 5.0 leverages technologies like Artificial Intelligence (AI), the Internet of Things (IoT), robotics and big data to create systems that can respond in real-time to complex and rapidly changing social conditions. The key lies in the advanced integration of cyberspace or virtual space and physical space or real space.

Japan's pursuit of Society 5.0 aims to address various challenges including an ageing society, productivity improvement, disaster response and energy conservation. It envisions a society where innovative technologies can be harnessed to provide solutions to these pressing issues, resulting in an improved quality of life for all.

The government of Japan has played a key role in fostering this connected society. It has implemented policies that encourage the development and adoption of new technologies, and it has invested heavily in infrastructure to support connectivity.

This connected society is transforming various aspects of life in Japan. In the realm of work, it has enabled flexible and remote work arrangements, reducing commuting times and improving work-life balance. In healthcare, telemedicine and digital health records have improved access to care and patient outcomes. And in the realm of social interactions, social media and other digital platforms have created new ways for individuals to connect and interact.

THE STATE OF INDIA'S INDUSTRY

Moving to the Indian context, the country's industrial sector is currently at a crucial juncture. While India has made significant strides in recent years, with rapid growth in sectors like information technology and telecommunications, there are still many challenges to overcome.

India's industrial sector is diverse, with key areas including manufacturing, mining, construction and electricity. While the service sector has been the primary driver of India's economic growth, the industrial sector also plays a vital role. However, this sector is characterised by a high degree of informality, with many businesses operating on a small scale and with limited access to technology.

India's industrial sector is also facing numerous challenges. These include a lack of skilled workers, inadequate infrastructure and a complex regulatory environment. Moreover, the sector is grappling with the impacts of climate change, with a growing need to transition to more sustainable practices.

While these challenges are substantial, they also present opportunities. The need for improved infrastructure, for example, can drive investment in sectors like construction and manufacturing. And the transition to sustainable practices can spur innovation and create new industries.

INDUSTRY 4.0: THE NEW PARADIGM

Before we delve into the potential of Industry 4.0 for India, let us clarify what Industry 4.0 is and how it differs from the third industrial revolution, or Industry 3.0.

Industry 4.0 represents the fourth major upheaval in industrial practices since the first Industrial Revolution

> Driven by the rise of data, connectivity, analytics, and man-machine interaction, Industry 4.0 is the next phase in digitisation in manufacturing.

in the 18th century. While Industry 3.0 was marked by the introduction of computers and automation, Industry 4.0 takes this a step further by introducing smart and autonomous systems powered by data and machine learning.

The key defining feature of Industry 4.0 is the creation of "smart factories". These factories utilise cyber-physical systems, the IoT, cloud computing, cognitive computing, and AI to create an environment where systems can monitor physical processes, make decentralised decisions, and perform tasks with minimal human intervention.

Industry 4.0 or 4IR, is the next phase in digitisation within the manufacturing sector. It is driven by disruptive trends including the rise of data and connectivity, analytics, human-machine interaction and improvements in robotics. Overall, four fundamental categories of disruptive technologies form the foundation of Industry 4.0.

Connectivity, data, and computational power: This includes the significant influence of cloud technology, the IoT, blockchain, and sensor technology.

Analytics and intelligence: Advanced analytics, machine learning and artificial intelligence play a crucial role in Industry 4.0.

Human-machine interaction: The interaction between humans and machines has evolved significantly over the years and it now covers virtual reality (VR) and augmented reality (AR) technologies, robotics and automation, and autonomous guided vehicles.

Advanced engineering: This includes additive manufacturing such as 3-D printing, renewable energy, and nanoparticles.

However, technology alone is not sufficient. To thrive in the Fourth Industrial Revolution, companies must ensure their workers are adequately equipped through upskilling and reskilling. Upskilling involves employees learning new skills to help them adapt to their evolving roles. Reskilling, on the other hand, involves retraining workers with new skills that enable them to fill different positions within their companies.

4IR has the potential to make products and services more easily accessible and transmissible for businesses, consumers and stakeholders all along the value chain. Preliminary data indicate that successfully scaling 4IR technology makes supply chains more efficient, working hours more productive, reduces factory waste and has countless other benefits for employees, stakeholders and consumers.

THE OPPORTUNITIES IN INDIA

The potential for Industry 4.0 in India is vast. The adoption of new technologies could help address many of the challenges facing India's industrial sector, from improving efficiency and productivity to promoting sustainable practices. The implementation of Industry 4.0 technologies could also help to formalise India's industrial sector, bringing more businesses into the formal economy and providing better conditions for workers.

India's tech sector is already making strides in areas like AI, machine learning and IoT, all of which are critical components of Industry 4.0. The country's thriving startup scene is driving innovation in these areas, and the government is increasingly recognising the importance of supporting technological development.

The country has also made progress in building the necessary infrastructure for Industry 4.0. The government's Digital India initiative, for instance, is working to expand internet access across the country, laying the groundwork for widespread digital connectivity.

Despite these promising developments, there are significant challenges to overcome. The adoption of new technologies requires significant investment and

> The implementation of Industry 4.0 technologies can help in the formalisation of India's industrial sector, attracting more businesses into the formal economy.

a skilled workforce, both of which are areas where India faces hurdles. The country will need to invest heavily in education and training to ensure its workforce is equipped for the jobs of the future.

It can be inferred that, during the last few decades of the 20th century, India saw the advent of Industry 3.0, characterised by the emergence of computer systems and automation. However, due to readily available labour and access to limited software, many Indian manufacturers were still caught in Industry 2.5, with their paper-based processes and heavy human dependency. The country, however, is ready to catapult directly into Industry 4.0, where machines will be equipped with the ability to communicate.

Industry 4.0 will transform existing technologies and capabilities in the manufacturing and production industry. It will amalgamate traditional manufacturing practices and sophisticated technology, provide real-time visibility of the complete value chain, and lead to greater efficiency and productivity.

These digital technologies enable the democratisation of data and allow insights at a broader level. The vision of Industry 4.0 will not only make machines integrated but will also establish a connection that will go beyond the manufacturing plant walls, offering complete visibility of the manufacturing process, even during the transit of the shipment.

A PWC India study published in 2016 indicated that more than 80% of the manufacturing industry is expecting a greater than 10% improvement in efficiency, while over 60% of the surveyed respondents expect a 10% improvement in additional revenue. Industry 4.0 will also yield the benefit of a faster learning cycle and give an edge to Indian companies that are competing with legacy producers in Europe and the Americas, which have had a head start.

However, it is also important to acknowledge the challenges. For instance, data has become a new currency for many companies, but inaccurate or disorganised data holds no value. To unlock value from their assets, manufacturers will need to integrate their IT and OT and make data easily accessible but secure. They should be able to run AI models that can predict or correlate, ultimately augmenting human decision-making. While companies remain reluctant to invest in new technologies, this revolution cannot be overlooked.

There is a need to upskill talent within factories rather than replace them. The most important action is to invest in capability building and cultural change. Upskilling in the areas of analytics and digital technologies will prepare the workforce for the changing environment and also make them ready for future learning, thus keeping them relevant.

It is also essential to leverage these emerging technologies into the entire enterprise value chain and their external diffusion into inter-organisational supply-chain networks. This would be an effective use of AI and machine learning from real-time data acquired from across the value chain, thus providing intelligent insights that would prompt smarter decisions.

All of this is not possible without a robust ecosystem of partners, such as start-ups and tech providers, who would develop easy-to-access and affordable technology to enable this revolution. Academia can conduct research and development to further foster the advancement in technology. The Industry 4.0 revolution is already underway. By 2023, the competitive advantage of businesses in all industries will be driven primarily by innovations developed in AI. The fourth industrial revolution will allow for new ways to design organisations to operate, and it will also transform the way we work. The time is ripe to shape it productively for a connected society in India.

The author is the Director General of the Cellular Operators Association of India (COAI).

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Ericsson, Swisscom deploy Radio Dot System for high-capacity 5G

> The solution allows Swisscom to serve more venues with high-capacity indoor 5G faster with up to 80% less equipment.

European communications service providers Swisscom and Ericsson have deployed a new feature that allows them to deliver high-capacity indoor 5G to enterprise customers within a 10 km radius, from one centralised location. The new feature complements Ericsson's indoor 5G solution, utilises fibre and hybrid fibre cables to provide power and data to active indoor antennas (Radio Dots) from the Indoor Radio Unit (IRU), extending cable reach from 300 m to an impressive 10 km.

The extended cable reach offered by fibre-based rollouts allows for more flexible deployment options, including remote IRU placement in challenging or costly locations. This enhances solution scalability across various venues and deployment use cases, enabling Swisscom to provide high-capacity indoor 5G to more venues faster, with up to 80% less equipment required on-premises and reduced service effort, resulting in a lower total cost of ownership.

Mark Düsener, Head of Mobile Networks, Mobile Services and B2B Telco at Swisscom, highlighted the importance of high-performing indoor 5G for digitalisation, stating that Ericsson's new indoor fibre capabilities enhance the capacity and coverage of Swisscom's 5G network. With increased deployment options, Swisscom can offer fast and reliable mobile connectivity to more small-to-medium enterprise customers with fewer equipment requirements.

Elaborating on the role played by Swisscom, Nils Andersson, Head of Indoor, Ericsson pointed out that the new fibre-based solution will enable Swisscom to tap into the small-to-medium enterprise market and provide seamless indoor 5G coverage to retail stores, offices, event spaces, and restaurants, offering an enhanced mobile experience to customers and employees.

The successful deployment of the fibre-based solution was demonstrated in a Swisscom store near Bern, Switzerland, where a Radio Dot was connected to a shared IRU located hundreds of meters away in a central office using existing fibre infrastructure. Compared to traditional CAT6a cables used for indoor 5G, the fibre connectivity significantly extends the reach, enabling Swisscom to serve up to eight small-to-medium venues from a single remote unit.

The new fibre-based solution is compatible with both single-operator and multi-operator (neutral host) indoor solutions, providing Swisscom with greater flexibility and efficiency in delivering high-capacity indoor 5G services. The collaboration between Swisscom and Ericsson continues to drive the advancement of 5G technology, benefiting businesses and end-users across various industries.

Qualcomm launches new satellite IoT solutions

Qualcomm Technologies has unveiled two new modem chipsets with satellite capability, the Qualcomm 212S Modem and the Qualcomm 9205S Modem. The chipsets are designed to power off-grid industrial use cases that require a standalone non-terrestrial network (NTN) connectivity or hybrid connectivity alongside terrestrial networks. They enable IoT enterprises, developers, ODMs, and OEMs to leverage real-time information and insights for effective management of business projects. Qualcomm Technologies has partnered with Skylo, an NTN service provider, to enable and operate this new connectivity medium.

The Qualcomm 212S Modem is specifically designed for stationary IoT devices, providing superior off-grid connectivity through satellite communication. It features ultra-low power consumption, making it ideal for remote, fixed locations and applications such as telemetry and data gathering from water and gas tanks, utility grid monitoring, early fire detection reporting, and environmental management.

On the other hand, the Qualcomm 9205S Modem offers IoT devices seamless connectivity to both cellular and satellite networks, ensuring virtually gap-free coverage. It integrates GNSS to provide accurate location data. This modem is suitable for industrial applications that require always-on, hybrid terrestrial and satellite connectivity, including transoceanic shipping container tracking, agricultural equipment and livestock tracking, and global fleet and freight tracking for supply chain management.

Both the Qualcomm 212S and the Qualcomm 9205S adhere to 3GPP Release 17 standards for satellite communications, simplifying the establishment of IoT-NTN connectivity. They easily integrate with the Qualcomm Aware Platform for NTN connectivity services and device management in remote areas, enabling businesses to make critical decisions based on accurate real-time data.

Nokia trials on-demand network slicing for Android users

Nokia has conducted a successful trial of a solution that allows Android smartphone users to purchase and activate network slices on-demand from their operator. The solution, available to Android 14 users, enables end users to enhance their experience across various applications such as gaming, streaming, broadcasting, and social media. It also provides an opportunity for operators to monetise 5G slicing services by offering premium network slices based on customer demand in specific areas.

The trial utilised Nokia's end-to-end slicing product portfolio, including entitlement and policy control servers, as well as UE Route Selection Policy technology implemented in Android 14. The solution enables the verification of network slice service availability, promotion of service packages to end users, and activation of selected dynamic network slice policies through the operator's Business Support System.

These capabilities allow network slices to be customised to support specific use cases and applications based on network performance, quality, traffic routing, latency, and security. For instance, gamers can activate a network slice with enhanced performance and low latency for local cloud gaming applications, while sports event attendees can access fast video replays and additional content through a dedicated streaming slice. On-demand slices can also be enabled in base stations serving concert arenas.

Huawei to launch commercial 5.5G network equipment in 2024

Chaobin Yang, Board Member, President of ICT Products and Solutions, Huawei sharing the company's plan at the MWC Shanghai 2023.

Huawei has announced that the company will launch a complete set of commercial 5.5G network equipment in 2024. Announcing this company's Director and President of ICT Products and Solutions Yang Chaobin said that the launch will mark the beginning of the 5.5G era for the industry.

5G deployment progressed rapidly over the past four years and is already yielding significant financial gains. Today, there are more than 260 commercial 5G networks worldwide, serving over 1.2 billion users, and there are already 115 million gigabit F5G users. With service models and content continuously evolving, breakthroughs in technologies like glasses-free 3D are creating unprecedented immersive experiences for users. However, these new services continue to require stronger 5G network capabilities. The industry has widely agreed that 5.5G will be a key milestone in the evolution of 5G.

Huawei proposed the concept of a "5.5G Era", based on an end-to-end solution that integrates comprehensive evolved technologies including 5.5G, F5.5G, and Net5.5G. This solution would protect operators' previous investment in 5G, while also improving network performance by 10 times. This 5.5G Era would feature 10-gigabit peak downlink speeds and gigabit peak uplink speeds to meet increasingly diverse service requirements. It would also refresh the industry vision by using new technologies like passive Internet of Things (IoT) to unlock a market of 100 billion IoT connections.

As an advocate for end-to-end 5.5G solutions, Huawei has been working with multiple players across the industry on R&D and verification of key 5.5G technologies. Significant progress has been made in this verification process, specifically for an extremely large antenna array (ELAA) which underpins 10-gigabit downlink, flexible spectrum access which helps realise gigabit uplink, and passive IoT which can enable 100 billion IoT connections. 50G PON is another key technology that can enable 10-gigabit speeds for F5.5G ultra-broadband networks.

Yang also announced that the company has been working on applying AI-native technologies to 5.5G core networks to continuously enhance network capabilities and availability. This would allow AI capabilities to be delivered to the very ends of networks so that they can better serve numerous industries. Net5.5G promises 10-gigabit access, ultra-broadband transport, and microsecond-level latency over AI networks, allowing it to serve as a next-generation network foundation for industrial digitalisation by providing high-quality network access.

The industry is still in its earliest stages of developing a vision for 6G, and only just beginning related research into key technologies. Hence, several organisations are turning to 5.5G as their milestone for future development. The 10-fold improvement in network capabilities in the 5.5G Era is set to enable numerous industries to unleash the productivity of digital technology.

Mavenir deploys cloud-based Remote Packet Gateway

Network Software Provider Mavenir has announced the deployment of its cloud-based Remote Packet Gateway to Deutsche Telekom IoT GmbH in North America. The initial use case of the deployment is focused on providing IoT connectivity to leading car manufacturers.

