


THE RISE OF MORE SOFTWARE IN THE TELCO TOWN

As software replaces telecom systems, hardware, and infrastructure, the looming threat of security breaches and performance bottlenecks cannot be ignored



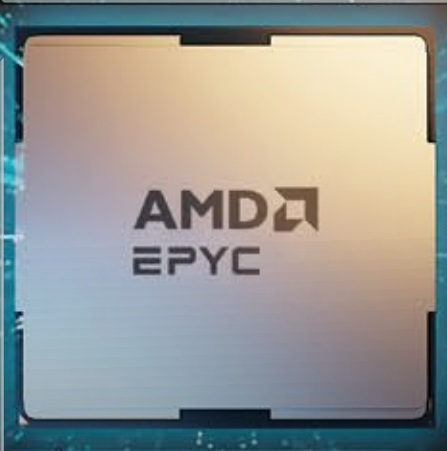
SECURITY



“We can help TSPs accelerate their digital transformation”

Fawad Qureshi
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SHUBHENDU
PARTH
[OPENING NOTE]

Enhancing India's prowess in the space sector

The Indian Space Policy 2023 marks a significant shift in India's approach to space exploration and operations. The policy aims to increase India's share in the global space economy from less than 2% to 10% by institutionalising private sector participation in the space sector while enabling the Indian Space Research Organisation (ISRO) to focus on research and development of advanced space technologies.

Private companies have been driving private sector investment in the space sector, and their reusable rockets have become a popular choice for space missions around the world. The inclusion of private companies in the space sector has proved to be a boon for many countries, including the United States. The Indian Space Policy 2023 seeks to replicate this success by allowing private companies to undertake end-to-end space activities in India, including building satellites, rockets and launch vehicles, data collection, and dissemination.

This policy spells out the framework for the private sector to use ISRO facilities for a small charge and encourages them to invest in creating new infrastructure for the sector. This move is expected to spur the growth of space-related industries in India, generating new jobs and opportunities for skilled professionals. By freeing up ISRO to focus majorly on R&D, the policy aims to enhance the country's capabilities in the space sector.

The policy will be implemented by the Indian National Space Promotion and Authorisation Centre (IN-SPACe), which will serve as an interface between ISRO and private sector enterprises. The operational part of ISRO's missions will be moved to the NewSpace India Limited (NSIL), a public sector undertaking under the Department of Space. This move is expected to create a demand-driven mode for space sector activities, with NSIL playing a strategic role in carrying out space-related activities.

While the Indian Space Policy 2023 is a significant step towards establishing the country as a major player in the global space economy, its success will depend on sustained efforts by the government, private sector enterprises, and research institutions. To realise the full potential of the Indian space sector, stakeholders will need to seize the opportunity and work together. The right policies, investments, and partnerships can ensure that the country becomes a major player in the global space economy and contributes to the advancement of human knowledge and exploration.

India has a long and proud history of achievements in the field of space exploration, including the successful Mars Orbiter Mission and Chandrayaan-2. The Indian Space Policy 2023 provides a roadmap for India to build on these successes and become a major player in the global space economy. With the right policies and investments, India has the potential to make significant contributions to human knowledge and exploration in the decades to come.

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Stay focused to enjoy Open opportunities

The industry needs to be wary of the efforts to shift the focus and redefine Open RAN, and instead pay attention to its basic principles

BY JOHN BAKER

There has been much debate and misinformation surrounding the concept of Open RAN, with incumbent mobile equipment providers and some media outlets providing negative self-opinionated comments. However, it is important to understand the two main principles of Open RAN. Firstly, Open RAN focuses on open interfaces and interoperability of network elements. Secondly, there is no requirement in any of the specifications on how to build the elements with open interfaces.

The Open RAN community has been very clear about encouraging innovation that allows suppliers to compete globally. It's also, worth noting that it takes a global community to build a global ecosystem and marketplace; as a result, the two are interdependent.

There has been a lot of discussion on vendor-locked silicon and the type of acceleration that is good or bad, which is crazy, to say the least. One can have a vendor-locked system from an incumbent that uses custom silicon technology with unknown acceleration techniques. This, according to the incumbents, is good for the industry, including from a security perspective being a single point of supply chain failure.

Compare that to a multi-vendor Open RAN solution that may use some common silicon or code that provides diversity in the supply chain – I know what I would recommend.

As to the discussion on software virtualisation being dependent on certain hardware cards, this is no different



IN SHORT

- Open RAN focuses on open interfaces and interoperability of network elements, and there is no requirement on how to build the elements with open interfaces.
- The Open RAN community encourages innovation that allows suppliers to compete globally, and it takes a global community to build a global ecosystem and marketplace.
- It provides diversity in the supply chain, compared to vendor-locked systems that may use custom silicon technology with unknown acceleration techniques.
- The industry is seeing the addition of new end-to-end system suppliers, which will drive economies of scale for competitive pricing.
- Initiatives that require local technology as an entry barrier can lead to product specification fragmentation and reduce cooperation.

Open RAN has approximately a 5% share of the market and is growing, which is a significant increase from four years ago.

to the use of different ethernet cards, or different processors and specific acceleration hardware in the mobile Core. The Core is Open, virtualised and has a secure supply chain.

The prime reason for Open RAN was that operators wanted more suppliers and supplier innovation, and we've seen so much innovation stemming from new companies focused on Open RAN. The industry is seeing the addition of new end-to-end system suppliers, on top of the traditional vendors, and when large operators get on board, that will start to drive the economies of scale to get chips and technology that are required at competitive pricing.

Costs are tied to scale and that is the big challenge in the Open RAN industry; it's all about scale. There are also virtualised RAN solutions today without accelerators or that use different accelerator suppliers with more options to come, demonstrating innovation at its best.

Governments on a global basis are looking at the possibility of Open RAN revitalising the local industry. This is great news, but such initiatives can also be harmful in a way, if they lead to producing fragmented product specifications and standards that require local technology as an entry barrier and ultimately drive fragmentation of the village, reducing the scale of the opportunity and reducing cooperation and divergence from the Open RAN principles.

Currently, according to LightCounting Market Research, Open RAN has approximately a 5% share of the market and is growing, which is a significant increase from four years ago. It would be great to see more articles that focus on the principles highlighting the success of the Open RAN ecosystem and the achievements of companies like Intel Corporation, DISH, Rakuten, NEC, Fujitsu, AMD, Qualcomm, Mavenir, among others, and present that as the threat to the incumbents.

In conclusion, Open RAN is about the open interfaces and interoperability of network elements, encouraging innovation and competition globally. It is all about demonstrating interoperability and supply chain diversity, promoting new suppliers and supplier innovation.

So, stay focused on the Open RAN principles, enjoy the opportunity to localise without specification fragmentation and local barriers to entry and we, the village, will all enjoy the benefits of an open future. 🍀

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Low latency takes the pole position in India

Ultra-low latency is no longer an option but is as crucial as connectivity, playing a significant role in ensuring a high-quality user experience

BY MADHU PANDYA

India is experiencing a surge in the popularity of the digital way of life in the post-COVID world. With over 658 million Internet users, approximately 47% of the country's total population, an increasing number of Indians are getting connected to the digital world. Moreover, there is a growing trend of using cloud-based applications, services, and content among the population.

As we continue to work, learn, play and socialise from home, there is an increasing demand for high-quality connectivity. Being merely connected is no longer sufficient. In an increasingly pervasive digital economy, a dependable and high-speed connection is vital for fully participating and engaging with high-bandwidth content and applications.

In the volatile context of high-frequency financial trading, a slight delay can cause a trader to fill an order at a much higher share price than desired.

By building ultra-low latency networks, CSPs can differentiate themselves in the market, offering superior service and generating new revenue streams.

As the digital economy in India matures and the number of users continues to grow, it has become increasingly important to ensure robust connectivity. This is essential for people to take advantage of the opportunities offered by the digital world. While much emphasis has been placed on the speed and bandwidth aspects of a quality Internet connection, latency is often overlooked. However, it is a crucial component that plays a significant role in ensuring a high-quality online experience for users.

THE LATENCY FACTOR

In recent years, low-latency connectivity has emerged as a critical component in ensuring high-quality Internet connectivity. This is especially important in time-sensitive use cases such as financial trading, online gaming, smart manufacturing, and video conferencing.

In simple terms, latency refers to the time it takes for data to travel from its origin to its destination and back. Therefore, the lower the latency, the better the online experience. Jitter is also closely linked to latency, as it refers to the consistency or inconsistency of latency across the network.

While minor delays may not seem like significant issues at the moment, they can quickly escalate into major complications down the line. For instance, in the volatile context of high-frequency financial trading, a slight delay can cause a trader to fill an order at a much higher share price than desired.

The latency issue has even given rise to an entire trading strategy called latency arbitrage. In this strategy, investors on ultra-low latency networks capitalise on the minor price differences in a stock that arise due to the time disparity between them and other market participants.

This practice has a significant market impact, with a 2021 Bank for International Settlements study estimating global profits from latency arbitrage at about USD 5 billion annually.

It is, therefore, fair to say that ultra-low latency is no longer an option but is almost as crucial as connectivity. As a result, it is not surprising that it has become a fundamental consideration in designing and building networks.

THE NEED FOR SPEED

The advent of new technologies such as 4G and 5G has brought about the ability to offer extremely low latency. For example, 5G can provide a latency of less than one millisecond, which is ten times lower than that offered by 4G. India conducted the 5G spectrum auction last year, and the Communications Service Providers, CSPs have only recently started offering 5G services. This technology is critical for use cases like Augmented Reality and Virtual Reality, which demand ultra-low latency. The widespread deployment of 5G will play a crucial role in reducing latency and, thereby, improving the quality of connectivity in the country.