The automotive industry is witnessing a shift in consumer behaviour, with a growing demand for sustainable mobility and a decline in the desire for car ownership as a status symbol. Trends such as electric vehicles (EVs) and car sharing are driving the need for connected cars and, eventually, autonomous driving. These factors are placing pressure on automakers and suppliers to build resilient supply chains, thereby increasing the demand for automotive IoT solutions.

Deutsche Telekom IoT GmbH has chosen Mavenir's Remote Packet Gateway solutions for 4G and 5G non-standalone (NSA) deployments. This enables localised data breakout, and routing traffic through two datacentres in California and Virginia to support IoT applications across the continent.

The Remote Packet Gateway utilises the Converged Packet Core Session Management and User Plane Functionality, replicating the control and user planes of the Packet Gateway as 4G components. This separation allows for reduced latency in user data, minimised transatlantic data transfers, and supports advanced connectivity services for vehicles, including internet radios, in-car Wi-Fi, telemetry data, remote map updates, and short-wave upgrades. Moreover, Mavenir's solution enables Deutsche Telekom IoT GmbH to provide international capabilities and connectivity services to multinational companies without geographical or technological constraints.

Bellevue City to use 5G, C-V2X to reduce traffic accidents

Bellevue, a city in Washington state has joined hands with T-Mobile to launch a collaborative project focused on enhancing road safety through the use of network-based Cellular Vehicle-to-Everything (C-V2X) technology and T-Mobile's 5G network. This initiative aligns with Bellevue's Vision Zero programme, which aims to eliminate road-related fatalities and serious injuries by 2030.

T-Mobile will provide cellular connectivity, C-V2X equipment, Internet of Things (IoT) solutions, technical integration, and end-to-end testing to support the project. The City of Bellevue will utilise these resources to implement and evaluate various C-V2X use cases, specifically targeting the detection and protection of pedestrians, cyclists, and other vulnerable road users.

Leveraging T-Mobile's robust and low-latency 5G network, the project enables near real-time communication between vehicles, traffic infrastructure, and individuals on the road. This includes situations beyond the visual line of sight. To enhance safety awareness, the City of Bellevue and T-Mobile will offer a mobile app that provides drivers with early visual and audible warnings regarding potential road interactions.

The initial phase of the project will focus on scenarios such as reduced speed zones, school zone flashing beacons, mid-block pedestrian crossings, and signalised intersections. By utilising C-V2X technology, the City of Bellevue aims to create a safer and more informed environment for all road users.

The C-V2X solutions and prototyping for this project were developed at T-Mobile's innovation centre, the 5G Hub, located in Bellevue's Spring District, where the company collaborates with partners and developers to create innovative solutions using the latest wireless technologies.

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Pathbreaker of the year - Tejas Networks

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Lifetime Achievement - Harish Mehta

Who's Who of the Indian IT Industry attended

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Pradeep Gupta, Harish Mehta, Sanjay Nayak and Ashank Desai

Unvelling of the Vision Document

Pradeep Gupta, Lt Gen. (Dr) Rajesh Pant and V Srinivasa Rao

India: Transformers for the world

Arun Seth and Sharad Sharma

India: Transformers for the world

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Bharat 2047: Picturing & Future as a Superpower

Pradeep Gupta, Saurabh Srivastava and Ajai Chowdhry

India 2047 - Next 25 Years of Indian IcT industry

Sunil Rajguru, CP Gurnani and Sanjeev Bikhchandani

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A MOONSHOT FOR INDIA

As India is paving its way for next-generation 5G connectivity, here is a peek at the milestones it has crossed and the challenges that remain

BY PRATIMA HARIGUNANI

When you aim for the moon (literally), you do three things. One, coral resources and expertise that would, otherwise, lie latent. Two, get an edge over other countries even if you fail some initial attempts. And three, in hurling a man or a rocket at the moon, you stretch your limits of infrastructure, talent, skills, and disruption- to the hilt.

So, when Ericsson chief Borje Ekholm said recently that India's 5G rollout is the fastest globally, and that by the end of 2023, the country will be ahead of others, he might be on to something. And his gaze is not an exception but concurs with what many other lenses have witnessed.

India's ambitious 5G path seems nothing short of a space mission. More so, as it is a race that will matter on a global firmament.

FIREWORKS AND PROJECTILES

As per the Nokia Mobile Broadband Index report, mobile data traffic in India jumped 3.2x in the last five years, hitting over 14 exabytes per month. Interestingly, mobile data consumption increases are coinciding with the launch of commercial 5G services in the country in October 202. This is because Communication Service Providers are on a good pace to deploy 5G networks and expand to newer areas at a fast pace. More than 70 million 5G devices are estimated to have been shipped to India in 2022. This confirms strong traction for 5G in the market.

This direction is echoed in the findings of CyberMedia Research Mobile Handset Market Review Report for CY2022 as well, which indicates that India's 5G smartphone momentum continued through CY2022. The share of 5G smartphone shipments increased to

"The government is leading the way in digitally transforming the nation, from smooth spectrum allocation to investing in last-mile accessibility to 4G and 5G services across the nation."

Anand Bhaskar
Managing Director, Service Provider Business Cisco India & SAARC

"Launching the 200 thousandth 5G site at Gangotri and installing sites across 700 districts within eight months showcases India as one of the fastest 5G rollouts globally."

Vinay Tamboli
Senior VP – Digital Analytics and Consulting Business, LS Digital

31% in 2022, registering an overall growth of 74% over the previous year. As many as USD 20 Billion value of 5G Smartphones were shipped in 2022.

As per the June 2023 Ericsson Mobility report, 5G mobile subscriptions are growing in every region and could top 1.5 billion globally by the end of 2023. It points out that following the launch of 5G services in October 2022, the major 5G Indian market is witnessing huge network deployments under its Digital India initiative. 5G subscriptions in India touched about 10 million by the end of 2022 and are estimated to account for about 57% of mobile subscriptions in the country by the end of 2028. This could make it the fastest-growing 5G region globally.

The report also found a strong link between the increase in 5G subscriptions and service revenue. Over the past two years, the introduction of 5G services in the top twenty markets led to a seven percent revenue boost.

The Nokia report also pointed out that India is poised for accelerated private network deployments in enterprises, driven by 5G. Enterprise spending on Private 5G networks will be driven by new use cases in diverse industry verticals, including manufacturing, utilities, transportation, and healthcare, among others, in India. India's investment in private wireless networks is expected to reach around USD 250 million by 2027.

Consider what an OpenSignal analysis also unlocked. While it is almost over four years since 5G first launched in South Korea and the US, and the experience is continuing to mature, India – with its very recent launch of 5G – has already demonstrated a marked improvement on 4G. The latest global 5G benchmark indicates that average 5G speed is several times faster than 4G and there is a significant uplift in the mobile video streaming and gaming experience. The average 5G download speeds are over 10 times as fast as 4G speeds in six markets and India with 19.2x levels is at a pretty good spot here, followed by Malaysia (14.4x), Sri Lanka (13.8x), Brazil (13.5x), Kuwait (10.8x) and Guatemala (10.4x).

When 5G kicks in with those breakneck speed levels and low latency advantages, there is no limit to the use cases that can transpire, from ultra-fast Internet-equipped education campuses to predictive maintenance-savvy factories, and smart farming to lightning-fast governance in cities and villages.

But are we there yet? If not, what's standing between this dream and the moon?

GETTING THE OIL CHECK DONE

India's progress in rolling out 5G has been remarkable, with the rapid expansion of connectivity through multiple government initiatives across all states and union territories, affirms Vinay Tamboli, Senior VP – Digital Analytics and Consulting Business, LS Digital. "Launching the 200 thousandth 5G site at Gangotri and installing sites across 700 districts within eight months showcases one of the fastest 5G rollouts globally. Infrastructure development, including fibre optic networks and tower installations, is being accelerated to support the increased bandwidth requirements of 5G."

There is no doubt that India is amongst the fastest-growing economies and mobile service markets, reckons Gaurav Sahay, Partner, SNG and Partners. "The development of 5G can play an important role in India's inclusion milestones, like bringing broadband to rural and remote homes. Trials have proved the potential 5G can offer, and can bridge the digital divide by enabling access to high-speed broadband."

India's 5G rollout is being hailed as the fastest globally, and by the end of 2023, we might be ahead of other countries, chimes in Anand Bhaskar – Managing Director, Service Provider Business Cisco India and SAARC. "Undoubtedly, the government is leading the

"The development of 5G can help India provide broadband to rural and remote homes and trials have proved the potential of 5G in bridging the digital divide."

Gaurav Sahay
Partner, SNG & Partners

way in digitally transforming the nation from the focus on digitising critical services and sectors, offering a smooth spectrum allocation to investing in last-mile accessibility to 4G and 5G services across the nation."

Giving a drill-down of the progress, Sourav Gupta, Telecom Analyst, Omdia captures key players and head-ways. "As of now, the 5G network has been rolled out by the nation's two major players Reliance Jio and Bharti Airtel. Jio is deploying the network based on the standalone mode using the 700MHz and 3300MHz bands. Bharti Airtel is deploying its 5G non-standalone (NSA) network using the 1800MHz and 3300MHz bands. Other market players like Vodafone Idea (Vi) and BSNL are expected to join the race in rolling out 5G by 2023 and early 2024 respectively."

He also cites some data from the Department of Telecommunication (DoT) which shows that 2,75,256 5G base transceiver stations (BTS) have been deployed across the country by early July 2023. This marks India as one of the fastest countries in the world in rolling out 5G.

Sahay points out some positive fillips that have helped India on this path; the National Digital Communication Policy (NDCP) initiation and the creation of a high-level forum establishes the government's focus on accelerating the deployment of 5G. India has taken steps to create an enabling environment for its rollout. He also counts on the role of global partners. "They will allow the transfer of technology and knowledge, accelerating the progress of 5G infrastructure development."

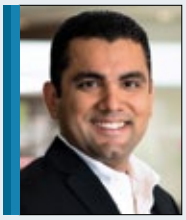
Omdia expects Vi to launch the 5G service in NSA mode as it is easier to implement and can make use of existing 4G networking hardware to reduce the cost of deployment. Gupta adds that BSNL is also going to launch 5G services by April 2024 and is in talks with the Indian IT giant TCS to procure the required equipment for testing and thereby begin the initial trial of 5G services. The government has already reserved 5G spectrum bands for BSNL and provided a USD 20.5 billion revival package to help the loss-making operator survive and compete with its private-sector rivals.

Puneet Sethi, Head – Product, Sales, and Operations, Ataya points out that for India the biggest positive is the pace of deployment. "Despite being a large market with multiple challenges, the pace of 5G roll-out in India has been significantly faster than several other countries. 5G use cases demonstrated at IMC 2022 by various operators are among the most advanced globally. We expect that 5G will continue to drive growth and productivity in India across sectors."

Tamboli also notes other positive aspects like successful spectrum auctions, active trials by leading telecom operators, and supportive policy frameworks.

Peeyush Vaish, Partner and TMT Industry leader, Deloitte South Asia points out that India's 5G rollout presents boundless opportunities through a dynamic landscape of emerging trends like IoT, Edge Computing, Cloud Gaming, and industry-specific use cases across various sectors. These trends illuminate the transformative power of 5G and have the potential to boost India's economy by USD 1 trillion till 2035.

New 5G networks will have a dense, distributed-access architecture and move data processing closer to the edge and the users to enable faster data processing, Sahay reminds us. "5G architectures will be software-defined platforms, in which networking functionality is managed through software rather than hardware. In healthcare, 5G technology will enable patients to be monitored through connected devices that continuously deliver data on key health indicators. In the auto industry, 5G will provide information on traffic, accidents, and more; vehicles will be able to share information with other vehicles and entities on roadways, such as traffic lights."



"Despite being a large market with multiple challenges, the pace of 5G roll-out in India has been significantly faster than several other countries."

Puneet Sethi
Head – Product, Sales, & Operations, Ataya

INDIA'S 5G CHALLENGES

- Deficiencies in areas like FTTH, fibre optics
- More work is needed in LTE, tower and small cell footprints
- End-user device readiness
- Network advancements
- Limited penetration of FTTH
- Underdeveloped fibre optic network
- Congested LTE spectrum
- Scarce tower and small cell availability
- Need for sufficient spectrum allocation
- Advancements in network infrastructure
- Need for clarifying spectrum sharing rules
- Auction of more spectrum for 5G deployment

But there are some delays and deterrents that cannot be glossed over.

ORBITS TO STEER

Sahay rightly argues about the vast geography of India and how it can create infrastructural challenges for 5G deployment. "An increased number of base stations, fibre optic connectivity, and backhaul capabilities will take time and investment. There are operational hurdles involved in the deployment of the 5G networks, such as site acquisition, obtaining necessary clearances, and addressing regulatory concerns."

Currently, only 36% of the mobile towers are fibreised and nearly 0.75 million towers have been deployed in India, Gupta paints the requisite brutal picture here. "According to Digital Infrastructure Providers Association (DIPA), 65% of the telecom towers need to be fibreised and 1.2 million towers need to be deployed by 2024 to make the country fully successful in 5G. Massive investment required in this stands out to be a bigger challenge for the telcos."

Two other key issues that can make or ruin this jump to the future, are ecosystem and technical pieces.

The good news is that a large part of the 5G eco-system can leverage what has been in place for 4G, suggests Sethi. "For example, some operators in India have chosen to start with NSA architecture which leverages the 4G core network and radio network investments for 5G deployments. However, one area that requires a new approach is private networks. Private networks are largely a 5G phenomenon in most markets including India. The network requirements for 5G private networks are significantly different from mass-market 5G rollout, which requires a new set of solutions. India can take the lead in driving innovation in the area."

India is also facing many other challenges in rolling out 5G, including low tower fibreisation, inadequate

"India's 5G rollout presents boundless opportunities through a dynamic landscape of emerging trends like IoT, Edge Computing, and use cases across sectors."

Peeyush Vaish
Partner & TMT Industry Leader, Deloitte South Asia

FTTH connectivity, and limited fibreisation of tower locations, observes Sahay. "Only around 34% of mobile towers are connected with fibre, hindering the seamless delivery of 5G services."

To address these issues, industry leaders are exploring new business models, such as forming separate fibre businesses and hosting FTTH providers as neutral parties. The government has taken initiatives like the BharatNet project to enhance broadband infrastructure in rural areas, led by organisations like Bharat Broadband Network Limited and RailTel, he notes.

"However, there are hurdles in obtaining Right of Way (RoW) permissions and utilising street infrastructure and electricity poles for small cell deployment. Even the 5G-ready end-user devices launched by the companies are not 5G-compliant but can only support the advanced 4G features which are similar to the 5G networks and can facilitate actual 5G technology, to a very limited extent."

Sahay also ponders if this hefty investment by the government and the industries and finally setting up the 5G compliant infrastructure, might be in vain due to the upcoming 6G technology and the connection of Low Earth Orbit or LEO satellites which India has launched, with the broadband connectivity.

To unleash all the potential ahead, the internet must be reinvented to become secure, predictive, and sustainable, Bhaskar reminds. "It requires an architecture that is agile, secure from the ground up and helps in value creation. The two key areas that need to be focused on are digital infrastructure and talent. None of these can become pervasive without a robust digital infrastructure, including the networks and data centre."

Not to forget, availability and the high price of 5G phones can still be a concern to limit 5G service takeup, Gupta reasons. "Hence, TRAI has been taking measures to make 5G handsets more affordable and support the digital connectivity growth."

Another interesting challenge is that of complacency or inertia. "Consumers using 4G handsets have observed performance improvements in terms of 4G speeds as operators have deployed more spectrum resources. So, apart from the younger generation, people won't buy a new 5G handset and switch to 5G so rapidly as they are happy with the network speeds they are getting right now." Gupta brings in an oft-missed aspect.