Reducing physical distance is another crucial factor in reducing latency, as being closer to end-users, whether human or machine, means that data travels shorter distances and simpler paths. This is one of the reasons for the exponential increase in the number of datacentres in the country.

According to a recent study by ANAROCK-Binswanger, India had 138 datacentres at the end of March 2022, and this number is likely to increase to 183 by 2025. Additionally, a JLL study suggests that India's datacentre industry will add 681 MW of capacity by the end of 2024, doubling its capacity to 1,318 MW.

The widespread deployment of 5G will play a crucial role in reducing latency and, thereby, improving the quality of connectivity in the country.



IN SHORT

- India's rapid digital transformation in the post-COVID era has led to a surge in the number of Internet users and an increase in the use of cloud-based applications, services, and content.
- Low-latency connectivity has emerged as a critical component in ensuring high-quality Internet connectivity.
- Ultra-low latency is almost as crucial as connectivity and has become a fundamental consideration in designing and building networks.
- The widespread deployment of 5G will play a crucial role in reducing latency and improving the quality of connectivity in the country.
- Service providers are already taking several steps to reduce latency, including increasing capacity, building new undersea cable systems, and leveraging 5G fixed wireless access technology.

Reducing physical distance is a crucial factor in reducing latency; one of the reasons for the exponential increase in the number of datacentres in India.

THE CSP's GAMEPLAN

Service providers are already taking several steps to reduce latency. For example, Bharti Airtel is increasing capacity by introducing new undersea cable systems to India, which will speed up data transfer. It has also partnered with Meta to develop undersea cable infrastructure that will support high-speed Internet in the country and increase data-carrying capacities between geographies.

For CSPs, there are economic benefits to reducing latency in their networks. Consider the potential economic growth promised by the metaverse, which is expected to be a major beneficiary of ultra-low latency connectivity. The size of the metaverse opportunity is estimated to range from USD 750 million to USD 13 trillion by 2030, providing a significant new market for CSPs to leverage 5G fixed wireless access technology to deliver the ultra-low latency experience required for virtual and augmented reality.

In today's fast-paced world, latency has become a crucial commodity in India. Public sector organisations, businesses, and communities are all striving to future-proof their networks, and this requires solutions that can keep up with the rapidly evolving online landscape that demands speedy, uninterrupted service.

Thankfully, there are already solutions being developed, refined, and made available by CSPs. By building ultra-low latency networks, these providers have a unique opportunity to differentiate themselves in the market, offering end-users superior service and generating new revenue streams for their business. By exceeding customers' expectations and fostering loyalty, CSPs can establish themselves as leaders in this competitive space. 🌐

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Shaping the global telecom industry

India aims to design, develop and deploy 6G technologies to provide ubiquitous intelligent and secure connectivity for high quality living experience



BY JAIDEEP GHOSH

A few months after launching 5G services, India recently unveiled the Bharat 6G Vision Statement, outlining the country's aspiration to provide its citizens with advanced, affordable, and sustainable next-generation 6G telecom technology

The Vision document identifies key research pathways being pursued or planned globally that are particularly relevant for ideating new possibilities in

the Indian context. It also identifies several connectivity and computing technologies, new hardware, software, high-frequency spectrum, artificial intelligence (AI) and machine learning (ML) engines, space-based assets, devices, and applications to unleash what is called a Tactile Internet.

Over and above the technical aspects, India's 6G aspiration is very evident.

Bharat 6G Vision is aligned with the national vision of Atmanirbhar Bharat and seeks to empower every Indian to become self-reliant.

The vision statement reflects India's aspiration to shape the global telecom industry by driving R&D, new standards, and innovations.

India intends to play a leadership role in shaping the 6G landscape globally, despite being a late entrant in 5G. The country aims to move beyond adopting globally developed telecom solutions to taking an active role in fundamental R&D, development of standards, devices, commercialisation, and launch.

Countries such as China, Japan, South Korea, EU states, and the US have already initiated 6G research. Commercial 6G launches are expected in the later part of the decade. This provides adequate time for India to work on the 6G Vision at a rapid pace to emerge among the leaders.

That would make India, the world's highest mobile data-consuming nation, a global force in the telecom industry.

THE VISION DOCUMENT

The sixth generation of wireless technology or 6G is still in the early stages of development. Experts predict that it will offer speeds and connectivity 100X faster than 5G, up to 1Tbps, with lower latency. This will be vital for powering emerging technologies.

6G is expected to have a wider set of uses in healthcare, remote-controlled manufacturing, robot navigation, agriculture, smart-home networks, entertainment, smart wearables, etc. thereby providing seamless connectivity between the physical world of senses and its digital representation, the cyber-physical continuum.

India has set up six task forces to focus on the pillars of the 6G vision, which have recommended aligning research efforts towards the most scalable and feasible technologies, exploring the full potential of 6G, and developing secure and trustworthy India-based 6G infrastructure.

The main recommendations of the task forces are provided here.

Creating a multiplatform next-gen network: The task force focused on the future of telecom networks in India beyond 2030, considering various strands such as optical and wireless networks, AI and ML optimisation, spectrum

usage, remote operations, digital twins, non-terrestrial networks, and 6G technology.

The task force highlights the need for a seamless integrated optical and wireless network, a dense optical network up to homes and offices, and attention to Gigabit Passive Optical Network (GPON) engineering in rural areas. It also emphasises the importance of user-defined virtualised air interfaces, drone communication, and hyper-personalised wireless networks.

The task force recommends aligning research efforts toward the most scalable and feasible technologies.

Developing innovative solutions: 6G has the potential to revolutionise human-to-human, machine-to-machine, and human-to-machine interactions. The task force suggests that a roadmap be created to explore the full potential of 6G to ensure the technology meets future needs. The key guiding principles suggested are equitable access, sustainable development, ubiquitous coverage, cost-effectiveness, data security and privacy. Allocation of reasonable financial resources is recommended in a public-private partnership model.

Taking lead on standardisation: The task force outlines the potential impact of 6G technologies over the next decade, including supporting ubiquitous instant communications and immersive experiences. Developing secure and trustworthy India-based 6G infrastructure is crucial for ensuring the country's sovereignty.

India can contribute to the development of 6G standards in various international bodies such as 3GPP, ITU, IEC, and IEEE to create a prominent position in the global standardisation space.

The vision document recommends closer coordination between government, industry, and academia to develop a research agenda for 6G standardisation areas of shared interest.

Ecosystem for devices and systems: The development of 6G devices is expected to provide

KEY RECOMMENDATIONS

- Innovative funding mechanisms to support industry, startups, academia, and national laboratories to undertake R&D.
- Innovative solutions through startups and CoEs that leverage the emerging 6G technologies to address key verticals such as water, power, healthcare, education, and smart cities.
- Shared use of spectrum, particularly in the higher frequency bands where the propagation is more akin to that of light.
- Reassessment and rationalisation of congested spectrum bands, and adoption of captive networks for Industry 4.0 and enterprise use cases in hitherto less used bands.
- New multi-sensor man-machine interfaces and devices leveraging edge cloud computing resources and AI.
- mmWave and (Sub-) Terahertz wireless communications at scale and very high data rates along with adaptive radio interfaces, advanced and novel antenna techniques, and increased virtualisation.
- Participation and contribution to global standards forums to ensure interoperability and global reach of our innovation.
- Fiber-broadband to every home and integrated dense wireless and optical network, with wireless communications primarily serving mobile users.
- Tactile Internet and remote operations of machines, robots, along with near-realistic 3D rendering of virtual participants in meetings.
- Space-Terrestrial integration for ubiquitous coverage.

hyper-connectivity between humans and machines through new man-machine interfaces, ubiquitous computing, multi-sensory data fusion, precision sensing and actuation, low-power and battery-less devices, and network capabilities.

The development of 6G technologies will drive new industry verticals, such as holographic communications, telehealth, and extremely high-rate information access. The task force highlights the need for significant R&D investments in 5G+ and 6G devices and systems.

Identification of spectrum: The task force has set out objectives to drive spectrum management initiatives, including identifying spectrum needs, signalling identified 6G spectrum bands, making spectrum available for 6G technology innovations, encouraging spectrum sharing, and positioning India as a hub of 6G wireless technology R&D and manufacturing.

Specific band-wise recommendations have been made, including reviewing spectrum bands, opening up a few bands to generate demand like 450-470 MHz, 526-612 MHz, and 31-31.3 GHz, expanding and positioning a large mid-band through, and delicensing or license-exempting key bands. Besides, strengthening the Wireless Planning Commission (WPC) with robust spectrum management and audit systems is an important recommendation.

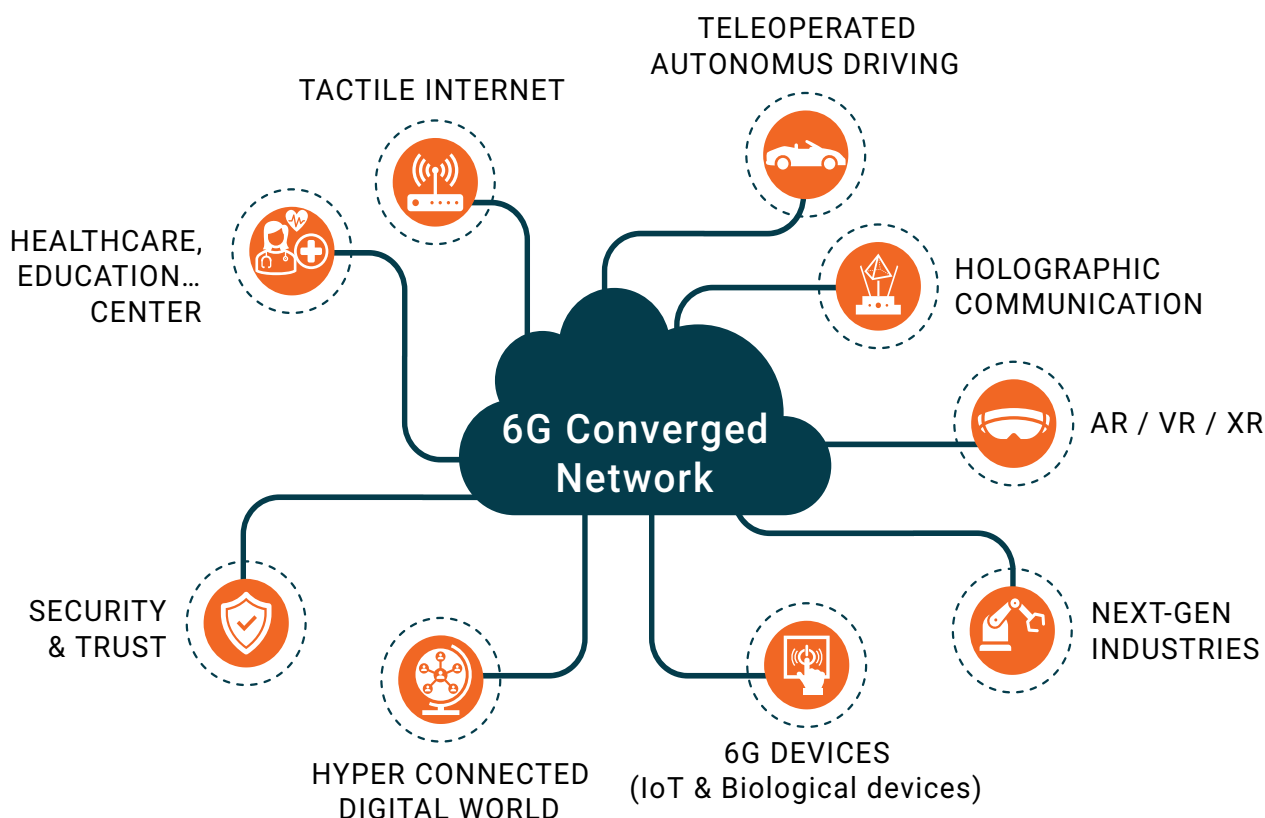
Ensuring adequate R&D finance: The task force mentions the need for significant funding and longer gestation periods for research and development (R&D) in telecommunication technology products. It recommends promoting the ecosystem for research, design, prototyping, development, proof of concept testing, Intellectual Property Rights (IPR) creation, field testing, security, certification, and manufacturing.

It recommends that the government creates a large corpus of R&D funds to facilitate various funding instruments such as grants, loans, VC funds, and a fund of funds, etc. Also, a pool of Rs 100 billion is envisaged to be created for the next 10 years. Finally, the task force recommends two tiers of grants, up to Rs 200 million to service funding requirements ranging from small to medium, and grants above Rs 200 million for high-impact projects.

THE IMPLEMENTATION APPROACH

The 2030 roadmap aims to provide 100 Mbps to every citizen, 500Gbps of bandwidth to every gram panchayat, connect 90% of households with high-speed broadband,

The development of 6G devices is expected to provide hyper-connectivity between humans and machines through new man-machine interfaces.



set up 50 million public Wi-Fi hotspots, and create 25 billion Internet of Things (IoT) devices.

To achieve this, Mission 6G will be launched, with financial resources and support provided to research, start-ups, and innovative ideas. An apex body will be created to oversee the mission focusing on timely execution.

The task forces recommend a two-phase approach for the development and commercialisation of 6G technology. In Phase 1 (2023-2025), support will be provided for explorative ideas, risky pathways, and proof-of-concept tests. Phase 2 (2025-2030) will focus on commercialisation and collaborating with similar missions worldwide.

Bharat 6G Vision is aligned with the national vision of 'Atmanirbhar Bharat'. It seeks to empower every Indian to become self-reliant in their lives while ensuring India's place as a leading player in advanced telecom technologies and solutions that are affordable and contribute to the global good.

The next decade could make India a global voice to reckon with in the telecommunications and technology arena. 🌐

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TV RAMACHANDRAN

HARNESSING THE 'MADE IN INDIA' POTENTIAL

To become a global supplier of ICT products, the country must strengthen its R&D base and incentivise the manufacturing sector



The Indian ICT sector has achieved numerous milestones in recent times. From the world's most aggressive rollout of 5G in over 500 cities to the successful completion of R&D for India's stack of 4G and 5G, the sector has been making great strides. Additionally, the launch of a 6G testbed and vision document and the implementation of a unique Production Linked Incentive (PLI) initiative to facilitate the growth of a global manufacturing hub are noteworthy accomplishments. Furthermore, the setting up of an electronics manufacturing cluster in Karnataka and aggressive plans for semiconductor chip manufacturing highlights India's push to become a leader in telecom manufacturing and R&D.

The country has never seen such focused and cohesive policies and actions to meet a longstanding need.

Technology and R&D are driving the global market for telecom equipment which is expected to grow at a CAGR of 6.9%, up from USD 539 billion in 2021 to USD 919 billion in 2029. While the market is big and growing, India's share has not been comparable to countries like China, Japan, South Korea, and the United States. A report by Indian Cellular and Electronics Association (ICEA) and EY indicates that India's market share in telecom equipment manufacturing is expected to be around 3%-5% of the global market.



India needs to do away with the current system of uncertain and delayed approval processes for importing capital goods intended for R&D purposes.

India's gross expenditure on R&D is extremely low at just USD 43 per capita or 0.7% of GDP, according to NITI Ayog's India Innovation Index 2021.

With the government taking a slew of initiatives, tremendous opportunities for growth lie ahead for the telecom sector.

THE INDIA STORY

A strong and vibrant R&D is a critical prerequisite to achieving a respectable ranking in global manufacturing. The US and China are by far the two biggest spenders with R&D spending of around USD 680 billion and USD 550 billion respectively in 2022. However, according to data from Statista, when expenditure is considered as a share of the overall GDP, smaller countries with tech-heavy economies such as Israel and South Korea invest larger shares of their GDPs into R&D.

As against the above, India's gross expenditure on R&D is extremely low at just USD 43 per capita or 0.7% of GDP, according to NITI Ayog's India Innovation Index 2021.

In consonance with the goal of *Atmanirbharta* or self-reliance in the area of R&D and manufacturing in the ICT sector, the government has brought out some excellent production-linked incentive (PLI) schemes for giving a boost to manufacturing in the sector. Experts feel that PLI while restructuring India's domestic manufacturing significantly, could help push its share in GDP to 25% and foster seamless upgradation of domestic firms into the regional and global production networks. However, there are some challenges on the ground which, if overcome through finetuning of the policy, may yield the desired results.

One difficulty highlighted is the lack of a centralised database that captures all required information to make the incentives award scheme more robust. Secondly, this scheme needs to take into account the fact that the Indian industry is heavily composed of Micro, Small and Medium Enterprises (MSMEs) which are important not only for feeding the bigger firms but also for contributing to much of the employment potential. The scheme needs to suitably incentivise and reward them.

One of the key challenges for locally manufactured products to compete in the world market is an adverse

5%-6% cost differential for manufacturing in India as explained in the Table *Cost differential between Make in India and Make Elsewhere*. This cost disparity of goods manufactured in India for exports vis-à-vis existing global manufacturing hubs like Malaysia and China needs to be comprehensively addressed for the 'Make in India for Export strategy' to be successful.

There is a need to offset this cost disparity by providing export incentives of about 5% for electronics and telecom products through government schemes such as the PLI and MEIS schemes. Though this data is a couple of years old, the point was highlighted and validated even recently in a full-fledged manufacturers' forum by one of the beneficiaries of the government's PLI scheme in telecom.

INITIATIVES AND INCENTIVES

Although there are huge challenges to be overcome, it should be appreciated that the government is sparing no efforts to ensure it leverages the favourable geopolitical situation and also remove all possible barriers to facilitate world-class manufacturing for India and the world. Some of the measures that deserve to be lauded include the policies for making the latest state-of-the-art semiconductor fabs and chips in India.

The government has also approved setting up Electronics Manufacturing Cluster at Dharwad in Karnataka. This will provide a big boost to electronics manufacturing, besides creating new employment and investment opportunities.

The results of the initiatives are there to see in the development of an indigenous stack for 4G and 5G by C-DoT, the government's flagship R & D company. It is extremely encouraging that more than 20 countries have placed a demand for procuring it.

To become a global manufacturing hub, it is imperative to have a strong R&D base. While the government has put together a plan for incentivising design-led R&D and is also incentivising the manufacturing of chips and semiconductor fabs locally, there remains a challenge for R&D companies who are working on new and

A key challenge for locally manufactured products to compete in the world market is an adverse 5%-6% cost differential for manufacturing in India.

emerging technologies. Typically, the R&D and product development process takes at least 1-2 years and it is imperative to streamline the process of permissions and approvals that would permit R&D companies to use experimental licenses and experimental spectrum.