THE SKY AHEAD

With all these ups and downs, the countdown has begun from 4G to 5G in a big way now. And India cannot afford to slow down or postpone this take-off. Especially with so much that is riding on how fast, and well, we crack the 5G roll-out.

To accelerate this trajectory, we would also need a heavy role from research, academia, and indigenous manufacturing.

Sahay illustrates how research and academic institutions came together to create an Indigenous 5G test bed in line with global standards. It also facilitates open access for R&D teams to explore its workability and feasibility in the Indian socio-economic paradigm, along with its sustainability in line with global standards.

"This enables Indian operators to gain a deep understanding of 5G technologies and plan their future networks effectively." Not to forget, these research and manufacturing developments will also create 5G technologies and intellectual properties which would be transferable to other nations and industry players, as it already has gotten a one-step-ahead start, comparatively.

As Gupta cites, while Jio and Airtel are installing the 5G network with the help of global technology vendors like

"For India, the biggest challenge is access to high speed and national coverage. Consolidation in India has helped a lot on the network economy."

John Strand
CEO, Strand Consult

Ericsson, Nokia, and Samsung, India side-by-side is also developing its own 4G/5G technology stack under the Atmanirbhar (self-reliant) vision. "BSNL will be the first operator in the country to use this home-built technology making it less dependent on global equipment vendors. This will also cut down its deployment costs."

Sethi seconds that academia and research have a very important role to play in identifying, creating and validating Private 5G-based solutions for manufacturing and other verticals. "Leading institutes across the globe have already identified this research opportunity and are moving forward in this direction."

As to Indigenous manufacturing, that part has a dual role to play here. "One, as a customer for a 5G-based smart manufacturing solution. Second, as a key stakeholder in research by providing requirements. With such a strategy, indigenous manufacturing can leapfrog conventional manufacturing in other parts of the world in productivity by employing various smart manufacturing solutions." Argues Sethi.

When we zoom in on the ecosystem part, looks like in building its 5G network, India is leveraging its existing 4G infrastructure, utilising shared frequencies and network equipment, as Tamboli explains. When asked whether it would be built on 4G concrete or with a new 5G gravel, Tamboli tells that while some new technologies like millimetre wave spectrum and small cells are necessary for 5G, these can be seamlessly integrated into the current 4G networks, eliminating the need for a complete rebuild.

"With the government's allocation of spectrum in the 3.5 GHz and 26 GHz bands, telecom operators can efficiently upgrade their networks to support 5G services on these frequencies," he points out.

AIR-BORNE AND UP

As per Tamboli's assessment, the 5G ecosystem in India is experiencing significant growth and government support, with spectrum allocation in the 3.5 GHz and 26 GHz bands and the establishment of 5G test beds. Major telecom operators, including Airtel, Reliance Jio, and Vodafone Idea, are actively deploying 5G services and expanding their networks. The availability of 5G-enabled smartphones from leading manufacturers like Apple, Samsung, OnePlus, Xiaomi, and Vivo further demonstrates the country's commitment to embracing the new technology.

Sethi cites how Private 5G use cases can demonstrate the outcome of the technology. "That includes deployment and leverage of 5G technology for smart manufacturing. For example, the automatic orchestration of robots on the factory floor. We also focus on the integration of 5G technology with pre-existing networks of Wi-Fi and wired networks on the factory shop floors."

Collaborations also matter. The partnership between Airtel and Meta in global connectivity infrastructure and communication platform solutions, as well as their collaboration with Saudi Telecom Company to extend the 2Africa Pearls subsea cable system to India, demonstrates the commitment to embracing new technologies, Tamboli says.

65% of the telecom towers in India need to be fibreised and 1.2 million towers need to be deployed by 2024 to make the country fully successful in 5G.

Digital Infrastructure Providers Association

> The network requirements for 5G private networks are significantly different from mass-market 5G rollout, which requires a new set of solutions.

"Additionally, the DoT's 5G Vertical Engagement and Partnership Programme, along with the establishment of an Inter-Ministerial Committee to foster collaborative efforts across various vertical ministries, showcases a coordinated approach to drive 5G opportunities across usage verticals. India appears to be on the right track, steadily progressing toward a strong and interconnected future."

To take a final look at the set-up all set for the sky, in terms of infrastructure, India currently has one that facilitates 4G connectivity and spectrums that are 5G-ready. But to optimise the potential of 5G, this infrastructure needs to be enhanced and at some juncture, be replaced as well. According to DIPA, most telecom towers still need fabrication, and 1.2 million new towers need to be deployed by 2023-24, points out Sahay.

"Other requirements include RoW facilitation, access to street infrastructure, fibre deployment, and infrastructure densification. Some states have not aligned with the amended RoW rules. Despite these challenges, Reliance Jio and Bharti Airtel are moving forward with the 5G rollout. The government plans to establish 100 labs for developing 5G applications in engineering institutions across India. This amendment in the Indian Telegraph Right of Way (Amendment) Rules, 2022 will ensure the speedy roll-out of the technology."

Gupta observes how the government is also helping the country's service providers in rolling out 5G. "Government has given the authority to service providers to use street furniture in building up the 5G infrastructure. Tools such as Shortest Distance, 5G planning and RoW have also been provided to the telecom service providers with detailed information to enable quick deployment of 5G BTSs and optical fibre. The Prime Minister GatiShakti National Master Plan has also been introduced for a quick 5G rollout and to help increase liberalisation in the country."

The way forward for India's 5G deployment involves identifying end-users, evaluating existing infrastructure, selecting rollout cities, determining investment models, and managing digital risks – stresses Sahay. He also adds that Telecom operators, tower companies, fibre providers, and regulatory bodies should work together to ensure the timely deployment of 5G networks. Government should also make mandates for telecom companies to work towards bridging the urban-rural digital divide.

John Strand, CEO of Strand Consult highlights that initially, 5G is about building a mobile network that can produce more and better data traffic at a higher speed and lower cost. "In a country like India, the biggest challenge is access to high speed as well as national coverage. Consolidation in India has helped a lot on the network economy." Adds Bhaskar: "As we go deeper into the 5G-connected world, it will require collaborative efforts from industry, technology players, and telecom operators to ensure scale, speed, and sustainability, ensuring longevity and a much lower carbon footprint, and a seamless and immersive experience."

As outlined by Aditya Khaitan, Partner, Consulting, Deloitte India, to realise the gains (USD 450 billion contribution to the Indian economy by 2040) promised by 5G; telcos would need to focus on enterprise and B2B business and drive deeper cross-sector collaboration across industry regulators, industry players, academia and start-ups.

"This would drive investments in the R&D of new technologies thereby fostering innovation; enable the establishment of standards and specifications for the design and development of these technologies; enable testing and certification of new products and services; aid in the development of India-specific use-cases to demonstrate impact on the value chain across industry verticals; and drive adoption of these custom solutions relevant to India."

As indicated, the country needs to fix these 5G nuts and bolts in time. If India can do it splendidly and swiftly, nothing can stop the country from imagining what lies beyond the Moon. As India's 6G alliance that was launched recently shows, the country is already gearing up for the next G (with 200 patents acquired already). Done well, and with an honest gaze at what's missing, we can, then, dream confidently of the leaps that lie ahead as ripples of 5G. We can, then, think of Mars.

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[GUEST COLUMN]
5G ROLLOUT

Accelerating 5G success in India

Scaling the fibre network is essential to accommodate the growing number of 5G sites and establish a robust backbone for widespread 5G implementation

BY PRAVEEN CHERIAN

Faster speeds, higher performance, reduced latency, and much more dependable service are just the tip of the iceberg when it comes to 5G. However, amidst all the excitement, one crucial aspect often remains in the shadows: the network infrastructure that serves as the backbone for 5G's boundless possibilities. While the striking features of 5G may steal the limelight, it is imperative to acknowledge the unsung hero that must shoulder the burden of supporting millions of devices concurrently.

Enter the "extremely critical" backhaul component of 5G networks, where the optical fibre reigns supreme.

But why is an optical fibre considered the critical element for a 5G backhaul? Well, picture a busy freeway during rush hours, packed with countless vehicles moving in unison. Similarly, 5G networks will witness an unprecedented surge in data traffic, with many devices vying for bandwidth. With its immense capacity and swift data transfer, optical fibre will act as the wide, spacious

> India's slow tower fibreisation is hindering the ambitious deployment of 5G, with the country lagging behind the target of 70% by 2024.

THE BUSINESS CASE

- India's slow tower fibreisation is hindering the ambitious deployment of 5G, lagging behind other countries in fibre coverage.
- Optical fibre provides high data transfer rates, low latency, reliability, and stability, supporting mission-critical applications in 5G.
- Fibreisation is critical for creating a network that can allow seamless scalability and adaptability for future wireless communication generations.
- Optical fibre is essential for 5G network backhaul, optimizing network performance and reducing congestion.
- Fibre rollout services are vital for extending high-speed connectivity to rural areas, bridging the digital divide and fostering inclusive growth.

> With its immense capacity and swift data transfer, optical fibre will act as the wide, spacious highway that can accommodate the bustling swarm of information.

highway that effortlessly accommodates this bustling swarm of information. It will enable 5G to transcend boundaries, unlock a world of innovation, and reshape industries like healthcare, transportation, education, and smart cities.

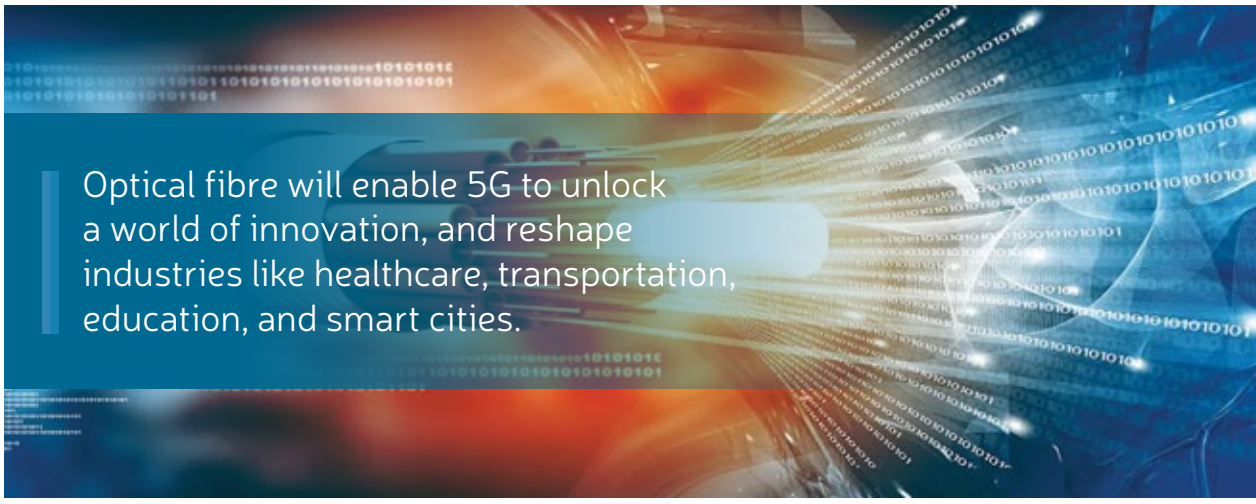
Neglecting this vital component would be akin to building a magnificent castle on a foundation of sand. As India embraces 5G, the expansion and reinforcement of optical fibre infrastructure must be prioritised, and it requires a concerted effort from all stakeholders, including the government, private sector, and regulatory bodies.

THE NEED FOR FIBRE ROLLOUT SERVICES

The roll-out of more fibre is crucial for 5G due to its higher wireless bandwidth capabilities compared to previous generations. However, 5G has lower wireless coverage, requiring more 5G sites to achieve the same coverage area as 4G. This necessitates increasing fibre density in areas transitioning to 5G, ensuring seamless connectivity and high-speed data transmission. Scaling the fibre network is essential to accommodate the growing number of 5G sites and establish a robust backbone for widespread 5G implementation.

India's slow tower fibreisation is hindering the ambitious deployment of 5G, lagging behind the target of 70% by 2024. This puts the country at a disadvantage compared to countries like Thailand (90%) and Malaysia (80%). According to a telecom infrastructure industry body, India, which currently has a fibreisation rate of 35.11%, must expand its fibre coverage by more than 3.5 million kilometres nationwide from the fiscal year 2023 to 2025.

The Digital Infrastructure Providers Association (DIPA) highlights that only 30% of sites in states like



Delhi, Uttar Pradesh, Bihar, and Gujarat have fibre connections. In Himachal Pradesh and other remote districts in the Northeast, only 40% of tower locations have been fibreised. No wonder then, India needs to do a lot on this front, particularly since fibre rollout services play are critical for enabling 5G networks to provide several compelling offerings.

Speed and capacity: Optical fibre provides high data transfer rates and large capacity, making them perfect for handling the vast amounts of data generated by 5G networks. With optical fibre as the backbone, 5G delivers faster speeds and meets the increasing demand for data, ensuring a seamless user experience.

Low latency: 5G offers ultra-low latency, which is vital for real-time applications like autonomous vehicles, remote surgery, and augmented reality. Optical fibre transmits data at the speed of light, minimising latency and enabling near-instantaneous communication. This low latency feature of 5G unleashes the potential of emerging technologies and applications.

Reliability and stability: Optical fibre is reliable and resistant to interference, electromagnetic radiation, and inclement weather. Unlike wireless connections, signal degradation or physical obstacles do not affect them. This reliability is crucial for mission-critical applications and services in 5G, including emergency services, IoT devices, and intelligent infrastructure.

Future-proof infrastructure: Optical fibre creates a future-proof foundation for 5G and beyond. It supports evolving requirements as technology advances and data demands grow. Upgrading wireless backhaul networks to optical fibre allows for seamless scalability and adaptability for future wireless communication generations.

Backhaul support: Optical fibre is essential for 5G network backhaul. It efficiently handles increased data traffic and higher capacity demands, ensuring fast and reliable connectivity between base stations and the core network. This seamless data flow reduces congestion and bottlenecks, optimising network performance.

Enhanced coverage and rural connectivity: Fibre rollout services are vital for extending high-speed connectivity to underserved rural areas. By expanding optical fibre infrastructure, remote communities can access the transformative potential of 5G, thereby bridging the digital divide and fostering inclusive growth.

India's 5G ecosystem is projected to capture 40% of mobile subscriptions by 2027, bringing in an estimated USD 17 billion in incremental revenue from enterprises by 2030. This progress opens doors to exciting possibilities like 5G FWA (home broadband), enhanced video streaming, multiplayer mobile gaming, and services like augmented and virtual reality.

It is imperative for the telecom ecosystem to step up and shoulder the responsibility of finding innovative new applications for optical fibre. When faced with challenges, there is always an opportunity for growth and positive change. This could be a significant stride towards a transformative technological revolution.

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5G propels Digital India's watershed moment

Despite challenges, India's telecom market shows promising signs for the 5G rollout, with the potential to become a leading global market

BY ANITA SOMANI

The Economic Survey 2022-23 stated that the rollout of 5G services in India can unleash new economic opportunities and help the country leapfrog the traditional barriers to development, spur innovation through startups and established businesses and advance the Digital India vision.

Since the 1980s, when 1G was introduced, the country has come a long way from the bulky phones and communication that was limited to a few people for professional purposes. 2G brought in the demand for personal use, and 3G ushered in phones that could fit in one's pocket. 4G gave India fast-streaming smartphones, app stores and video streaming and 5G is going to be a game changer that would reshape both our professional and personal lives by enabling new use cases like connected vehicles, augmented reality (AR), enhanced video and gaming, among several others.