Since the government is committed to developing these new technologies under the Atmanirbhar programme, the country needs to do away with the current regime of uncertain and delayed approval processes in importing capital goods for R&D. With the deployment of 5G happening, a significant number of new devices and ecosystem would need to come up. Hence, the country cannot afford to miss out on global opportunities to develop new technologies and products under the flagship programs of Make in India and Design in India.

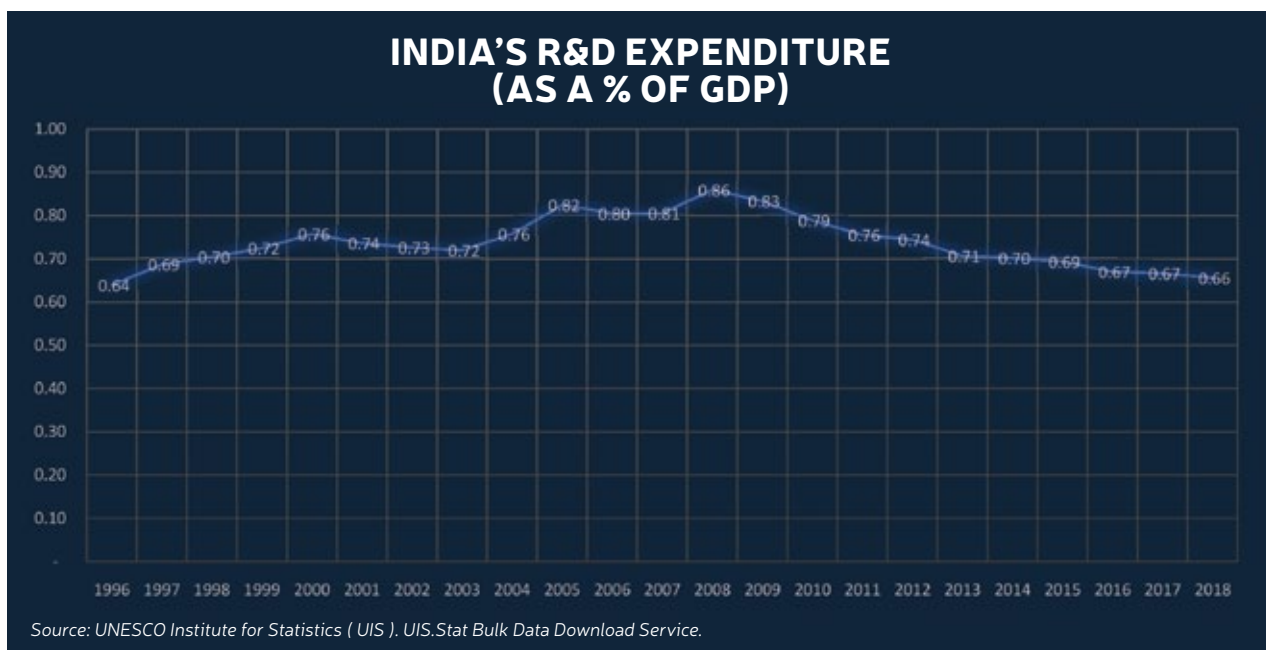
Another challenge for developing India as a hub for R&D in telecom is the difficulties in the import of used capital equipment required for setting up R&D labs. To prevent the dumping of old electronics equipment into India under the e-waste policy guidelines, the Ministry of Environment and Forest (MoEF) and Ministry of Electronics and Information Technology (MeitY) have

restricted the import of electronics equipment older than one year with a condition to re-export within three years.





Global companies establishing R&D labs in India and projects in the country typically use old capital equipment. R&D activities are carried out on a collaborative approach between different R&D labs of vendors at multiple locations, which requires shifting capital equipment between different locations globally during the testing and project phase.

Capital goods for R&D purposes with no further sale or commercial transaction value should be permitted under the 'free to import' category. Since R&D equipment has a longer life cycle, there should not be any need to re-import the same. Such conditions, if permitted, would enable ease of doing business and help incentivise global companies to continue their ongoing R&D operations in India. It will also encourage new companies to open and relocate their global R&D centres in India.

This would benefit the country immensely as it will generate more employment and development of a skilled workforce on the latest, cutting-edge technologies and help India become a training hub for LDCs and others.



COST DIFFERENTIAL BETWEEN MAKE IN INDIA AND MAKE ELSEWHERE

Landed cost element	India vs. China/Malaysia/Thailand*
Bill of Material (BoM)	 India comparable Global pricing list Global pricing for components
Inbound freight for shipping components into factories in India	 2.5% unfavourable (Sized as 2% of Bill of Material cost) Compared to global and regional benchmarks, India is farther away from component factories and the shipping rates are more expensive due to lower volume flowing into India, specific transportation lanes vs. the ones going to mega factories in Malaysia and Thailand.
Transformation cost and conversion of raw material into finished goods	 India comparable Factories in India lack scale compared to those in China. Advantageous labour rates in India are offset by the cost of facilities and electricity.
Outbound freight for shipping out finished goods	 2.5% unfavourable (Sized as 2% of Bill of Material cost) Due to low export volumes compared to global benchmarks, the logistics rates are slightly higher. Higher export volume is needed to offset.

* Based on a May 2016 study

Note: There is about a 5% cost differential in manufacturing in India for exports. Also, there is a cost disparity of exports of India vis-à-vis existing global nodes like Malaysia and China.

It will also help the country become a global R&D hub besides evolving as a global manufacturing centre.

The goal of 50 million public Wi-Fi Hotspots as captured as a National objective in the Bharat 6G Vision document released in March is another great opportunity for local manufacturers to become global suppliers of competitive public Wi-Fi components and devices. This meshed with the unbundled model of delivering public Wifi hotspots, especially in rural and economically backward areas through the historic PM-WANI scheme can help create huge employment opportunities for the youth in the rural areas of the country.

Another great opportunity lies in the manufacturing of the Internet of Things or IoT components in India. The country can serve as a large market and also as a supplier to the global market.

If India addresses these issues as well as improves the ease of doing business in this field expeditiously, it could powerfully leverage the geopolitical advantage and will become a powerhouse both in R&D and manufacturing for telecom and the ICT sector.

Backed by the suitable initiatives from the authorities and the government, India is well on its way to achieving the vision of increasing the manufacturing sector's contribution to GDP, from 14% to about 25%. It will also help increase India's share in global trade to over 10% making it one of the top three global exporters in the world. 🇮🇳

TVR is Hony. FIET (London) and President of Broadband India Forum.

(The views expressed are personal)

Research inputs by Debashish Bhattacharya and Neha Hathiari.

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India approves space policy to boost private sector participation

The Space Policy 2023 will provide a framework for the country's space sector for the next decade and boost India's space missions



“The industry will be feeling emboldened and enabled to have a larger participation due to the Indian Space Policy 2023.”

Dr Jitendra Singh
Minister for State for Science and Technology, Government of India

The government of India has approved the Indian Space Policy 2023 to strengthen the country's space department and provide a larger role to research, academia, startups, and industry. The policy outlines the roles and responsibilities of organisations such as the Indian Space Research Organisation (ISRO) and private sector entities. The policy is expected to offer clarity on the recent components established and enable greater private sector participation.

The Minister for State for Science and Technology, Jitendra Singh, stated during a cabinet briefing that the policy would boost research, academia, startups, and industry, enabling the latter to have a more significant participation in the space sector. He added that the private sector would feel more emboldened and enabled due to the Indian Space Policy 2023.

The opening up of the space sector to private participation, initiated by Prime Minister Narendra Modi, has led to the growth of startups in ISRO, with their number reaching 150 within three years. The policy is expected to provide a framework for the country's space sector for the next decade and boost India's space missions.

India has made significant progress in space exploration in recent years, with successful missions such as the Chandrayaan-2 and the development of the

Gaganyaan mission, which aims to send astronauts to space by 2022. The Indian Regional Navigation Satellite System (IRNSS) is also under development and is expected to provide accurate positioning services over India and its neighbouring regions.

The Indian Space Policy 2023 is a critical step towards creating a comprehensive space ecosystem in India that can support innovation and collaboration between the government and the private sector. The policy provides a framework that outlines the roles and responsibilities of various stakeholders and promotes greater transparency and accountability in the sector.

The policy's emphasis on the private sector's role is crucial as it would help create new opportunities for innovation, generate more employment, and support economic growth. The policy's focus on research and academia would also help develop new technologies and improve existing ones, making India a leader in space exploration.

Overall, the Indian Space Policy 2023 is expected to provide a significant boost to the country's space missions, enhance the role of the Department of Space, and offer a framework for the space sector for the next decade. The policy's focus on private sector participation and innovation would create new opportunities for growth, employment, and development in the space sector.

TCS launches 5G-enabled AI solution for manufacturing sector

Tata Consultancy Services has announced the launch of its 5G-enabled solution, TCS Cognitive Plant Operations Adviser for the Microsoft Azure Private Mobile Edge Computing (PMEC) platform, to help companies in industries like manufacturing, oil and gas, consumer packaged goods, and pharmaceuticals transform production, harnessing AI and machine learning to make it more intelligent, agile and resilient.

TCS Cognitive Plant Operations Adviser is a composite AI solution for manufacturing and process plant operations that uses Microsoft Project Bonsai low-code, AI platform, for which TCS is a launch partner, to provide insights and information to plant operators for taking real-time and autonomous decisions. A part of TCS' Enterprise 5G Edge suite, the solution integrates with Microsoft Azure private MEC to help plant operators reduce waste, increase equipment uptime, and zero-out safety incidents.

The TCS solution does this by bringing together all core elements needed to build intelligent digital twins of the plants, systems, processes, and plant operation through the curation and reasoning of digitally captured domain and tacit knowledge. It delivers high-capacity



compute capability with secure, reliable network connectivity at the production site, supporting self-monitoring, self-diagnosing, self-optimising, and self-learning capabilities.

"We are helping our clients with plant operations to build predictive and prescriptive capabilities into their production for superior outcomes using powerful cognitive and edge compute capabilities. We are delighted to launch the 5G-enabled TCS Cognitive Plant Operations Adviser solution, as part of our Enterprise 5G Edge suite of solutions on Microsoft Azure," said Siva Ganesan, Head, Microsoft Business Unit, TCS.

Volante, HCLT to accelerate cloud payments modernisation

Volante Technologies, a leading provider of cloud payments and financial messaging solutions, has announced a strategic alliance with HCLTech, a digital and engineering services company. The partnership aims to drive payments modernisation and help financial institutions keep up with the rapidly changing digital disruption taking place in the industry.

Under the partnership, HCLTech will combine its digital and engineering services capabilities with Volante's cloud-native payments solutions and low-code financial platform. The collaboration will enable financial institutions to deploy solutions for instant payments, real-time gross settlement (RTGS) payments, and multiple low and high-value domestic and international payment methods quickly. The companies will also co-innovate to make their shared vision of payments available to a broader range of customers and financial services organisations.

To support the configuration, customisation, integration, and implementation of Volante's ecosystem of business services for payments modernisation, the companies will develop centres of excellence in India and Romania. Both organisations are committed to ramping up this multi-regional team of specialists over the next three years.

Srinivasan Seshadri, Chief Growth Officer, and Global Head of Financial Services, HCLTech said, "Our partnership with Volante will help our clients operate in a stable, scalable and flexible payment ecosystem and develop faster time-to-market capabilities." The collaboration aims to enable tremendous impact in the areas of payments-as-a-service for financial institutions and help banks modernise their payments infrastructure.

HCLTech and Volante Technologies are currently working on multiple implementation engagements with some of the largest banks in the world.

Silicon Labs launches SoC for smart cities, long-range IoT



Silicon Labs has announced the general availability of its FG25 system-on-chip (SoC), aimed at providing intelligent and connected devices to municipal environments and cities, where there is a growing demand for such technology. The FG25 is ideal for Wi-SUN applications, and it strengthens the company's commitment to wireless IoT connectivity in India and around the world.

The SoC provides long-range, low-power transmissions and can operate at a range of up to 1.6 kilometer in dense urban and rural environments with minimal data loss. It also supports the orthogonal frequency-division multiplexing (OFDM) modulations introduced in Wi-SUN Field Area Network (FAN) 1.1, enabling high data bandwidth of up to 3.6 Mbps. The device also features advanced security options, including Secure Vault, Mid and High, which enable customers to securely generate and store encryption keys. The FG25's memory, 1920kB flash and 512kB RAM, can support the thousands of nodes needed by smart cities.

CyanConnote, a global leader in narrow-band RF mesh networking, has already embraced the SoC. Ratna Garapati, MD and CEO, CyanConnote India, said that the FG25 SoC would help them transform their smart metering solutions by delivering high-quality products that would meet stringent SLA and security requirements, along with the compliances of their customers. The adoption of Wi-SUN standards, which comes as a stack as part of FG25, ensures seamless interoperability within the AMI and IoT ecosystem in the country, further enhancing their value proposition.

Tech M, Red Hat to migrate CSP's 5G workload to the cloud



Tech Mahindra has teamed up with Red Hat to help communication service providers (CSPs) migrate to the cloud and modernise their infrastructure. This partnership will provide customised solutions to aid CSPs in moving 5G and multi-access edge computing (MEC) workloads to the hybrid cloud using Red Hat OpenShift Service on AWS and Tech Mahindra's netOps.ai hyper-automation platform. The partnership will also enable the two companies to help CSPs deploy a distributed, multi-vendor 5G Core, edge and MEC solution in a hybrid and multi-cloud environment.

The joint offering will provide a comprehensive range of products and services to help CSPs simplify the 5G Core, Edge and MEC ecosystem. It will allow the telcos to develop and deploy 5G use cases with a clearer migration strategy to move network workloads from on-premises to hybrid and multi-cloud scenarios without changing their existing software stack. The partnership will address multi-domain network transformation across RAN, 5G Core, transport, and enterprise edge use cases.

Red Hat OpenShift Service on AWS will provide managed containerised workloads natively on AWS, helping service providers build, deploy and scale 5G and edge applications. Tech Mahindra's netOps.ai will provide a network automation and managed services framework, offering zero-touch provisioning for core and edge orchestration, incorporating life cycle management, infrastructure, one-touch application automation for network provisioning, and consistent operational procedures.

The partnership is aligned with Tech Mahindra's NXT.NOW framework, which focuses on investing in emerging technologies and solutions that enable digital transformation and meet the evolving needs of the customer. Tech Mahindra is a Red Hat Advanced Business Partner and currently has over 1000 trained professionals on Red Hat technologies, specialised in skill areas such as virtualisation, cloud, and automation across the globe.

Airtel, India Post launch WhatsApp banking services

Bharti Airtel and India Post Payments Bank (IPPB) have jointly announced the launch of WhatsApp Banking Services for IPPB customers, enabling them to access banking services on their mobile phone. The WhatsApp messaging solution will be delivered to customers through Airtel IQ, a cloud communications platform as a service that enables brands to engage with their customers across voice, SMS and WhatsApp channels. Airtel is the first telecom company in the world that serves as a Business Service Provider (BSP) for WhatsApp.

Airtel will enable IPPB customers to seamlessly connect with the bank on WhatsApp and effortlessly avail a host of banking services including doorstep service request, locating nearest Post Office and much more. In line with the government's ambition to bring digital and financial inclusion to citizens of India in their language, the Airtel-IPPB WhatsApp Banking solution will also work on to build multi-language support, enabling added convenience to customers especially to those in the rural



parts of the country to access banking services in their preferred language.

Airtel has been working with IPPB to deliver as many as 250 million messages per month to the bank's customers many of whom are located in mofussil towns and tier 2 and 3 cities. The addition of the WhatsApp messaging will add to customer's accessibility to connect with the bank on their fingertips and deliver banking services in the rural pockets of the country.

NVIDIA selects Oracle Cloud Infrastructure for AI services

NVIDIA has selected Oracle Cloud Infrastructure (OCI) as the first hyperscale cloud provider to offer NVIDIA DGX Cloud, an AI supercomputing service at a massive scale. In addition, NVIDIA is running NVIDIA AI Foundations, its new generative AI cloud services, which are available through DGX Cloud, on OCI.

OCI's Supercluster includes OCI Compute Bare Metal, an ultra-low latency RoCE cluster based on NVIDIA networking and a choice of HPC storage. It has been deployed and validated by NVIDIA to support thousands of OCI Compute Bare Metal instances that can efficiently process massively parallel applications. OCI Supercluster networking can now scale up to 4,096 OCI Compute Bare Metal instances with 32,768 A100 GPUs.

NVIDIA DGX Cloud and the NVIDIA AI Foundations services that run on it leverage OCI's unique Supercluster which was certified by NVIDIA to ensure it meets the high standards of DGX Cloud. OCI Compute Bare Metal instances with NVIDIA H100 GPUs are now in limited availability. Additionally, NVIDIA announced that Oracle is adding NVIDIA BlueField-3 DPUs to its networking stack.



NVIDIA AI Foundations model-making services span language, images, video and 3D, as well as biology. Enterprises can use the NVIDIA NeMo language service and the NVIDIA Picasso image, video and 3D services to build proprietary, domain-specific, generative AI applications for intelligent chat and customer support, professional content creation, digital simulation and more. For biology AI model training and inference, the NVIDIA BioNeMo cloud service offers tools to quickly customise and deploy generative AI applications.

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LT GEN DR S P KOCHHAR

PAVE THE PATH FOR INDIAN TELECOM EQUIPMENT



India must take steps to urgently overcome testing and certification challenges to ensure the safety and security of 5G infrastructure in the country

Recent years have seen a massive geo-political shift in the global ICT manufacturing landscape, and these developments have put India in an advantageous position in the manufacturing arena. From being a major service-sector-based economy till a few years back, India has now stepped up to become a globally leading industrial nation, especially in the important areas of ICT, from software to assembly and core manufacturing.

India's gradual progress in this domain is pretty visible, and the country is gaining in each area in a phased manner. While India's prowess in software is

already established with the globally acknowledged capabilities in IT and ITeS, assembling has also become an increasingly important trait of India with the growing number of mobile devices and handset production facilities.

The Production Linked Incentive, PLI scheme announced by the government for telecom and networking products worth Rs 12,195 crore and its amendment in June 2022 to introduce a Design-led Manufacturing Scheme with additional incentives of more than USD 533.33 million indicate the government's progressive approach to core manufacturing as well. This surely resonates well



Rigorous testing of equipment is a vital component for ensuring seamless connectivity and robust performance for users across the country.



The DoT modified certain important compliance requirements of Phase III and Phase IV of the MTCTE regime in January 2022 to ease compliance obligations.

with the national objectives of gaining Atmanirbharta or self-reliance and Make in India.

While innovations, designing and assembly are a crucial part of manufacturing, testing and standardisation is one of the most sensitised aspects that hold eminence to ensure the efficient and effective working and performance of any product or equipment, so that the network deployments end up being as successful as envisaged. Hence, the country needs to ascertain that the testing procedures for the equipment are competent and dynamic, to keep pace with the fast-evolving manufacturing ecosystem and digital infrastructure requirements.