India's digital transformation journey has been spectacular. While its initial phases were marred by delayed deployments of the latest mobile telephony (there was a gap of around six years between the auction and mass deployment of 4G waves) and regulatory and other roadblocks, the ecosystem came together and 5G is witnessing a comparatively quicker and smoother rollout. Government initiatives like Digital India have also helped in the transformation.

All these factors have led to an exponential increase in demand for data in India. Accelerated by low tariffs and easy availability of low-cost 4G smartphones, India's mobile-first broadband has witnessed tremendous growth.

THE SECTORAL OUTLOOK

Connectivity is an enabler that allows technologies to realise their full potential. The Fourth Industrial Revolution offers an opportunity for sectors to enhance their competitiveness and contribution to regional economies. Its full potential will be realised through the wide-scale deployment of 5G communication networks, as they will transform many sectors, such as manufacturing, transportation, public services, healthcare, agriculture, education, banking, etc. 5G networks will make smart cities, smart hospitals and smart factories a reality.

IN SHORT

- India's digital transformation journey has progressed significantly, with 5G experiencing a comparatively quicker and smoother rollout.
- India has moved up in global rankings for 5G network availability, with rapid network deployments and a projected 700 million 5G subscriptions by 2028.
- Government initiatives address industry needs through reforms, including a proposed Telecommunications Bill and the promotion of design-led manufacturing under the PLI scheme.
- Challenges include the low penetration of 5G smartphones, commercial viability, taxation issues, and the need for contributions from various sectors, especially start-ups.
- Despite challenges, India's telecom market shows promising signs for 5G rollout and adoption, positioning it as a leading market in the future.

Smart cities: City governments use 5G networks to provide better services to citizens, track public utilities, and monitor city infrastructure proactively. IoT-enabled dumpsters and trucks can monitor fleet inventory and help cities understand how much waste they produce and where that waste accumulates. Transportation departments can use 5G to monitor highway congestion and reliably access high-definition, live video feeds of traffic cameras across the city, with the ability to span hundreds of miles and support millions of devices.

The 5G use cases in cities are fleet tracking, infrastructure monitoring with IoT sensors, city-wide video surveillance and traffic cameras and secure and controlled internet access for residents.

Healthcare: The healthcare sector is poised to undergo a transformative shift with the integration of 5G technology. This advanced connectivity is expected to create a connected ecosystem in healthcare that is predictive, preventative, personalised, and participatory. There are several key use cases where 5G can revolutionise healthcare services.

One prominent use case is connected healthcare, which encompasses remote patient monitoring and telemedicine. With 5G, healthcare providers can remotely monitor patients' vital signs in real time, enabling timely interventions and personalised care. Additionally, 5G facilitates online consultations and digital prescriptions, offering secure and efficient healthcare delivery, particularly in rural areas where access to medical services is limited.

Smart hospitals are another area where 5G can make a significant impact. By digitalising and centralising medical records, 5G enables quick and secure access to patient information, expediting the diagnosis and treatment process. Internet of Things (IoT) devices play a crucial role in smart hospitals, streamlining processes, improving crisis management, and providing real-time information on the availability of hospital beds. This enhances operational efficiency and patient care.

Healthcare automation is a promising application of 5G technology. Remote robotic surgeries can be conducted with the precision and expertise of specialised surgeons, regardless of geographical limitations. Augmented and virtual reality (AR/VR) technologies can assist in medical procedures and training by providing immersive visualisations and simulations. Medical professionals can even learn complex procedures online using haptic gloves equipped with sensors. Moreover, drones can be employed for medical service

delivery, enabling faster delivery of medicines, vaccines, and the collection of medical samples.

The integration of 5G technology in healthcare holds tremendous potential for improving patient care, outcomes, and accessibility, particularly in underserved areas. By leveraging the power of 5G, healthcare providers can create a healthcare ecosystem that embraces innovation and empowers patients in their healthcare journey.

Education: The high-speed connectivity of 5G, lower latency and the ability to connect a massive number of mobile devices, could enable new and improved opportunities to increase equal access to education with distance and remote learning.

One compelling use case is the integration of AR and VR technologies into new learning platforms to significantly enhance the learning experience for students. Another impactful application of 5G is the real-time live streaming of lessons with ultra-high-definition (UHD) 8K resolution. This advancement can greatly improve access to education in remote and rural areas.

The use of robots in education is another area where 5G can play a transformative role. By leveraging the high-speed connectivity and low latency of 5G networks, robots can be employed to make higher education more inclusive. It can also be leveraged to establish smart classrooms, campuses and universities.

INDIA VS. GLOBAL

As the rollout of 5G network services picks up pace in the country, India has moved up by four positions from #64 in March to #60 in April on the Speedtest Global Index, according to a report by Ookla, moving ahead of some G20 nations including Russia and Argentina.

As of April 2023, 5G network access was available in 503 cities in the United States, the highest globally. China followed in second, with availability in 356 cities. While in North America the addition of mid-band spectrum now enables superior multi-band 5G experiences for many users, India is experiencing massive network deployments, making it the fastest-growing 5G market globally. According to the June 2023 edition of Ericsson's Mobility Report, by the end of 2028, India is likely to have 700 million 5G subscriptions, accounting for 57% of overall mobile subscriptions in the world.

REFORMS AND INITIATIVES

As a major reform measure, the Government of India by releasing the Draft Telecommunications Bill 2022, has addressed the industry's need to consolidate and revamp the existing legal framework for the telecommunication sector.

The bill proposes efficient policy-making to smoothen the right of way clearances, licencing requirements, enhanced security of the end-user, and efficient utilisation of the spectrum-and-innovation-led Initiatives.

The bill proposes a regulatory sandbox that promulgates innovation. The related provisions of the bill allow established organisations and startups to use the sandbox for developing and testing new technology and facilitate innovation under a suitably flexible framework. Such a framework will provide special terms and conditions, and exemptions from terms and conditions of any licence, assignment, registration or authorisation. This not only empowers start-ups but also generates employment, reduces the time-to-market for new and complex technologies and helps secure funding for a long-term commitment.

To facilitate design-led manufacturing of 5G products in India under the Production Linked Incentive (PLI) Scheme for Telecom and Networking Products, the central government amended the existing PLI scheme to extend its scope as well as timeline. In the Union Budget 2023-24, the government reduced customs duty on imports of some mobile phone parts.

FUTURE OF 5G IN INDIA

Despite the growth of the 5G ecosystem, 5G smartphones are yet to form a substantial part of the total smartphones used in India. There also remains the question of commercial viability as telecom is one of the most heavily taxed sectors, and low tariffs add fuel to the fire. As telcos penetrate deeper into the country's rural landscape, the 5G sentiment is changing, creating more complexities for pricing and eventual investments.

The ecosystem demands contributions from various sectors, especially start-ups that can be providers of new-age solutions to propel holistic multi-dimensional growth.

To sum up, despite the challenges, the Indian telecom market has shown some promising signs of 5G rollout and adoption with the potential to become one of the leading markets in future.

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Catalysing India's 6G game

Bharat 6G Alliance will enable market access for Made-in-India telecom products and position India as a global leader in the 6G space

BY SHUBHENDU PARTH

India has taken a remarkable stride towards technological advancement with the recent announcement of the Bharat 6G Alliance (B6GA). The alliance aims to launch next-generation technology in India and establish the country as a global leader in developing 6G standards. It will bring together key stakeholders from the public and private sectors, fostering collaboration and the development of 6G in the country.

The initiative aims to position India as a global leader in the ever-evolving telecom sector and establish the country as a major supplier of telecom hardware and infrastructure equipment. Highlighting the importance of B6GA, the Union Minister of Communications and Electronics and Information Technology, Ashwini Vaishnaw said that it is a significant step towards making India a global leader in telecommunications.

He further pointed out that the country has already secured over 200 patents in the 6G space, positioning the nation to spearhead the next-generation technology. The government also plans to introduce a new wave of telecom reforms in the coming weeks.

The forthcoming 6G technology will build upon the foundation of 5G and unlock enhanced capabilities, including improved reliability, ultra-low latency, and affordable solutions. The Bharat 6G Alliance serves as a collaborative platform that brings together key stakeholders from the public and private sectors, academia, research institutions, and standards

By becoming a global supplier of IP, products, and solutions in affordable 5G and 6G, India can reduce its dependency on imports and boost export potential.

IN SHORT

- Bharat 6G Alliance (B6GA) positions India as a global leader in developing 6G standards.
- Collaboration among stakeholders to foster innovation and 6G development in India.
- India aims to secure a leadership role in 6G technology with over 200 patents already secured.
- Strategic objectives include deploying 6G as a force multiplier and contributing to global standards.
- Government support, telecom reforms, and global collaborations drive India's 6G ambitions.

development organisations. It aims to accelerate the development and deployment of 6G technology in India.

THE STRATEGIC OBJECTIVES

The Bharat 6G Alliance has set forth ambitious objectives to ensure India's leadership in 6G technology. First and foremost, the alliance aims to deploy 6G technologies as a powerful force multiplier for India by 2030. By actively participating in standard development organisations, the alliance seeks to contribute to the global advancement of 6G standards. Collaboration with other 6G global alliances and global technology alliances will enable India to shape future technology-related global standards, products, operations, and services.

Central to the alliance's mission is the promotion of an ecosystem that fosters research, design, prototyping, development, and testing of telecom products, solutions, and use cases. By creating synergies among academic institutions, domestic industries, research and development entities, and government bodies, the alliance aims to nurture a balanced growth of the technology and innovation ecosystem in India. This will involve identifying priority areas for research, engaging all stakeholders, and encouraging innovation-driven initiatives that push the boundaries of 6G technology.

GLOBAL COLLABORATION AND MARKET ACCESS

Recognising the importance of international collaboration and knowledge exchange, the Bharat 6G Alliance seeks to forge coalitions and synergies with other 6G global alliances. Through these partnerships, the alliance aims to facilitate global cooperation and leverage expertise from around the world.

Additionally, the alliance is committed to enabling market access for Indian telecom technology products and services, positioning India as a global leader in 6G innovation. This will be achieved by promoting technology ownership, indigenous manufacturing, reducing imports, boosting export opportunities, and fostering the creation of intellectual property.

SUPPORT FOR TELECOM SECTOR REFORMS

The launch of the Bharat 6G Alliance demonstrates

India's approach and focus on innovation promises to drive economic growth and social development, while establishing the country as a technology powerhouse.

B6GA GOALS?

- Enable India to become a global supplier of affordable 5G and 6G solutions.
- Deploy 6G as a force multiplier for India by 2030.
- Support Indian participation in standard development organisations.
- Build coalitions with global 6G alliances and technology associations.
- Address India's priorities in 6G and future technology standards.
- Promote research, design, and development of telecom products and solutions.
- Study and recommend national requirements for standardisation bodies.
- Develop readiness for implementing the Bharat 6G Vision in India.
- Foster collaboration between academia, industries, startups, and government entities.
- Identify priority research areas for industry, academia, and service providers.

the Government of India's commitment to driving technological advancements. Prime Minister Narendra Modi had previously unveiled the 6G vision document, emphasising the potential of this initiative in creating opportunities for innovators, industries, and startups. In addition to the alliance, the government plans to introduce telecom reforms aimed at creating an environment conducive to innovation, attracting investment, and fostering a thriving telecommunications ecosystem.

By actively contributing to international standardisation organisations such as 3GPP and ITU, the alliance aims to position India at the forefront of 6G innovation. This will not only bolster the country's technological capabilities but also create a significant positive impact on various sectors. The advent of 6G technology holds the promise of revolutionising sectors such as healthcare, education, entertainment, agriculture, weather predictions, and public services.

India's leadership in 6G technology will have a profound economic impact. By becoming a global supplier of IP, products, and solutions in affordable 5G and 6G, India can reduce its dependency on imports and boost export potential. Indigenous manufacturing and the creation of intellectual property will contribute to the country's GDP growth, generate employment opportunities, and foster a culture of innovation.

The launch of the Bharat 6G Alliance marks a significant milestone in India's journey towards becoming a global leader in next-generation telecommunications. Through strategic collaborations, research and development initiatives, and proactive government support, India is well-positioned to shape the future of connectivity.

As the world prepares for the transformative potential of 6G technology, India's proactive approach and its focus on innovation promise to drive economic growth, enhance societal development, and establish the country as a technological powerhouse in the global arena. The Bharat 6G Alliance serves as the catalyst that will propel India into a leadership role, shaping the telecommunications landscape for years to come.

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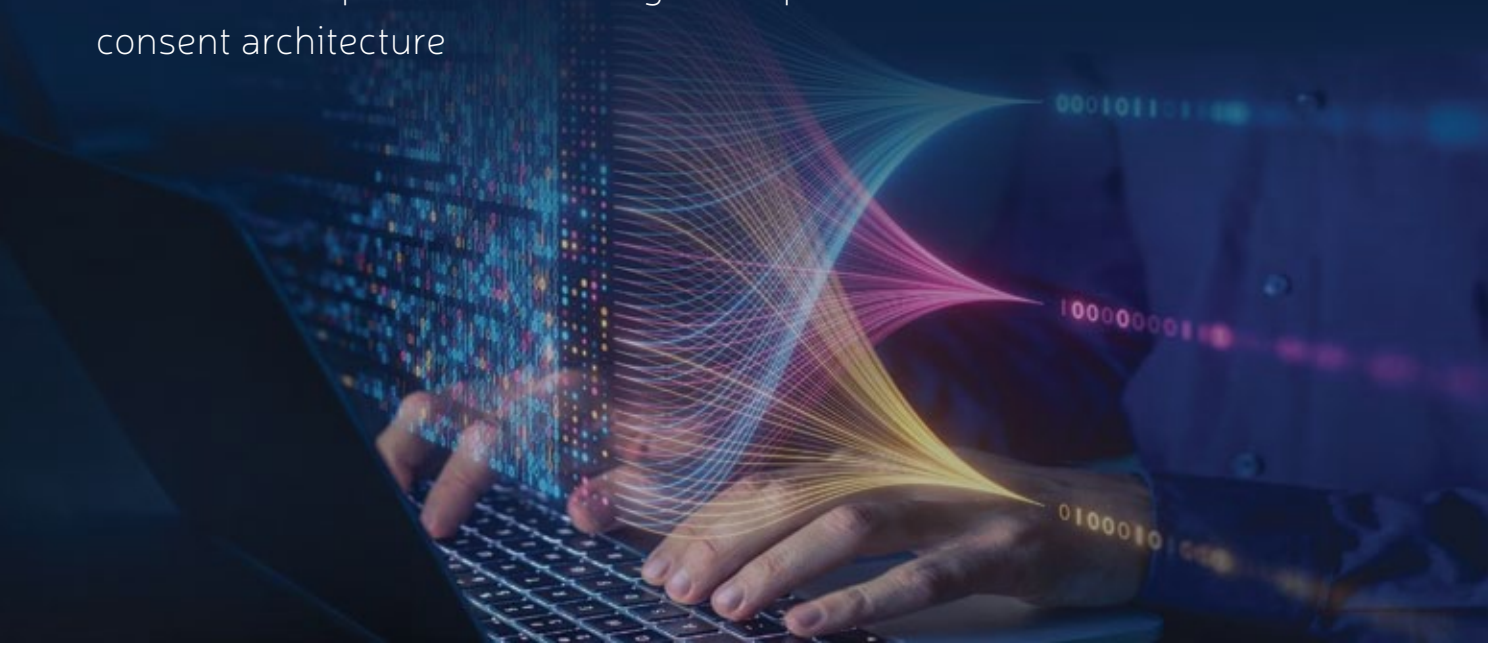
[ANALYSIS]
DATA PRIVACY

TSPs path to the data protection

To ensure full compliance with the upcoming DPDP Bill, telcos will need to revamp their data management processes and reconsider their consent architecture



BY KIRTI MAHAPATRA & PUNYA VARMA

India's exponential growth in the last five years has been a shining beacon, in an otherwise bleak world economic outlook. Credit, for example, must be given to the government's steady focus to expand India's technology sector. The RBI estimated the size of India's digital economy to be USD 222.5 billion in 2019 while a MEITY report suggests that India's digital economy could be valued between USD 500 billion to USD 1 trillion by 2025.