India has developed its own Mandatory Testing and Certification of Telecom Equipment, MTCTE, which was introduced in September 2017 to ensure that new telecom equipment does not degrade the performance of the existing network to which it is connected while safeguarding the security and safety of the telecom network and end-users.

Therefore, any ICT-related product, manufactured locally or imported in India is required to undergo testing at TEC-designated Conformity Assessment Body or CAB test labs or recognised CAB of Mutual Recognition Agreement, MRA partner country's labs accredited by accreditation bodies under International Laboratory Accreditation Cooperation (ILAC), or Indian Accredited Labs designated by TEC.

The government has been actively working to simplify the testing procedures to achieve the objective and gain efficiencies in the product(s) to be used in the Indian telecom network by introducing several supportive measures. For example, the Department of Telecommunications (DoT) modified certain important compliance requirements of Phase III and Phase IV of the MTCTE regime in January 2022 to ease compliance obligations, while also addressing potential security concerns at the same time.

This demonstrates a reformative and progressive approach by the government to ensure the effectiveness

and security of equipment through efficient testing measures. Furthermore, meeting certain industry requirements in this regard could enhance India's proficiency in producing high-quality local equipment while also utilising world-class telecom equipment from global manufacturers, further strengthening the country's position in the market. Here are a few such recommendations that can help.

#1: There is a need to increase the number of test labs to support the testing of a massive volume of products and deal with the lack of testing infrastructure in the country. The TEC has assured that there will be sufficient CABs available as it envisions building sufficient testing infrastructure within the country. The industry remains positive on these terms.

#2: The MTCTE procedure exempts TEC certification for equipment being imported for R&D or as samples for testing. However, there is a need to provide exemption on Customs duties for products that enter India for testing and certification temporarily. Currently, there is no provision under Customs law to allow duty-free imports of products for TEC testing and certification. This would help the industry to bring in products for testing processes, whereby damage to the product does not result in losses for the companies.

#3: Most of the existing notifications by relevant authorities cover the import of testing equipment for repair, calibration, reprocessing, etc. for shorter durations. Further, if the product is unfit for use after testing, the law must allow local scrapping, with the evidence of such scrapping submitted to the local Customs office to release the temporary import bond and provision. This would help the companies lessen the burden of a continuous to and fro process of transferring the product since the tested product has already served the purpose and would be unfit for any further use.

#4: To allow for additional and adequate transition time, MTCTE authorities may need to follow the global best practices and accept the international test reports and certificates wherever applicable, to ease the burden on the business.



WHAT INDIA MUST DO

- To keep pace with the fast-evolving manufacturing ecosystem, India needs to ensure that testing procedures for equipment are competent and dynamic.
- There is a need to provide exemption on Customs duties for products that enter India for testing and certification temporarily.
- If the product is unfit for use after testing, the law must allow local scrapping, with the evidence of such scrapping submitted to the local Customs office.
- MTCTE authorities may need to follow the global best practices and accept international test reports and certificates wherever applicable.
- For tests like MTCTE and ComSec, India must recognise a common criteria certification from countries that Mutual Recognition Arrangement with India.

The TEC has assured that there will be sufficient CABs available as it envisions building sufficient testing infrastructure within the country.

#5: It may be fruitful to recognise a common criteria certification from countries that are parties to the Mutual Recognition Arrangement with India, for tests like MTCTE and ComSec where the focus is on safety and security issues. Options can be provided to the companies to either conduct in-country testing in India or submit test reports from an accredited global test lab to ensure safety and security along with various other parameters.

Given the rapid deployment of 5G that is happening in India at the moment, a few challenges must also be overcome urgently to enable appropriate testing of 5G infrastructure in the country and 5G as a whole. To ensure the safety and security of 5G networks, continuous testing and evaluation will be required to uncover vulnerabilities and devise effective mitigation techniques.

One of the primary hurdles is the lack of consistency in testing procedures which may lead to errors and conflicts in test results. 5G networks rely on a variety of technologies, such as millimetre-wave radio frequencies, huge MIMO antennas, and software-defined networking, all of which necessitate specific testing equipment and knowledge. The complexity makes it challenging to build and implement testing tools and systems that can reliably monitor and assess its performance.

Another challenge is the necessity for trustworthy and accurate data to inform the testing and development of 5G infrastructure and devices. Data is required to detect possible faults and opportunities for improvement, but gathering and evaluating this data in real-time presents huge challenges. There are also worries over the safety and security of 5G networks, particularly regarding the use of sensitive data and potential cyber threats.

These obstacles can be overcome with sustained investment in R&D, standardisation of testing methodology, and most importantly through continuous engagement and collaborative effort by the industry and government, together.

As the telecom sector in India continues to grow and evolve, rigorous testing of equipment will remain a vital component for ensuring seamless connectivity and robust performance for users across the country. By investing in state-of-the-art testing infrastructure and protocols, India's telecom industry can set a new standard for quality and reliability, setting the stage for continued growth and innovation in the years to come. 🌟

Lt Gen Dr Kochhar is the Director General of COAI.

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SECURITY

A person's hand is shown holding a tablet computer. The background is dark with various digital security icons overlaid, including gears, circuitry, and a shield with a checkmark. The word 'SECURITY' is written in a light blue font across the middle. The main title is in large, bold, white and light blue letters.

THE RISE OF MORE SOFTWARE IN THE TELCO TOWN

As software replaces telecom systems, hardware, and infrastructure, the looming threat of security breaches and performance bottlenecks cannot be ignored

BY PRATIMA HARIGUNANI

The joke was that hardware is anything in a computer that can be thrown out of the window. Perhaps, that is how frustrated users can sometimes feel. After all, hardware can sometimes get exhaustingly slow, complicated, heavy and difficult to maintain.

That should explain why software began to elbow out hardware in so many places in telcos' systems, infrastructure, and back-end areas. From storage to network to control panels, a lot of hardware is now being 'softwarised' and virtualised.

Enter the age of SDN, SDDC and NFV. And wait, there is more on the way.

MEET SOFTWARE – IN THE HEGEMONY OF HARDWARE

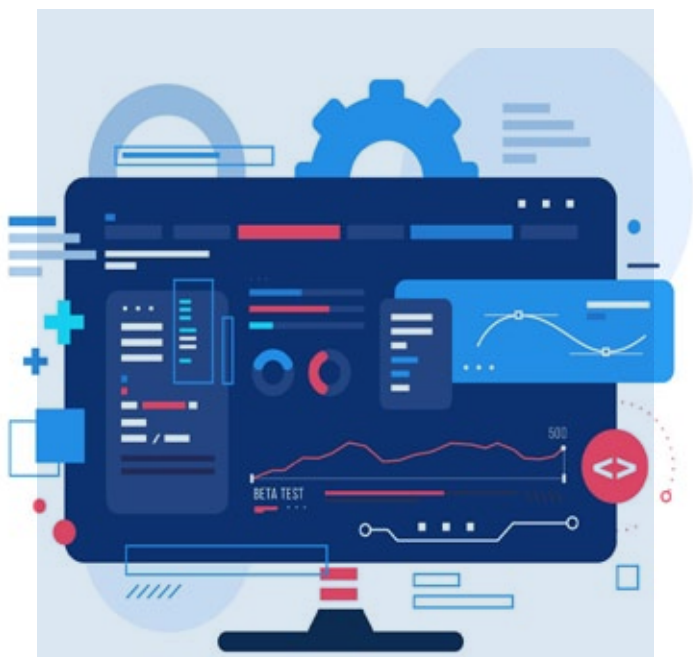
Software is about fluency, softness, and flexibility. This essence can break many dead-ends that hardware would struggle with. With the software, one can partition things, simplify stuff, can carry less weight than before, and also play around with it.

SDN or software-defined networking does something that completely changes the hardware paradigm of networking. It separates the control plane and data plane and, thus, gives traffic control, and network efficiency. This explains why many communication service providers (CSPs) began investing in SDN for end-to-end network and service administration and control.



“Telecom companies should prioritise investing in advanced security solutions that utilise data analytics for real-time threat detection and incident response.”

Prof. Bhaskar Ramamurthi
Department of Electrical Engineering, IIT Madras



THE BUSINESS CASE FOR SOFWARISATION

- Software provides more flexibility and agility compared to hardware, making it more appealing to communication service providers.
- SDN is growing rapidly, and the SDN market is expected to reach USD 95 billion by 2032.
- SD-WAN is replacing traditional WAN networks to decrease bandwidth and optimise WAN connectivity, and the SD-WAN market is growing at a strong double-digit rate globally.
- SD-WAN is particularly attractive due to its decentralised architecture, application-aware path selection, centralised orchestration, and native security.
- NFV market is growing, and it is estimated to reach USD 7.8 billion by 2032, primarily due to the cost savings organisations can achieve.
- The pandemic has contributed to the growth of SD-WAN and NFV markets, particularly as it accelerated the need for a more distributed workforce and data-intensive applications.

Automating network administration can lead to easier provisioning, configurations, visibility, agility, and flexibility of networks, which in turn can help CSPs reduce Capex and Opex through data-driven digitalisation and softwarisation.

According to ResearchandMarkets, the SDN market can grow by USD 25.97 billion during 2021-2025. A Future Insights report indicates that the global SDN is likely to jump from USD 16 billion in 2021 to USD 95 billion by 2032. The demand for SDN emanates from the need to simplify and manage networks which have grown in both size and complexity in the last few years.

The power of software has trickled into many other areas as well, spawning a new species altogether with SD-WAN, NFV and SDS.