A key component of this growth is likely to be India's telecom sector, with the newly introduced 5G technology expected to contribute USD 450 billion to the economy between 2023 and 2040. With such rapid advancements, particularly in disruptive and highly data-intensive technologies, the need of the hour is to toe the fine line between promoting innovation and protecting individuals' data and privacy.

The Government of India appears to be committed to seizing this opportunity. In November 2022, the MEITY released the draft of the Digital Personal Data Protection Bill (DPDP) providing for the data protection of individuals for public consultation. Further, the MEITY is on the anvil of releasing a new law to replace the age-old Information Technology Act of 2000, which continues to govern India's technology sector. As reported, the Union Cabinet has approved the draft DPDP Bill 2023 and is likely to introduce it in the upcoming monsoon session of the Parliament.

> TSPs will have to develop engineering solutions to provide subscribers with a summary of data actions and a list of sharing partners.

ADOPTING THE DPDP BILL

Given that the DPDP Bill is expected to overhaul the data protection and privacy regime, its impact on India's telecom industry which is built on millions of subscribers' data will be significant. Players in the telecom sector will have to ensure compliance with the new regime, while also ensuring that they adhere to their sectoral compliances. Business as usual, as they say, will have to change.

Let's look at a couple of examples.

The unified license (UL) that telecom service providers (TSPs) are required to obtain places minimal data governance-related conditions on them. TSPs are broadly required to use their "best efforts" to ensure that the collection of information, including photo ID as required under the UL, is done only to the extent necessary for providing their service. TSPs are also required to ensure the confidentiality of such information unless disclosure is necessary for providing their service. These requirements are not similar to the privacy standards in jurisdictions like the EU. Even the IT Act contemplates higher compliances for the collection and processing of only sensitive personal information.

Contrasting the above with the requirements that the proposed DPDP Bill places on data fiduciaries like TSPs who will now have to, among others, provide an itemised notice to their customers of the data, including in cases where consent was collected in the past. This also includes the data they want to collect and the specific purpose. It also aims to mandate that TSPs can process such data (i.e., undertake activities like collection, structuring, combination, sharing etc.) only for the purpose specified in the notice, and they must obtain customers' consent (whether explicit or deemed) for such processing.

To comply with these requirements, TSPs would certainly need to overhaul their data management processes and rethink their consent architecture. For example, TSPs would need to understand whether their usual methods of processing subscriber data would now require explicit consent for each class of data, or if deemed consent would suffice. Reliance on 'deemed consent' will also require greater thought as there is limited clarity on how this will unfold practically.

The DPDP Bill offers various rights to data principals, who are subscribers of TSPs. These rights include the ability to receive information about their processed data, which would increase compliance costs for TSPs as they would need to develop engineering solutions to provide subscribers with a summary of data actions and a list of sharing partners. Additionally, the bill ensures timely resolution of grievances. On the other hand, the UL does not guarantee any subscriber rights regarding TSPs' data processing or an effective grievance mechanism.

Currently, TSPs only need to establish a "complaint centre" to address service-related concerns. To comply with the data principal rights outlined in the DPDP Bill, TSPs will likely need to revamp their operations. This could involve investing in staff training to address data privacy concerns and implementing engineering solutions for specific processes. Furthermore, TSPs may need to adopt stricter timelines for grievance resolution, considering the seven-day appellate period proposed in the DPDP Bill, compared to the 30 days stipulated by telecom regulations.

While this article highlights only a couple of examples, there will likely be many more points of conflict which emerge as the data privacy framework matures in India. As such, the Indian telecom sector will need to be methodical about how they approach these changes with regular compliance assessments and audits as well as devising a flexible and practical compliance roadmap, in close coordination with the government to highlight specific issues the sector may face while achieving compliance with the proposed law.

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TV RAMACHANDRAN

A CASE FOR THE NON-COMPETING CUG

Denying direct spectrum allocation to enterprises would be unfair, as Private 5G networks can play a critical role in India Inc's digitalization efforts

Private 5G networks are gaining momentum and presenting exciting digitalisation opportunities for the entire industry, including the telecom sector. According to an ABI Research report, as of May 2023, globally there were nearly 1,000 private cellular networks for enterprises indicating a massive surge in Private 5G networks as compared to last year. This also indicates that world-over enterprises across sectors are seriously driving improved efficiencies through digitalisation.

India's size, population, and digital aspirations would naturally lead one to expect the existence of numerous private networks, perhaps around 100-150, and a growing trend in this direction. Regrettably, this is not the case, as there is currently no operational private network, be it 4G or 5G, in the country. However, this situation presents incredible growth opportunities for India. According to a report by NASSCOM and Arthur D Little, there is an estimated revenue potential of USD 1.5 trillion across 10 industries by 2030, indicating that

> Private networks are like Closed User Groups or CUGs and do not compete with licensed public telcos or encroach on their turf.

a significant portion of this potential can be targeted and achieved.

It is crucial to recognise the unique value proposition that private networks offer, providing dedicated and localised connectivity solutions for enterprises, industries, campuses, or smart cities. Unlike the public cellular networks – Public Land Mobile Network (PLMN) – operated by licensed mobile operators, Private 5G networks provide enhanced control, security, and reliability, specifically tailored to meet the specific needs of the organisation. However, it should be noted that these networks are not licensed to provide services to retail consumers outside of the designated building or campus.

We need to first appreciate that private networks provide dedicated and localised connectivity solutions for enterprises, industries, campuses, or smart cities. Unlike the cellular Public Land Mobile Network (PLMN) that private mobile operators with a license to provide public telecommunication service have, Private 5G networks offer enhanced control, security, and reliability, tailored to meet the specific needs of the organisation but are not licensed to provide service to any retail consumer outside the specified building or campus.

These networks are like Closed User Groups or CUGs and do not compete with licensed public telcos or encroach on the latter's turf. A Private 5G network may be set up in any one of the following ways, as recommended by TRAI and approved by the Cabinet.

#1 Telecom Service Providers (TSPs) with Access Service License may provide private networks as a service to an enterprise by using network resources like network slicing over its PLMN public network.

#2 TSPs with Access Service License may establish isolated Captive Non-Public Network for the enterprises using the IMT spectrum acquired by them.

#3 Enterprises setting up Private Captive Networks may obtain the spectrum on lease from TSPs and establish their isolated network.

#4 Enterprises setting up Private Captive Networks may obtain the spectrum directly from DoT and establish their isolated network.

The process involves mobile operators, and direct spectrum allotment to enterprises is just one method among many for establishing a Private 5G network. This decision is fair, considering that private and public networks are not in direct competition since the spectrum is for use within the campus and business site. Moreover, as enterprises embrace Private 5G networks to enhance their digitalisation efforts, they would experience significant operational improvements. This would result in a greater need for external communication requirements, majorly benefitting the mobile operators.

Private mobile networks, initially introduced with 4G, are now experiencing substantial growth with the advent of 5G. These networks are enabling the development of new use cases in cutting-edge technologies such as decision-making, robotics, autonomous vehicles, connected machines, and various forms of video applications (virtual reality, augmented reality, digital twins, immersive gaming, and video surveillance). Industries such as ports, supply chains, warehouses, mining, healthcare, education, and manufacturing are among those reaping the benefits of 5G private networks.

THE USE CASES

Private 5G networks offer more than just internal communication. They facilitate a wide range of applications, enhancing efficiency through mission-critical wireless communication for vital infrastructure, business operations, and public safety. These networks also serve as the foundation for smart factories and production, providing producers with compelling advantages enabled by 5G technologies.

Supply chain management and logistics: Private 5G networks can enhance logistical processes by providing real-time asset tracking, inventory management, and tracking of goods. They can help with automated warehouse management, driverless cars, and improving the overall efficiency and visibility of the supply chain.

The refusal to allocate spectrum directly to captive private networks will inevitably slow down enterprise digitisation and hurt India's GDP.

IN SHORT

- Lack of operational Private networks in India hinders the country's digitalization potential.
- Private networks provide dedicated, secure connectivity solutions tailored to specific needs.
- Private 5G networks serve as the foundation for smart factories and production, providing producers with compelling advantages enabled by 5G technologies.
- Direct spectrum allocation to enterprises is a fair approach, as it is non-competing with telcos and allow organisations to optimise their business operations.
- Denying direct allocation slows enterprise digitization, hampers GDP growth, and stifles India's digitalization efforts.

Smart grid: They play a crucial role in enhancing the security, stability, and operational effectiveness of electricity systems. By integrating information, communication, and control technology, smart grids can bring significant advancements to the infrastructure.

Smart cities and smart driving: Private 5G networks play a crucial role in the development of smart cities, enabling the implementation of intelligent infrastructure. These networks support a range of applications, such as smart grids, smart lighting, traffic management systems, and public safety solutions. These networks enable efficient urban services, enhance citizen safety, and support various IoT-based applications. Additionally, 5G networks can help make intelligent driving technology safer and more effective. It is anticipated that by 2025, fully autonomous vehicles will become prevalent on our roads.

Manufacturing and Industrial Automation: Private 5G networks can provide real-time monitoring and management of production operations, enhancing productivity, efficiency, and quality assurance. They make it easier to deploy systems using AI, robotics, and industrial automation. Predictive maintenance, remote troubleshooting, and machine-to-machine communication are all supported by these networks.

Healthcare: The potential for Private 5G networks in this sector is enormous. They can facilitate the delivery of high-definition medical imaging and video consultations, as well as telemedicine services, remote patient monitoring, and other functions. These networks can increase data exchange speed and reliability, which will improve operational effectiveness and patient care.

SETBACK TO DIGITAL INDIA PLANS

It is widely acknowledged that each enterprise possesses unique operational requirements and specific Service Level Agreements (SLAs) to meet. However, enterprises often face challenges in having their stringent SLAs fulfilled by mobile operators, whose networks and services are primarily optimised for general retail customers across various segments. Neither side is at fault, but this situation inevitably leads to the conclusion

that it would be beneficial for enterprises to design and manage their own dedicated 5G networks. In the interest of fairness, it is justifiable to allocate the required spectrum directly to enterprises. This recommendation was also put forth by the country's apex telecom regulator, TRAI, in its detailed recommendations to the government on 11 May 2022.

It is important to recognise that each enterprise has unique and specific requirements, even within the same industry category. For instance, the digitalisation needs of Maruti Udyog would differ from those of Toyota, Hero Honda, or any other company. Moreover, since the spectrum allocation is intended for a specific enterprise, application, or location, there would typically be only one interested party. Consequently, conducting an auction for this purpose would be irrelevant and pointless. As seen in other parts of the world, the most effective approach would be to administratively assign the spectrum directly to the respective applicant or enterprise. This was also part of the TRAI's recommendations.

However, reports indicate that the Department of Telecommunications (DoT) has decided that enterprises should obtain spectrum only through leasing from telcos. This not only hampers aspiring companies like TCS, Infosys, GMR, and Larsen & Toubro, who are seeking government airwaves for the construction of 5G private networks but also poses a significant setback to India's digitalisation efforts across various industries.

Experts argue that private networks operate under different dynamics, as network virtualisation and disaggregation have expanded the vendor ecosystem beyond traditional telecom players. This crowded marketplace includes operators, industrial players, hyperscalers, startups, system integrators, and equipment vendors, all vying to address this opportunity.

The refusal to allocate spectrum directly to captive private networks will inevitably slow down enterprise digitisation and hurt India's GDP, according to a senior analyst at ABI Research.

The urgency for Private 5G networks cannot be overstated, especially for a country on the brink of digital transformation. The country is not prepared to wait indefinitely for telcos to deliver P5G networks when there is ample capacity and scale that can be utilised, particularly since the proposal has clear approval from the Union Cabinet. Shouldn't the fundamental right of choice in optimising their business be granted to enterprises with pending applications for direct spectrum allocation?

India has a vast ecosystem of MSMEs and startups, many of whom would eagerly accelerate their growth through captive wireless networks. However, being smaller entities, they are likely observing the progress of current applicants from larger enterprises who are seeking spectrum from the government before considering their direct applications. Encouraging direct spectrum assignment to enterprises and other aspirants would likely lead to a surge in the availability of private 5G networks, catalysing India's digitalisation. It is essential to support and facilitate this process rather than stifling it.

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Research inputs by Debashish Bhattacharya.

The views are personal.

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[COMMENTARY]
INTERNET OF THINGS

Enabling business India's IoT goals

To fully unlock the potential of the Internet of Things in India, a balanced coexistence of patent pools and bilateral negotiations is vital in the IoT ecosystem

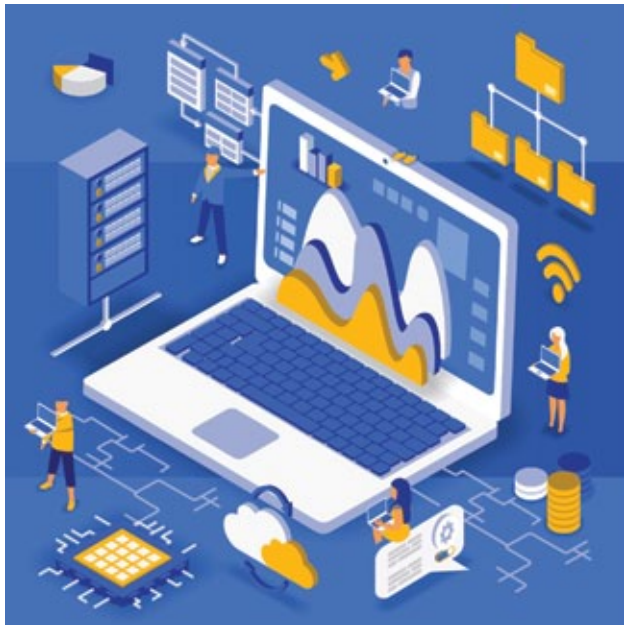
BY GITANJALI SHARMA & DR SHEETAL CHOPRA

With the Internet of Things (IoT) gaining popularity and getting integrated across sectors, businesses are incorporating cellular standards from 2G to 5G to enhance their products, processes, or services. And the products cut across sectors, including security, transportation, construction, healthcare, and more. The technology also promises massive economic benefits for Indian companies and the country.

India's IoT market grew to USD 1 billion (around Rs 82 billion) last year and is projected to experience a 14.23% growth between 2023 and 2028. Within this context, standardised cutting-edge technologies are often protected by standard essential patents (SEPs) that are necessary to implement a standard or technical specification. Such SEPs, for example, can enable IoT devices to communicate with each other via the Internet. SEPs are typically available on fair, reasonable, and non-discriminatory (FRAND) terms and conditions, which

India's IoT market grew to USD 1 billion (around Rs 82 billion) last year and is projected to experience a 14.23% growth between 2023 and 2028.

> Setting royalties based on this economic value is crucial to incentivise the development of technology that can unlock even greater economic value.