SD-WAN or Software-Defined Wide Area Network is seen as an answer for all the necessary tools and intelligence that a telco needs to dynamically scale and centrally manage networks through a single and intuitive user interface. Especially after 87% of enterprises are moving towards Internet-based connectivity as the main WAN technology, to the detriment of Multiprotocol Label Switching (MPLS).

Deloitte has outlined how all this will change the way traffic flows on the networks, triggering the need for flexibility and security more than ever before. The reliance on MPLS to connect sites to datacentres can result in increased network spend, traffic bottlenecks, network congestion, and additional MPLS capacity. SD-WAN simplifies WAN management and operation by decoupling networking hardware from its control mechanism.

Deloitte's analysis of the Annual Recurring Costs of traditional WAN networks revealed that connectivity is the prime target for optimisation, with WAN connectivity accounting for 60-70% of costs. This highlights the need for a new approach to decrease bandwidth due to the general increase in traffic, as carrying Internet traffic over expensive dedicated MPLS links is cost-inefficient.

According to the Gartner Magic Quadrant report for WAN Edge Infrastructure 2021, by 2025, 40% of enterprise locations will rely solely on Internet WAN connectivity to deliver flexible, cost-effective, and scalable bandwidth, as compared to 15% in 2021. This



“Upgrading mission-critical infrastructure to manage increased IT workloads and data strategy can propel businesses forward in the digital era.”

Srinivaschary T

Lead - Solution Architect, Dell Technologies India

report highlights the market's shift from traditional branch routers used to connect branch locations to datacentres in an MPLS implementation, towards SD-WAN.

The SD-WAN provides a more decentralised architecture and cloud workload support and is widely replacing edge routers. It also adds application-aware path selection across multiple links, centralised orchestration, native security, and other application performance optimisation functions such as WAN optimisation. The report predicts that 60% of enterprises will implement SD-WAN to enhance agility and support for cloud applications by 2024, as compared to about 30% in 2020.

In 2021, the worldwide SD-WAN market experienced remarkable growth of 35%, generating record revenue of more than USD 2 billion, as per a report by Dell'Oro Group. It is that also remarkable that the hardware-based Access Router market witnessed a decline in spending, as enterprises shifted towards software-based SD-WAN solutions for branch infrastructures.

Enterprises accelerated their network infrastructure upgrades compared to pre-pandemic times, and Dell'Oro research indicates that the SD-WAN market is growing at strong double-digit rates in all regions of the world. The demand for SD-WAN solutions surged in 2021 as enterprises optimised their branch network architectures for cloud services and workloads. The pandemic created a pent-up demand and also drove companies to evaluate and adopt SD-WAN to support their more distributed workforce.

Let us talk about SDN's cousin Network Function Virtualisation (NFV). The NFV market which grew from USD 3.9 billion in 2021 to USD 4.1 billion in 2022, is estimated to reach USD 7.8 billion by 2032, according to Fact MR. One of the key reasons for the growth of the NFV market is the cost savings that organisations can achieve by using network virtualisation technologies. These technologies allow companies to reduce the expenditure

incurred during the installation and maintenance of hardware equipment.

The pandemic has also contributed to the growth of the NFV market. Telecommunications and essential services were critical during the lockdowns, leading to an increased demand for data-intensive applications and a growing trend of cloud-based networking systems.

SDN, SD-WAN, and NFV are examples of how software is seeping into hardware from all angles and with a significant force. However, the question is whether this 'software imperialism' has changed anything for the better. Were we better off with hardware, or are we better now with more software?

A CHESS-BOARD BATTLE OR A REAL WAR?

Uprooting the deep-seated footprint of hardware in any infrastructure is neither practical nor magical. It is unrealistic to expect a simple solution by pouring in a lot of software. Managing software can be harder than hardware. It can be challenging to monitor its performance and ensuring its security may take more time than with hardware. Additionally, taking backups and rebooting systems is a different process in software than in hardware.

Furthermore, the software can expand and spill over in shadows, leading to sprawls, over-provisioning, hidden costs, and chaos. Therefore, it only makes sense to make a huge 'pivot' to software if the gains are absolute, enduring, and worth the switch, not just incremental improvements.

In 2019, Gartner released its Hype Cycle report on enterprise networking reporting that SD-WAN was quickly becoming a mainstream technology while SDN had become obsolete. Gartner analysts observed that true SDN technologies had not gained significant market traction. The report revealed that networking technologies had undergone incremental improvements focused on speed and features. When



HOW DOES THE SOFTWARE SCORE?

ADVANTAGES

- Light-weight infra
- Affordability
- Use-based investments
- Cloud-native models
- Speed and agility
- Elasticity and modularisation
- Tight topology control

CHALLENGES

- Visibility and Control
- Backward compatibility issues
- Performance monitoring and optimisation
- Costs for compatibility-related investments
- Sprawl and Over-provisioning
- Integration and fragmentation
- Security and Complexity
- Outages

I&O leaders were asked to deliver more services at an increasing pace with fewer errors and at a lower cost, it became imperative that enterprises achieve truly-agile networks. The time for incremental network evolution was gone.

However, even SD-WAN had to prove its worth beyond being just an acronym change. Forrester’s Principal Analyst Andre Kindness argued in 2022 that SD-WAN could be walking into the sunset without a market of its own because it was just a feature or a set of features, rather than a standalone solution. Additionally, security was a significant consideration. Forrester clients had conveyed that they had not realised the security ramifications of incorporating SD-WAN.

And hardware may not have been exactly replaced by software.

According to Prof. Bhaskar Ramamurthi, Department of Electrical Engineering at IIT Madras, the belief that there is ‘more use of software’ than hardware is a misconception. He explains that in the telecom infrastructure, much of the software now runs on commodity datacentre hardware (servers) instead of custom-built high-performance hardware. “This is because the commodity hardware had become more powerful,” he says adding that only the algorithms in the radio transceivers continue to run on custom hardware, specifically at the tower top and base.

Moving to more software has its share of ifs, buts and caveats.

WHAT IS COMING NEXT – ROOKS OR BISHOPS OR BOTH

The transition towards software has become imperative in today’s era. However, steps need to be taken to ensure that it is more of a solution than another problem.

One such step is to avoid unexpected costs and resource constraints while striving to become lean and agile. Deloitte suggests conducting a comprehensive analysis to rank applications based on criticality and their network requirements. It is essential to address both performance issues and future application requirements before implementing SD-WAN. Additionally, it is crucial to establish a robust security posture that includes ensuring visibility of all assets, traffic flows, users, and identities, and defining how data is protected when traversing the WAN.

Moving forward, new forces such as artificial intelligence (AI), Secure Access Service Edge (SASE), and Security Service Edge (SSE) will claim their share of this once-hardware kingdom with a new ferocity. These technologies could provide the much-needed answer for better monitoring, control, and efficiency.

According to a report by Dell’Oro Group in March 2023, the global SASE market exceeded USD 6 billion in 2022. The demand for security is expected to double the revenue of SSE between



“Cloud providers such as AWS, Microsoft Azure, Google Cloud, and smaller providers will be the primary source of APIs in the future.”

John Strand
CEO, Strand Consult

2022 and 2027. The networking segment of SASE, particularly SD-WAN, experienced a 30% YoY revenue growth as enterprises shifted to SD-WAN solutions and the supply chain for hardware substantially improved. Modernisation of networking and security for enterprise branches and hybrid workers could lead to total SASE revenue surpassing USD 60 billion between 2022 and 2027.

Gartner's report for WAN Edge Infrastructure 2021 also predicted a significant increase in the use of secure SASE and AI functionality in enterprise deployments of SD-WAN over the next few years. It is expected that by 2024, more than 70% of SD-WAN customers will have implemented a SASE architecture, compared to 40% in 2021. The report also predicted that by 2024, 20% of SD-WAN centralised configuration and troubleshooting will be touchless via an AI assistant. The Dell'Oro report also noted that many vendors are leveraging the convergence of SD-WAN and network security technologies to differentiate their SD-WAN solutions.

Srinivaschary T, Lead-Solution Architect, Dell Technologies India, highlights that businesses are eager to adopt new technologies like AI and ML for rapid digitalisation. These technologies require adaptable and scalable infrastructure that automates critical processes without compromising security.

“Upgrading mission-critical infrastructure to manage increased IT workloads and data strategy can propel businesses forward in the digital era. Businesses need to harness the transformative power of technology to build a secure digital foundation for the future,” he says.

Prof Ramamurthi suggests that telecom companies should prioritise investing in advanced security solutions that utilise data analytics for real-time threat detection and incident response. This will enable them to stay competitive in the industry and reap the full benefits of software services. He emphasises that taking security seriously is crucial for telecom businesses to thrive.

To achieve this, telcos should consider implementing modern security measures that leverage data analytics to monitor network traffic and identify anomalous behaviour that may indicate a potential security threat. These solutions can also provide real-time incident response, reducing the risk of a security breach and minimising its impact if one occurs.

Investing in such solutions can also result in a visible return on investment for telecom companies. By preventing security breaches and ensuring the security of their customers' data, telcos can build a reputation for trust and reliability, which can translate into increased customer loyalty and revenue.

John Strand, CEO of Strand Consult, emphasises the crucial role of APIs in the evolving landscape of telco infrastructure. He notes that while mobile operators and the GSMA launched new APIs at Mobile World Congress, he does not believe that replicating the OneAPI concept from 2009 will be successful. “That concept was never a success, because operators could not deliver a business model with the services. Instead of developers using operator APIs, they chose to use the APIs that are in the Android and iOS operating systems.”