IN SHORT

- Standard essential patents (SEPs) protect cutting-edge technologies used in IoT devices.
- Patent pools can reduce transaction costs and increase transparency in licensing SEPs.
- Establishing a single patent pool covering all sectors of IoT would likely be detrimental to its development.
- Consensus-building among stakeholders is crucial for successful patent pools, and bilateral agreements have their benefits.

are determined by the parties in good faith licensing negotiations.

NEED FOR A PATENT POOL

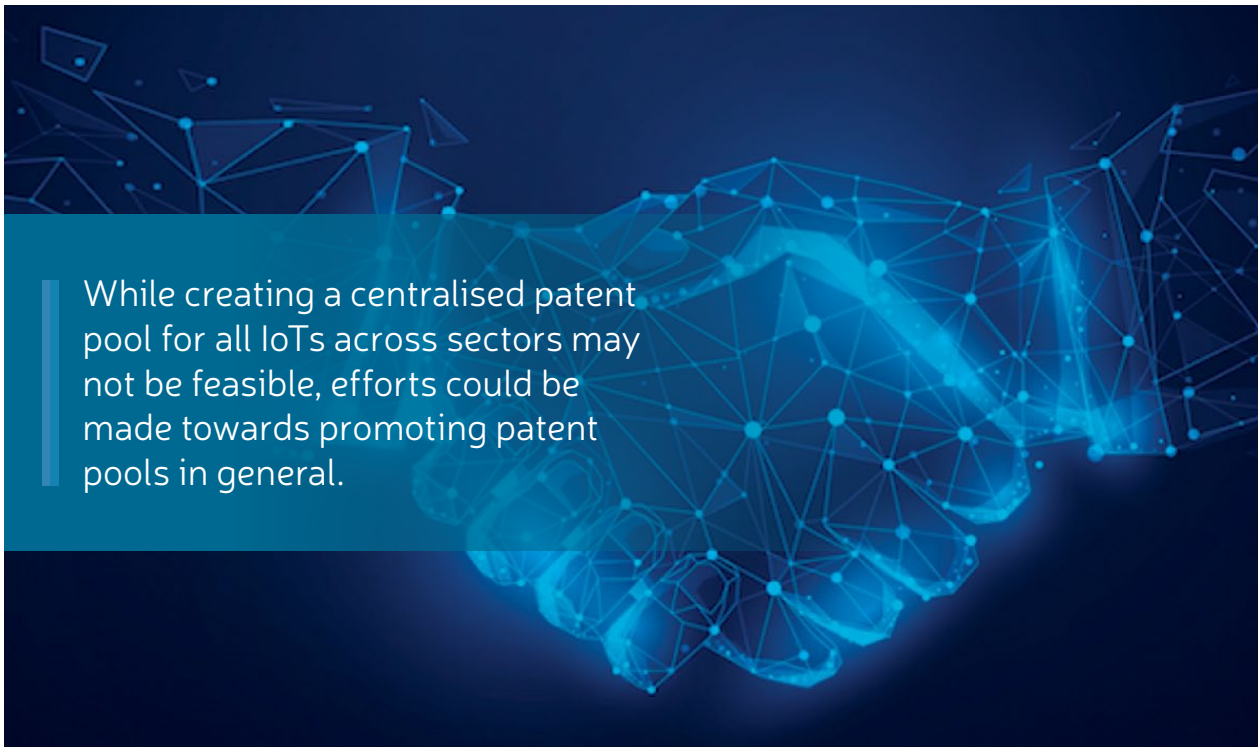
The FRAND licensing can be worked out through bilateral negotiations or via an intermediary like the patent pool. A patent pool is an agreement between a pool administrator and two or more patent owners to jointly license their SEPs. While pools are subject to scrutiny under competition law, their positive impacts are widely recognised. For instance, patent pools can reduce transaction costs by offering a single point of access to multiple SEP portfolios. They can also provide more transparency if pricing information is publicly available and increase certainty by verifying the importance of the patents submitted to the pool.

Now here is the catch! Considering that patent owners can collaborate to create a pool and jointly market it, one may wonder whether a single patent pool can be established to cover all SEPs utilised in various sectors entering the IoT. Unfortunately, such an initiative would likely be more detrimental than beneficial for the development of the IoT.

ONE SIZE DOES NOT FIT ALL

A successful pool addresses the specific needs and requirements of an industry. For example, the needs and requirements for smartphones and base stations will be different from those for connected vehicles or industrial automation. One such set of needs and requirements would be cross-licensing considerations.

Smartphone and base station companies tend to contribute their patented R&D much more heavily to cellular standardisation, whereas vehicle and industrial automation companies do not. Appreciating the needs and requirements of different industries takes time to understand and develop, and cannot be addressed all at once in one pool.



Secondly, it is important to realise that consumers in different industries derive varying levels of economic value from standardised technology, depending upon factors such as the type of standardised technology, the end product, and the specific use case. Understanding this economic value requires time and collaboration between industries and patent holders or pools of patent holders.

Setting royalties based on this economic value is crucial to incentivise the development of technology that can unlock even greater economic value for consumers. Hence, a patent pool that attempts to establish uniform royalties across all use cases and industries for all standards, without considering the economic value of such standardised technology in those particular contexts, would not align with this significant policy objective.

Thirdly, the industry consensus regarding patent pools has led to successful outcomes in terms of pools that incentivise further innovation and widespread adoption of standardised technology. Consensus-based patent pools attract innovators and implementers, whereas those that overlook the interests of either party are less successful. Building consensus among stakeholders is a crucial aspect, albeit a time-consuming one. Consequently, attempting to establish a single patent pool encompassing all use cases in all industries for all standards would not be viable without a consensus.

While creating a centralised patent pool for all IoTs across sectors may not be feasible or advisable, efforts could be redirected toward promoting patent pools in general. In this way, the market could create different pools according to the needs of the diverse industry sectors.

Patent pools can facilitate the licensing of SEPs, but it is important to acknowledge that bilateral agreements may be more suitable in certain situations. For instance, parties might prefer to cross-license their SEPs, exchange know-how, explore joint ventures, or negotiate non-essential patents through direct agreements. Therefore, both patent pools and bilateral negotiations need to coexist in the IoT ecosystem for India to fully realise its potential.

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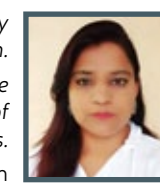

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- One Day Forum
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- 25+ Speakers
- 150+ Telco Ecosystem Decision Makers
- Keynotes & Panel Discussions
- Fire Side Chats
- Technology Showcase
- Live Networking Session
- Live Social Feeds
- Networking Lounge
- Break-out Sessions

WHO TO ATTEND

- Policy Makers & Goverment Leaders
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- CXO from Service Providers- Cloud , Applications , Content , IOT , Datacentre, Citizen Centric, Technology Companies , System Integrators
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- CXO's from the telecom equipment manufacturers, equipment vendors, Test& Measurement Companies, Handset/Device Manufacturers,
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Ganesh Lakshminarayanan
CEO – Enterprise Business and Business Head – Cloud, Airtel Business

"We are helping accelerate digital education in India"

Bharti Airtel recently announced that it has won the Cloud and CDN mandate from the Digital India Corporation (DIC). The project aims to power India's national platform for open education digital content Digital Infrastructure for Knowledge Sharing (Diksha). It also means that the Diksha application and website will be powered by Airtel Cloud, enabling students across the country to access free educational content in their preferred Indian language. Airtel Cloud will also lead the migration of Diksha to Oracle Cloud. Interestingly, Diksha offers over 9,300 courses in more than 35 Indian languages. It has witnessed over 50 billion learning sessions and 60 billion minutes of usage by students. ***Pratima Harigunani*** *caught up with* ***Ganesh Lakshminarayanan,*** *CEO – Enterprise Business and Business Head – Cloud, Airtel Business to double-click on this handshake and what it can transpire ahead. Excerpts from the interview:*

How much change and speed will this initiative bring and how will it benefit the Digital India Corporation?

At Airtel Business, we are committed to fostering collaborations that can help enhance the country's stride to a digital tomorrow. This partnership is in line with this commitment and aims to accelerate the Digital India initiative of the government. With the strengths and capabilities of Airtel Cloud, the Diksha app and website will now be seamlessly accessible to students and teachers across 28 states and eight Union Territories who can now enjoy over a billion hours of learning content in their preferred language.

What would the CDN element bring in here?

Airtel Cloud's low latency and high-bandwidth Edge CDN solution will transform the way education content is consumed digitally. It will help Diksha to distribute

> Airtel will help Diksha to distribute content on its digital platforms enabling students in remote locations to access educational content efficiently.

> Students and teachers across 28 states and eight UTs can now enjoy over a billion hours of learning content in their preferred language.

the content effectively on its digital platforms, enabling students even in the remotest locations in the country to access educational content efficiently.

What new can network, Cloud and latency do in such projects of national scale and significance?

We are helping accelerate digital education in India. Our capacity will enable Diksha to scale and widen its content offerings exhaustively. With this, the platform will be able to add more content, especially regional content that every student in the country can access in their local language from over 35 languages. With Airtel Cloud, students can enjoy a fantastic experience of Diksha without any buffering or loading delays.

Network, cloud and latency play crucial roles in advancing missions of national scale and significance in several ways, including improvements in connectivity. A robust network infrastructure ensures reliable and widespread internet connectivity, enabling citizens across the country to access digital services, education and information easily. We can also move towards enhanced access to services. As Network expansion and improved connectivity enable more people to access government services, healthcare facilities, education platforms, and e-commerce, bridging the urban-rural divide and promoting inclusivity. Also, Cloud computing enables the storage, processing, and analysis of vast amounts of data, facilitating scalable and efficient delivery of digital services, such as e-governance, digital payments, and online education. Thus, elevating scalability and efficiency parts.

What about the latency factor?

Low latency networks provide faster and more responsive connections, enabling real-time communication, video streaming, and other time-sensitive applications. This enhances user experience and enables seamless access to digital services. By leveraging network infrastructure, and Cloud technologies, and reducing latency, the Digital India mission can accelerate the adoption of digital services, improve access to information and empower citizens across the country. Besides, secure cloud infrastructure helps protect sensitive data and ensures privacy, fostering trust in digital transactions and encouraging individuals to participate in online activities.

So, what unique proposition is Airtel bringing to the table in this case?

Airtel's strength lies in its mobility services. A large percentage of the devices on which the students and teachers will access this content will be using Airtel mobility service. With a strong 4G coverage and fast expanding 5G coverage, the performance of our CDN on these devices will be much better.

How different would this be from other edtech platforms already available in the country?

Diksha sets itself apart from other edtech platforms already existing in the country through its scale and accessibility. With over 9,300 courses available in multiple Indian languages, Diksha offers one of the largest collections of free education content worldwide. The platform has witnessed billions of learning sessions and minutes of usage, demonstrating its popularity and impact. The partnership with Airtel further strengthens Diksha's capabilities by leveraging its cloud and CDN solutions, enabling seamless access to educational content for students across the country.

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Unlocking the network matrix

API Holdings implemented SD-WAN to enhance its network visibility, streamline centralised management, and improve the application performance

BY PRATIMA HARIGUNANI

SD-WAN is a cool thing. It sounds great to softwarise and smartify one's network. On paper, SD-WAN also promises a lot of agility, simplification, visibility, and twinkle-toed uptime. But the devil is always in the details. Or, to be precise, in the trenches. However, being a healthcare enterprise, that too with a digital-first posture, is not easy. The IT team has to make sure that the network availability is high. The resilience and uptime of the network cannot be ignored when you promise utmost agility and instant solutions to not just your end customers but other ecosystem partners.

That means, there is no room for congestion, delays, and blind spots.

TRIGGERS FOR THE SWITCH

The decision to implement SD-WAN at API Holdings transpired due to several challenges and gaps that the enterprise was facing with its traditional networking infrastructure.

"Before adopting SD-WAN, we were faced with challenges such as limited visibility and control over our network traffic, inefficient management of multiple branch locations, slow application performance, and high costs associated with maintaining dedicated MPLS connections," pointed out Chandresh Dedhia, Group CIO of the company. He further explained that these challenges hindered API Holdings' ability to scale, optimise application performance, and ensure consistent connectivity across the organisation.

THROUGH THE TUNNEL

Capturing the overall deployment experience of SD-WAN, Dedhia highlighted that the deployment experience of Silver Peak's SD-WAN solution was largely positive.

"We carefully planned the implementation process and engaged with a reliable partner, Hararei India, which provided us with comprehensive technical expertise and support. There were no major issues during the initial

"SD-WAN's built-in security features have strengthened our network's security posture, reducing the risk of data breaches and unauthorised access."

Chandresh Dedhia, Group CIO, API Holdings

NEED FOR SD-WAN

- Limited visibility and control over network traffic
- Network optimisation hurdles
- Inefficient management of multiple branch locations
- Slow application performance
- Connectivity issues
- High costs associated with maintaining dedicated MPLS connections

THE BENEFITS

- Streamlined network operations
- Better uptime
- Improved efficiency
- Reduced administrative overhead
- Cost savings
- Flexibility and scalability of the network

stages. Hararei and Silver Peak promptly addressed any minor issues that surfaced, minimising any potential impact on our business operations and end-users."

As to hidden costs, he pointed out that proper planning and alignment with partners helped the team accurately assess and manage expenses. Dissecting in detail he shared that, unlike other OEMs, Silver Peak's pricing model is easy to understand and simple. "They have only two types of software licenses. One for the EdgeConnect software, including all the SD-WAN features, and Boost for fabric-wide WAN Optimisation. Overall, there were no surprises and our SD-WAN project expenses were well within the anticipated budget," he added.

But, often, such projects also call for a lot of reskilling and training. He avers. "The IT team required some training to familiarise themselves with the SD-WAN management platform and the new configuration paradigms. However, the learning curve was manageable, and our team quickly adapted to the new technology."

Another challenge that such leaps from one environment to another entail is that of business disruption. How did the team plan for, and manage downtime?

"We carefully scheduled the deployment to minimise disruption to our business operations. With proper planning, we were able to achieve a smooth transition without any significant downtime," Dedhia said.

THE PROOF OF THE JAM

Talking about the overall effectiveness of SD-WAN in the healthcare domain, Dedhia highlighted that SD-WAN has proved to be highly effective in meeting API Holdings' business needs. "It has provided us with enhanced network visibility, centralised management, and improved application performance across our branch locations. The ability to prioritise critical applications and dynamically route traffic based on real-time conditions has significantly optimised our network performance and user experience."

SD-WAN's simplified management interface allows the company to streamline network operations, thereby improving efficiency and reducing administrative overheads.

SD-WAN ESSENTIALS

- Thoroughly assess your organisation's specific networking requirements and challenges before investing in SD-WAN. Understand the areas where SD-WAN can provide the most value and align them with your business objectives.
- Choose a reputable SD-WAN OEM and partner with a proven track record and strong customer support. Engage in detailed discussions with the partner to ensure they understand your unique needs and can provide the necessary expertise and assistance throughout the deployment process.
- Develop a comprehensive deployment plan that includes a phased approach, proper testing, and a well-defined rollback strategy if needed. This will help minimise potential disruptions and ensure a smooth transition.
- Consider the training needs of your IT team and allocate sufficient resources to facilitate their understanding of SD-WAN technology. This will enable them to effectively manage and troubleshoot the new infrastructure.
- Regularly monitor and evaluate the performance of your SD-WAN deployment. Leverage the analytics and reporting capabilities of the SD-WAN solution to gain insights into network traffic, application performance, and security posture. This information will help you fine-tune your configuration and optimise your network.

He further highlighted how SD-WAN's built-in security features, such as encrypted tunnels and segmentation, have strengthened the overall network security posture, reducing the risk of data breaches and unauthorised access.

"The simplified management interface has also allowed us to streamline network operations, resulting in improved efficiency and reduced administrative overhead.

Additionally, SD-WAN's ability to leverage multiple transport options, including cost-effective internet connections, has helped us achieve substantial cost savings without compromising on network reliability and performance. This flexibility has enabled us to scale our network effortlessly and support our business growth objectives. SDWAN proved to be the right solution for our digital-first business," he said.

Network connectivity in remote areas can be a challenge. "We had to increase this much-needed resilience. We have created SD-WAN across all sites in the company. This has massively improved resilience and availability in the network. It has improved overall bandwidth and optimised traffic in a very strong way. We have also been able to reduce costs through this initiative."

There have also been significant improvements in uptime and network optimisation. "Earlier our uptime was close to 95% and now it's above 99%." Ask him how latency and congestion issues are controlled, especially given the internet infra in many corners of India, and he pointed out how SDWAN helped manage this as well. "It does the link bonding, latency management, compression, and CRC and hence we can manage the latency and congestion issues."

As to how the team keeps the networks smart, swift, and resilient, he pointed out that the company has a single monitoring and management console that gives it visibility across all the group companies.

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Managing cloud migration challenges

As cloud migration gains momentum, network intelligence will become crucial in overcoming challenges and ensuring a successful migration

BY PRAMOD GUMMARAJ

In today's digital age, cloud computing has become an essential component for businesses seeking to stay competitive in their respective industries. Cloud migration is a process that involves transferring an organisation's data, applications, and other resources to a cloud-based infrastructure. This enables businesses to take advantage of numerous benefits such as flexibility, scalability, cost savings, and improved security.

Cloud migration, however, also presents various challenges such as network complexities, performance issues, and security risks. With the availability of smarter analytical technologies and tools, network intelligence is emerging as a critical tool for accelerating cloud migration. It does so by providing businesses with the necessary insights and intelligence to make informed decisions about their cloud infrastructure.

> While cloud migration is critical for businesses to stay competitive, it often leads to challenges such as network complexities, performance issues, and security risks

Organisations that invest in network intelligence are better equipped to manage the complexities of cloud migration and realise the benefits of cloud computing.

SO, WHAT DOES NETWORK INTELLIGENCE MEAN?

In simple terms, one may define network intelligence as the process of collecting, analysing, and interpreting data from various network sources to gain insights into the network's performance and behaviour.

It involves using advanced tools and technologies such as artificial intelligence, machine learning, and data analytics to monitor network traffic, identify patterns and anomalies, and predict network performance. Network intelligence provides businesses with a real-time view of their network's health, allowing them to identify and address issues before they impact critical operations.

IMPACT ON CLOUD MIGRATION

Cloud migration involves transferring an organisation's data and applications from on-premises infrastructure to a cloud-based environment. This process involves numerous complexities, such as network performance, security risks, and data management challenges. Network intelligence plays a crucial role in accelerating cloud migration by providing businesses with the necessary insights and intelligence to overcome these challenges.

Pre-migration planning: Before migrating to the cloud, organisations need to assess their current IT environment and determine which workloads are suitable for migration. Network intelligence can help with this process by providing insights into network traffic patterns, application performance, and user behaviour. This information can be used to identify which workloads are most critical, which applications are most resource-intensive, and which users require the most bandwidth.

Identifying the right workload: One of the biggest challenges of cloud migration is deciding the workloads to be migrated. Some workloads are better suited for the cloud, while others may not be cost-effective to migrate. Network intelligence can help organisations identify the right workloads to migrate by analysing performance, utilisation, and cost data. This information can be used to create a migration plan that maximises the benefits of cloud migration.

Increasing network capacity: As more organisations move their workloads to the cloud, the demand for network capacity is increasing. Network intelligence can help organisations optimise network capacity by analysing usage patterns, predicting future demand, and recommending solutions to increase capacity. This information can be used to ensure that the network can handle the increased demand, reducing the risk of performance issues and downtime.

Enabling predictive maintenance: Network intelligence can enable predictive maintenance, which can help organisations reduce downtime and improve network reliability. By analysing network data, network intelligence can detect potential issues before they become major problems. This information can be used to schedule maintenance activities proactively, reducing the risk of downtime and improving network reliability.

Network performance optimisation: Network intelligence enables businesses to optimise their network performance by providing real-time insights into network traffic and behaviour. This allows businesses to identify and address performance issues before they impact critical operations. With network intelligence, businesses can monitor network traffic, identify bottlenecks and congestion, and optimise network resources to ensure maximum performance.

Security risk mitigation: Cloud migration presents numerous security risks such as data breaches, cyberattacks, and insider threats. Network intelligence provides businesses with the necessary intelligence to identify and mitigate these risks. By monitoring network traffic, identifying anomalies, and detecting potential security threats, businesses can take proactive measures to safeguard their cloud infrastructure and data.

INTELLIGENCE MATTERS

- Cloud migration offers flexibility, scalability, cost savings, and improved security.
- Network intelligence helps accelerate cloud migration by providing insights and intelligence.
- It collects, analyses, and interprets data to gain insights into network performance and behaviour.
- Network intelligence aids in pre-migration planning, workload identification, and capacity optimization.
- It enables predictive maintenance, optimizes network performance, mitigates security risks, and manages data effectively.

> One of the biggest challenges of cloud migration is deciding the workloads to be migrated since all workloads may not be cost-effective to migrate.

Data management: Cloud migration involves transferring large amounts of data from on-premises infrastructure to a cloud-based environment. This presents numerous data management challenges such as data integrity, data loss, and data privacy. Network intelligence enables businesses to monitor data traffic and ensure data integrity, enabling seamless data migration without compromising data privacy or security.

Cost optimisation: Cloud migration can be a costly process, with numerous expenses such as infrastructure, licensing, and maintenance costs. Network intelligence provides businesses with insights into their network performance and behaviour, enabling them to optimise network resources and reduce costs. By identifying unnecessary network traffic and optimising network resources, businesses can reduce their cloud infrastructure costs while maintaining optimal network performance.

Cloud migration is a critical process for businesses seeking to stay competitive in today's digital age. However, the process presents numerous challenges that can impact critical operations, including network performance, security risks, and data management challenges. As cloud migration continues to gain momentum, network intelligence will play an increasingly crucial role in ensuring its success.

Organisations that invest in network intelligence will be better equipped to manage the complexities of cloud migration and realise the benefits of cloud computing. Network intelligence provides businesses with the necessary insights and intelligence to accelerate cloud migration by optimising network performance, mitigating security risks, ensuring data integrity, and reducing costs. As businesses continue to embrace cloud computing, network intelligence will become an essential tool in ensuring successful cloud migration and maintaining optimal cloud infrastructure performance.

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Driving datacentres' sustainability goals

Flash-based datacentres promote greener digital infrastructure through energy efficiency, reduced carbon emissions, and improved efficiency gains

BY SHUJA MIRZA

Enterprises worldwide are recognising the importance of sustainability as climate change becomes more important during boardroom discussions with new regulations looming in. However, the focus on digital transformation is causing datacentres to consume more energy than ever before.

According to Bloomberg, an optimistic projection suggests that by 2030, the information and communications technology sector will consume approximately 8% of the world's total electricity demand, compared to 2% recorded in 2020. It is expected that storage as a proportion of datacentre (DC) energy consumption, will continue to expand and might account for as much as 38% of the overall DC power requirements by 2030, making sustainability further important.

Before integrating technology to align with an organisation's environmental, social, and governance (ESG) objectives, it is crucial to first establish a baseline and subsequently define a target to systematically advance towards those goals. This entails adopting modern technologies specifically designed for the contemporary datacentre environment.

Several companies offer a comprehensive suite of solutions that assist organisations to achieve this, empowering them to publish a sustainability dashboard and scorecard. These solutions enable continuous optimisation of energy consumption and maximisation of resource utilisation, aiding organisations in their pursuit of achieving their sustainability goals.

The selection of an appropriate storage solution for datacentres assumes a pivotal role in the realisation of sustainability objectives. By making an informed decision, organisations can contribute significantly to their environmental responsibilities while simultaneously advancing their digital transformation initiatives. Here are five ways in which all-flash datacentres can help enterprises achieve their sustainability goals.

#1

Fewer watts per TB, lesser energy for cooling: The most significant sustainability benefit of flash-based storage over hard disk drives (HDDs) is its energy efficiency. Flash storage can support more data per watt of power consumed than HDDs. In a datacentre, this efficiency results in significant energy savings and lower carbon emissions.

#2

A more efficient way of storing data: Flash storage supports de-duplication, compression and compaction.

A FLASH IN POINT

- Digital transformation is constantly increasing datacentre energy consumption, posing sustainability challenges.
- Information and communications technology sector is expected to consume 8% of global electricity demand by 2030.
- Baseline establishment and adoption of modern technologies help align ESG objectives in datacentres.
- All-flash datacentres offer sustainability benefits such as energy efficiency and reduced carbon emissions.
- Flash storage enables cleaner manufacturing, efficiency gains, lower costs, faster performance, and lower TCO for sustainable datacentres.

These efficiency features allow users to store more data in a lesser storage footprint, thereby reducing the costs of running flash-based storage systems. With decreasing costs, flash storage enables organisations to leverage its benefits on a larger scale, offering improved efficiency, faster data access, and enhanced reliability compared to traditional spinning disk storage.

#3

Cleaner manufacturing and sourcing: HDD manufacturing process involves the use of raw materials such as aluminium, glass, and rare-earth elements such as Neodymium (Nd) and Dysprosium (Dy) to make the magnetic media inside the drive. Rare earths are mined by digging vast open pits in the ground, which can contaminate the environment and disrupt ecosystems. When poorly regulated, mining can produce wastewater ponds filled with acids, heavy metals, and radioactive material that might leak into groundwater.

Unlike in the case of HDDs, flash storage devices are more easily recyclable, because their NAND chips can be remanufactured using previously used components without significant security or privacy risks. It is important to note that both manufacturing processes have their sustainability challenges, and efforts are being made to improve sustainability across the entire electronics industry.

#4

Lowest cost per Input-Output (I/O): Flash offers superior performance, even over nearline HDDs and hybrid SSDs/HDDs, which means it can handle more data in less time. Without powering spinning disks, flash delivers read speeds that are 10 times faster than HDDs. By reducing the time to access and process data, flash enables more efficient use of computing resources, which can help reduce overall energy consumption.

#5

Lower total cost of ownership: It is significantly easier to invest in sustainability goals if there is a reliance on a lower overall total cost of ownership (TCO) as a result of your efforts. While the initial cost of flash might still be slightly higher than that of HDDs in some cases, the TCO over the lifespan of flash-based storage is lower due to its reduced energy consumption, physical footprint, and lower maintenance costs. Hence, choosing flash-based storage over HDDs helps datacentres bring down their carbon footprint in a small but measurable way and help contribute to a more sustainable future.

As the world continues to grapple with the challenges posed by climate change, businesses must adopt sustainable practices across all aspects of their operations. All-flash datacentres offer an excellent opportunity for organisations to align their sustainability goals with their IT infrastructure and they are already beginning to recognise the potential of all-flash datacentres in driving their sustainability goals.

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Building a transparent digital marketing ecosystem

Web3.0 can increase transparency and accountability in digital advertising by establishing decentralised marketplaces and incentive-based ad systems

BY HIMANSHU NAGRECHA

The most recent buzzword that has been influencing the advertising market is generative AI-ChatGPT. As a natural language processing tool, it can respond swiftly to queries that are potentially disrupting the search ad markets. For instance, incorporating ChatGPT into search engines can produce marketing campaigns catered to the unique requirements and interests of individual users. Additionally, ChatGPT's capacity to produce text that sounds like human speech may help produce more convincing and engaging ads.

In this regard, the face of advertising is going to change forever, as it will transform how brands communicate and engage with their customers. In a bid to successfully provide intelligent and effective digital experiences,

> Brands have been integrating generative AI and Web3 as a strategy to successfully provide intelligent and effective digital experiences.

> Ad fraud can manifest itself in a variety of ways, such as domain spoofing, ad stacking, fake social media profiles, and bots, among others.

brands have been integrating generative AI such as ChatGPT and Web3 as a strategy. With Web3, we are moving into a new era of the internet, and with its advent, we can experience a seismic shift from a centralised system to a decentralised system. With privacy breaches being the norm in Web 2.0, Web3 ensures data stays protected by the user. With the amalgamation of both technologies, advertisers will be able to target customers more effectively, and consumers will be able to keep their data private.

On one hand, where advertisers can leverage new-age technologies for meeting digital goals, fraudsters too are determined to make a quick buck out of this. They are consistently getting sophisticated with their tactics using AI, which is leading to the wastage of the ad budget and hampering the effectiveness of the campaign. Therefore, entering the realm of Web3 and generative AI will require careful planning, instruction, and preparation. Furthermore, advertisers will need to be aware of what they are up against in this brand-new environment.

UNDERSTANDING THE AD FRAUD MENACE

The misuse of any new technology always occurs shortly after its introduction, and it is evident in the field of online advertising as well. Ad fraud is an issue that emerged with digitalisation and has become a huge problem that marketers and agencies are dealing with today. It can manifest itself in a variety of ways, such as domain spoofing, ad stacking, fake social media profiles, and bots, among others. Digital fraud drained over USD 80 billion in 2022, and Statista predicts it will exceed USD 100 billion in 2023. It is a serious issue because the sector is losing an outrageous sum of money.

Also, as technology advances, the methods used by fraudsters are changing significantly. One method that has been uncovered is a malicious AI-generated ad campaign on social media platforms that is aimed at obtaining sensitive information from users. For instance, fraudsters can particularly float what seems to be an informative document for individuals but is originally a method used for extracting data that could be used for phishing and other attacks.

The mere breach of sensitive data can lead to eroding consumer confidence, a breach of trust, and a loss of consumer loyalty. For advertisers, it can result in regulatory consequences, financial losses, and scrutiny of data handling processes, undermining the effectiveness and credibility of advertising efforts. It is a reminder of the new potential threats that companies can encounter as fraudsters use new-age technologies.

On one hand, generative AI has been aiding advertisers in better customer engagement, but it also poses risks for undermining customer trust and data privacy. In this regard, it is evident that advertisers must be cautious while collecting and utilising user data and ensuring that they use new-age technologies more cautiously. As a result, the need of the hour is to utilise Web3 and generative AI to foster advertising transparency.

WEB3'S ROLE IN FOSTERING AD TRANSPARENCY

Transparency poses a significant challenge for advertisers in the digital advertising ecosystem. However, it is the most critical element that helps advertisers optimise their campaigns and budgets as well. Furthermore, it also helps the publishers safeguard their brand image and revenue while helping customers secure their privacy and data.

In the real world, however, transparency is often hindered by the complex system of advertising, which includes several intermediaries. In a bid to negate this challenge, advertisers can leverage the power of Web3 and generative AI to foster a more transparent advertising ecosystem.

MORE TRANSPARENCY AND ACCOUNTABILITY

By establishing decentralised marketplaces and incentive-based ad systems, Web3 technology will increase transparency and accountability in the digital advertising sector. Although the current ecosystem faces many difficulties, including ad fraud, data privacy issues, and a lack of transparency, Web3's use of blockchain technology allows advertisers to keep track of every transaction and offers better transparency throughout the whole advertising supply chain.

Examining and confirming the consumer journey through verified ad delivery and confirming that a genuine human, not a bot, clicked the advertisement, would further ensure transparency. As a result, the

ability of advertisers to control how their investments are managed will increase. In addition, they will be able to keep an eye on where their ads are being placed.

DECENTRALISATION OF SOCIAL MEDIA

Users will have more control over their data and online identities when social media is based on Web3. It promotes independence and transparency without a central authority, in contrast to centralised social networking systems.

Censorship resistance, ownership of personal data, and more control over user-generated content are all advantages of decentralising social media. This may result in more open and transparent platforms and give users more control over data and content. It makes it possible for advertisers to efficiently place their advertisements which delivers efficient results. As a result, businesses may be able to more effectively target particular consumers.

ENHANCEMENT OF PERSONALISED ADVERTISING

The demise of the third-party cookie has already caused marketing methods to change, and semantic targeting in Web 3.0 may be why digital marketers need to customise their content. Blockchain technology can be used to build a decentralised identification system that gives consumers permission-based control over their data sharing with advertisers. With the use of this data, marketers will be able to monitor customer interactions and engagement to better understand their target market.

Consumers can be targeted by businesses based on their online behaviours, interests, and activities, resulting in more specialised advertising and precise targeting. Ad campaigns will be more successful as a result, with real click-through rates and improved conversion rates.

ALL THINGS CONSIDERED

Web3 and generative AI have the potential to revolutionise the advertising landscape by bringing transparency to the forefront. The blockchain abilities of Web3 can be leveraged to foster better transparency in terms of decentralised social media, enhancement of personalised advertising, and reduction of ad fraud. In addition, by integrating it with generative AI such as ChatGPT, advertisers can evaluate customer preferences, plan more targeted campaigns, and increase conversion rates.

However, as advertisers and marketers utilise these technologies for mobile and social media marketing, ad fraud still poses a potential threat to ad budgets and campaign effectiveness. To prevent ad fraud in this new digital world, marketers can follow certain steps. Ideally, advertisers must understand a campaign's traffic flow, whether it is fake or real. To understand that, they need to leverage data-driven tools that would help them track campaign performance and optimise ad spend. Furthermore, using ad fraud detection tools can help them discover any discrepancies in the traffic flow, thereby pointing towards fraudulent activities.

With increasing competition and rising concerns about privacy in the digital space, advertisers, in addition to adapting to new technologies, must also diversify their ad spending across various platforms. In addition, they must also consider ad fraud prevention tools in a bid to save their ad budget, get genuine engagements, and increase ROI in their social media and mobile marketing campaigns.

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ABB launches power solutions for datacentres

ABB India's Electrification business has unveiled the MegaFlex DPA power solution specifically designed for the Indian market. Built on the Decentralised Parallel Architecture, the new UPS solution is part of ABB's EcoSolutions portfolio and aligns with the company's circularity framework, emphasising its commitment to sustainability.

With the rising demand for Software as a Service and Infrastructure as a Service application, the continuity of datacentres has become paramount. India's datacentre market is projected to grow significantly due to the surge in internet subscribers, increased usage of mobile devices, digital payments, and the focus on big data, cloud computing, IoT, and data protection. Ensuring datacentre continuity is crucial for India's digital infrastructure.

The MegaFlex UPS range targets the IEC and UL markets, offering power ranges of up to 1.5 MW and 1.6 MW, respectively. ABB claims that the solution has exceptional availability and reliability, while it occupies a significantly smaller footprint compared to competing models with equivalent power ratings. "Its sustainable power technology minimises energy losses through high-efficiency converters, allowing adaptability to variable IT loads," the company stated.

The new solution integrates seamlessly with ABB's power infrastructure products, ensuring a continuous flow

of clean power to datacentres and enhancing system-wide resiliency. Its modular platform enhances serviceability, with improved self-diagnostics, predictive maintenance capabilities, and reduced downtime. MegaFlex DPA also features standardised power distribution architectures, high-efficiency converters, portability, compatibility with different battery technologies, optional redundant power capacity, and advanced connectivity options.

NetApp adds new data protection features for BlueXP

Data-centric software company, NetApp has introduced new security features for NetApp BlueXP, further solidifying its position as a leading option for secure data storage. In today's technology landscape, where data is invaluable yet vulnerable, the need for robust cybersecurity measures is paramount. NetApp recognises the challenges faced by organisations in managing data across diverse environments, including on-premises and multiple cloud platforms, while ensuring protection, security, and compliance.

The latest capabilities offered by NetApp BlueXP enhance its unified experience and provide advanced data service capabilities, enabling organisations to discover, manage, and protect data across their multi-cloud infrastructure. Leveraging AI and ML operations, these features empower businesses to achieve optimum results in data management while safeguarding against cyber threats such as ransomware attacks and potential data loss or corruption.

Among the feature updates and innovations are simplified backup and recovery processes, extended data protection across various environments, and deployment options in highly secured environments, including government sites. NetApp BlueXP now offers a single control plane for customised backup strategies, eliminating the need for multiple tools and specialised resources. Additionally, it supports application-consistent database deployments in major clouds, allowing seamless integration with Oracle databases on Amazon FSx for NetApp ONTAP.

NetApp BlueXP serves as the central management method for NetApp ONTAP, the industry-leading data management software, both on-premises and in the cloud. This announcement includes over a dozen feature updates and innovations, reflecting NetApp's commitment to providing customers with an unrivalled cybersecurity posture and simplified data management operations in today's complex data landscape.

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STL implements communication system for Kochi Water Metro

Optical and digital solutions company, STL has announced the successful implementation of a state-of-the-art communication system for the Kochi Water Metro in Kerala. The company has deployed its Neox Unified Communications solution, incorporating advanced technology such as IP telephony, contact centre capabilities, Automatic Call Distribution, IVRs, and Centralised Voice Recording modules.

The Kochi Water Metro project aims to connect 10 island communities in Kochi to the mainland through a network of 78 battery-operated electric hybrid boats. These eco-friendly boats will operate along 16 routes, covering a total distance of 76 kilometres and serving 38 terminals. This water taxi service not only offers a greener transportation option but also opens up new avenues for trade, commerce, and social interaction in the region.

STL's Neox platform enables seamless communication among 145 internal users and 10 Helpdesk executives located across 38 jetties, 1 Boatyard, and 1 Operations Control Centre (OCC). This comprehensive solution allows for internal and external stakeholder communication, connecting staff members and citizens alike.

The integration of Neox with VHF radios and PA systems across the jetties facilitates system-wide calling, ensuring effective communication throughout the Water Metro network. Neox IP Telephony connects extensions to the public switched telephone network, enabling audio, video, and instant messaging communication for internal users. Additionally, Neox offers an analytical dashboard, enhancing the efficiency of boat services and aiding in the operations and maintenance of the entire system.

CommScope unveils NaaS solution platform

CommScope, an infrastructure solutions company, has announced three new RUCKUS Networks solutions that offer enterprises and service providers innovative ways to deploy, manage, and operate purpose-driven networks. These solutions provide distinct advantages individually and, when used together, offer a robust solution for delivering reliable user experiences, addressing coverage and mobility challenges, and simplifying operational demands.

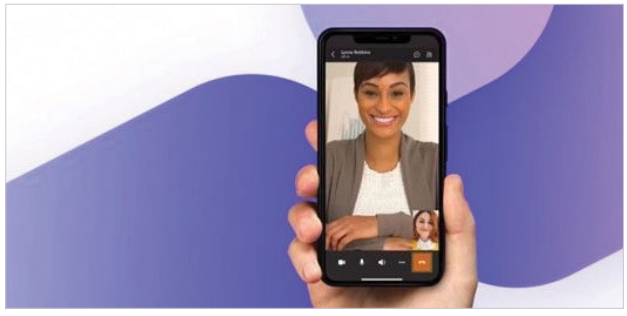
The AI-driven RUCKUS One cloud-native platform offers network assurance, service delivery, and business intelligence through a unified dashboard. This simplifies converged network management across multi-access public and private networks, providing organisations with streamlined operations and enhanced visibility.

The Network as a Service (NaaS) programme introduces a new operational and financial model for businesses to consume networking solutions and services on a subscription basis. This allows organisations to move away from upfront capital expenditures and outsource lifecycle operations to RUCKUS and its channel partners. Additionally, CommScope Financial Services offers traditional leasing or complete hardware-as-a-service finance models.

The new multi-access public and private solution, combined with NaaS, facilitates the deployment and management of networks leveraging private cellular or a converged network using a mix of Wi-Fi, IoT, wired, and private cellular technologies. The solution is ideal for businesses and partners requiring private cellular solutions for applications like smart manufacturing, enabling seamless integration with existing IP network infrastructure.

By providing a comprehensive suite of solutions for multi-access public and private network management, including the ability to outsource resources through NaaS, RUCKUS Networks empowers partners to deliver tailored solutions while enabling businesses to focus on their core operations.

Exotel, Microsoft offer direct routing for Teams Phone in India



Cloud communications platform (CPaaS) provider Exotel has announced a partnership with Microsoft to offer Direct Routing for Microsoft Teams Phone in India. This collaboration allows Teams Phone customers and users in India to leverage Exotel's services for Public Switched Telephone Network (PSTN) calling. The partnership aligns with Exotel's mission to provide scalable, cost-efficient, and flexible solutions for seamless customer conversations.

The collaboration between Exotel and Microsoft brings numerous benefits to Indian businesses. By integrating Exotel's secure and compliant Direct Routing offering with Microsoft Teams, businesses can enable PSTN calling seamlessly. This integration empowers organisations to enhance their communication capabilities, streamline operations, and deliver exceptional customer experiences.

Highlighting the significance of this collaboration, Exotel CTO Anil Kumar that it will enable the two companies to address the missing piece of PSTN calling. "Cloud-based solution for Direct Routing by Exotel in collaboration with Microsoft ensures providing more flexibility to customers along with cost savings," he said.

Bhaskar Basu, Country Head – Modern Work at Microsoft India, emphasised the value of the collaboration, saying, "With Exotel's secure and cloud-based solution, Microsoft Teams customers and users in India can effortlessly enable PSTN calling through select partners, resulting in frictionless conversations and cost efficiency. This collaboration unlocks possibilities for Indian businesses and strengthens their ability to thrive in the digital era."

In today's digital business landscape, effective and interconnected conversations are vital for success. The collaboration equips Indian businesses with a robust, secure, and connected customer conversation platform, enabling them to thrive in a competitive market.

Comviva, e& enterprise to provide enterprise CPaaS platform

Comviva has announced an expansion of its strategic partnership with e& Enterprise to provide an advanced omnichannel Communication Platform as a Service (CPaaS) platform for enterprises. The platform will enable real-time communication capabilities, allowing enterprises to enhance and personalise the end-user customer experience seamlessly across multiple channels.

Businesses across industries will have the ability to self-onboard, create customised applications, and deliver tailored experiences to their end customers. Comviva's cloud-based CPaaS platform integrates seamlessly with business applications, enabling secure real-time customer interactions for all engagement use cases, from marketing to operations to customer service.

Comviva's CPaaS platform is a full-stack solution that empowers telecom service providers to facilitate real-time customer interactions for enterprises. With messaging services, chats powered by conversational AI capabilities, and scalability to handle billions of messages annually, the platform enhances customer experiences and enables automated user interactions in a natural language format.

Speaking on the collaboration, Miguel Villalonga, CEO, e& Enterprise Cloud said that the partnership will help the company create an open and collaborative CPaaS ecosystem. "With our CPaaS solution, engageX, we aim to help enterprises craft engaging and effective customer journeys," he stated. Comviva CEO Manoranjan Mohapatra emphasised the transformative nature of the partnership. "The partnership will usher in a new era of enterprise customer experiences, driven by simplicity, rich customer experience, and personalisation," he said.

LTTS, BSNL to enable private 5G network deployments

L&T Technology Services (LTTS) has announced a strategic partnership with Bharat Sanchar Nigam Limited (BSNL) to enable global enterprises in their private 5G network deployments. As per the agreement, BSNL will provide the spectrum using both PLMN or isolated allotment, while LTTS will cater to the private network requirements by deploying equipment, applications, servers, technology, and software, along with core integration of devices and sensors within the customer's ecosystem. LTTS will act as a master system integrator, offering technology choices, equipment, and use case buildout, while BSNL will serve as the official network provider.

According to IDC, the global private 5G market is projected to surpass $8 billion by 2026, with a compound annual growth rate of 35.7% from 2022. The demand for Non-Public Networks (NPN) in India is increasing due to faster connection speeds and lower latency. The adoption of Captive Non-Public Networks (CNPN) is also rising as enterprises prioritise network modernisation for enhanced security.

Amit Chadha, CEO and Managing Director of LTTS, expressed excitement about the partnership, emphasising the significance of 5G-enabled private enterprise networks for digital transformation. The collaboration aims to support sustainable and smart spaces through joint private networks and digitisation initiatives.

BSNL commented that the strategic partnership with LTTS will enable them to assist global organisations in their digital transformation journeys. They anticipate rapid adoption of private networks across multiple industries and use cases, recognising 5G as a significant enabler with the potential to benefit millions of end-users.

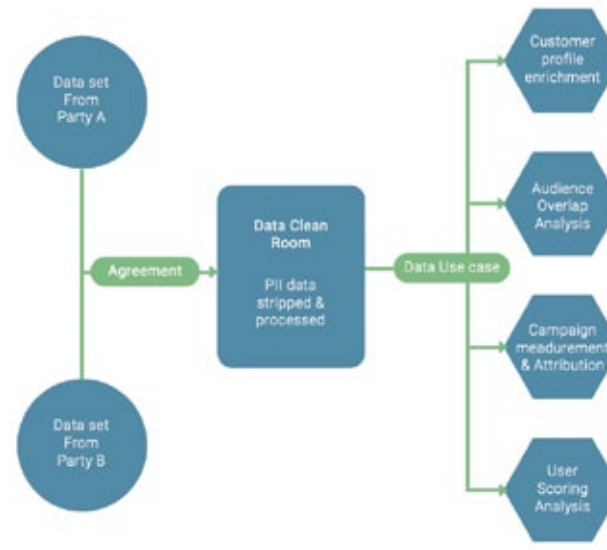
Hoonartek launches enterprise data clean room

Hoonartek has introduced DataHaven, an advanced Enterprise Data Clean Room on the Snowflake platform. DataHaven revolutionises data collaboration and analytics by enabling organisations to securely analyse and collaborate on combined datasets without sharing personal identifiable information (PII). With DataHaven and Snowflake's powerful capabilities, companies can quickly establish a robust data environment and collaborate with partner organisations in popular public clouds.

DataHaven leverages Snowflake's built-in data access controls to protect sensitive data, offering query controls, output restrictions, query logging, and cryptographic computing tools. This ensures that companies can generate unique insights about advertising campaigns, investment decisions, clinical research, and more while maintaining data security.

The need for enriched data and collaboration across industries and geographies is evident. In sectors like media, advertising, and telecom, brands, media publishers, and ad partners require seamless collaboration across multiple datasets to improve campaign performance and enhance customer experiences. DataHaven provides a solution that allows secure collaboration without compromising customer privacy.

Building data clean rooms is often a complex and time-consuming process. Hoonartek addresses this challenge by integrating Snowflake's unique architecture into



DataHaven, offering simplicity, scalability, and enhanced data security. As a Premier Snowflake Partner, Hoonartek brings together the expertise and technology required to deliver a seamless experience.

In the future, DataHaven will incorporate integration with Meta and Google, along with features like Know Your Customer compliance, ISO certifications, and advanced security modules. Companies can take advantage of DataHaven's secure data clean room in the cloud where their data resides, ensuring high availability, security, and meaningful insights.

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