Strand predicts that cloud providers such as AWS, Microsoft Azure, Google Cloud, and smaller providers will be the primary source of APIs in the future. “Additionally, there will be APIs based on over 140 open interfaces in 3GPP's work,” he says predicting that going ahead cloud providers will be the winners, similar to the success of Apple and Google's app stores.

Looks like the new definition of 'hardware' is anything and everything that can be replaced with 'software'. Throwing anything out of the window is not something we, or our environment, can afford. And that is precisely why software should get better. It should become the baby. Not the bath water. 🚽

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[INTERVIEW]

SNOWFLAKE



Fawad Qureshi

Global Field CTO, Snowflake

“We can help TSPs accelerate their digital transformation”

A technology leader with a blend of business and financial knowledge **Fawad Qureshi** is a Global Field CTO at Snowflake helping telcos all around the world on building net new business models. In an interaction with **Shubhendu Parth**, he talked about the recently launched Telecom Data Cloud and how its ecosystem of partners can help telcos accelerate digital transformation, enable superior customer experiences, maximise operational efficiency, and monetise new data services. Excerpts:

Telcos are both users and drivers of cloud and data analytics. Where does Snowflake’s Telecom Data Cloud fit in this scenario?

We recently announced the launch of the Telecom Data Cloud, which unites Snowflake’s data platform, Snowflake- and partner-delivered solutions, and industry-specific datasets. It helps telecommunications service providers (TSPs) break down data silos within companies and across the ecosystem, allowing organisations to easily and securely access data in near real-time, enrich it with machine learning (ML) models, and then share and analyse it to drive better decisions. With the Telecom Data Cloud, Snowflake and its ecosystem of partners can help TSPs accelerate digital transformation, enable superior customer experiences, maximise operational efficiency, and monetise new data services.

Mobile devices and broadband connectivity are now part of every aspect of our day-to-day lives. The

telecommunication sector remains a driver of growth, innovation, and disruption for all global businesses, especially in rapidly growing industries such as video streaming, the Internet of Things (IoT), and virtual and augmented reality. The revenue shift from traditional products to innovative cross-industry collaboration solutions requires an evolution of the telecommunications business model. To stay ahead, telcos must transition from complex legacy technologies to modernise their networks and deliver value to partners across industries.

The Snowflake Telecom Data Cloud helps the telecom industry break down data silos within companies and across the ecosystem, allowing organisations to easily and securely access data in near real-time, enrich it with ML models, and then share and analyse it to drive better decisions and outcomes. It enables superior customer experiences, maximises operational efficiency, and increases profitability through cost reduction and new data product monetisation with Telecom Data Cloud.

So, how is it different from the existing solutions?

The underlying Snowflake platform is the same. The difference is that we have customised it by adding new partners and new solutions required for the telecom sector. We have telecom data providers who are the best 5G providers in their countries. The telecom-specific data sets enrich the data cloud, which means that if a telecom player wants to use the Snowflake platform, they will get

The Telecom Data Cloud helps monetise data and applications by enabling telcos to create more personalised data and application service offerings.

AT&T is using Snowflake's Data Cloud to enable business partners seamlessly access data to improve customer experience and maximise operational efficiencies.

ready-to-use data, assets, apps, and templates that will help in accelerating the journey towards building their data products.

In technology terms, what new does the Telecom Data Cloud offer?

The Telecom Data Cloud offers a single, fully-managed, secure platform for multi-cloud data consolidation with unified governance and elastic performance that supports virtually any scale of storage, compute, and users. It also helps maximise operational efficiency; with one unified platform, teams across IT, network engineering, data science, network operations, and product management can collaborate using data to improve planning, make faster business decisions, rapidly respond to customer needs, better manage network resources, and reduce time to market on new services.

It adds advanced AI and ML capabilities with Snowflake- and Snowpark-enabled machine-generated data in near-real time using ML models to predict faults, schedule maintenance ahead of time, and reduce operational downtime. The Telecom Data Cloud also helps monetise data and applications by enabling telcos to create more personalised data and application service offerings with Snowflake Marketplace and launch innovative new services, including monetisation around advertising and selling IoT data to any industry.

The Telecom Data Cloud helps telcos leverage an industry-leading network of telecommunications partners, take advantage of a rich partner ecosystem, and their industry-specific, prebuilt templates to build valuable industry solutions faster.

What kind of industry partnerships and ecosystems are you referring to?

Within the Telecom Data Cloud, customers can access industry-specific solutions to leverage best practices, reduce time-to-value, and increase overall impact. Companies announcing new pre-built solutions include applications powered by Snowflake, like the one developed by AMDOCS that allow telcos to modernise

their business, including moving to the cloud and 5G monetisation efforts. It also helps simplify business processes around charging, billing, and new digital services.

Snowflake Marketplace partners, like Flywheel, OneWeb, and TransUnion enable live access to a variety of data sources leveraging the company's privacy-preserving collaboration technology, including satellite, geospatial, or demographic data to unlock new revenue streams and power innovative business solutions.

Consulting and service companies like Amazon Web Services Cognizant, SDG Group, Prodapt Consulting, and Wipro can reduce time-to-value for customers with pre-build partner solutions that help solve top-priority use cases, including integrating OSS and BSS data, maximising operational efficiency, and monetising data to help grow business value. Besides, technology partners like Alteryx, CARTO, DigitalRoute, H2O.AI, Informatica, Sigma Computing, and ThoughtSpot provide integrations and out-of-the-box solutions so customers can attain deeper insights and realise the full power and ease of use of the Telecom Data Cloud.

But, how is it different from what the telecom players are already doing? What difference will the new solution make?

The Snowflake Telecom Data Cloud brings all the solutions together into a single platform. Currently, the telecom industry has to bring solutions and use cases together from different systems. While the cost of bringing this data together is very high, it is also very time-consuming. Therefore, the usual time-to-market becomes very high. Snowflakes help bring all the data into a single consolidated customised view that provides a holistic analysis of the business. That is a big differentiator.

Can it also help in better utilising the AI and ML capabilities and modernising the telecom infrastructure and network?

Absolutely. Let me give an example of our partnership with Capgemini. To make their decarbonisation – path



“Telcos must transition from complex legacy technologies to modernise their networks and deliver value to partners across industries.”

to net zero – programme successful, we are using ML to manage the network, so that some of the network equipment can be put to sleep when there is less load. It stops consuming energy and we can reduce the electricity consumption on the network. So that’s intelligent network management based on AI and ML. One of the key things that telecom players are always going through is asset rollout and decommissioning, from 3G to 4G, and now to 5G. Now, telcos have only a certain number of assets to roll out. So, how can they do it intelligently? Certainly, they will want to make that decision based on data and based on value. That is what some of our customers have been using it for. This is a perfect platform.

Can you give some more examples of usage?

Some of the largest global customers in the telecommunications industry are already using Snowflake’s Telecom Data Cloud to grow revenue and maximise operational efficiency. For example, AT&T is using Snowflake’s Data Cloud to drive a single source of truth for their data across the organisation where business partners can seamlessly access its data to improve their customer experience and maximise operational efficiencies.

OneWeb, the Low Earth Orbit or LEO satellite communications company was able to move its data operations over to Snowflake in just six weeks and is leveraging it to harness the power of spatial data for the enhanced performance of its network, as well as to monetise data through new space data services. Similarly, M1, Singapore’s first digital network operator uses

Snowflake to combine data from its CRM, billing systems, website, and mobile app to provide a more complete view of the customer experience as it drives transformation and evolution in the local telecommunications landscape.

Is this launch aimed at helping telcos migrate to 5G?

I won’t say that it is particularly targeted at migration to 5G, but it is certainly one of the use cases. We call this the value-driven network rollout. In this instance, I want to decommission my older assets, and I want to roll out new ones.

What about privacy and security? What is Snowflake doing in this front?

There are multiple things that we have about data privacy. The Snowflake platform is fully governed, fully secured, and fully managed, so it provides complete insights, lineage, and metadata into all the processes.

We also have a feature called the Data Clean Rooms, which allows companies to share data in a privacy-compliant manner. So if you have a data point in the telecom sector and you want to compare and combine it with a data point in the airline sector, a Data Clean room is a concept that allows you to combine the data without revealing the full underlying data on both sides. The regulations about data sharing help in building privacy, and compliant data products across the ecosystem. We have got a lot of customers globally, who are making use of data clean rooms around the world. 🌍

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Add more power to the new-gen data networks

Optical interconnects are revolutionising high-speed data transfer in the digital age making it critical for driving the telecom sector growth

BY JITENDRA BALAKRISHNAN

The term “high speed” in the context of networks has referred to an ever-changing benchmark over the years. There is a significant variation in what is commonly understood. But one can reasonably expect such networks to deliver a data transfer rate of 1 Gbps or higher today. This varies from 100 Mbps for Fibre-to-the-Home (FTTH) networks to 10-100 Gbps in enterprise or datacentre networks, and this expectation is only going to rise in the future.

Many factors determine the data transfer rate or the “speed” of the network – the medium of transmission, the distance of transmission, modulation formats and more. Focusing on the medium, wireless transmission is a must today but it needs a wired backhaul. These backhaul networks were traditionally made of copper wires that were installed over decades, but they are not capable of supporting the data transfer needs of today, leave alone the future. This is because the frequency of transmission over copper networks limits bandwidth, the maximum data-carrying capacity.

Copper also has significant issues in reach, and struggles to transfer more than 10 Gbps beyond 50 meters. In contrast, optical fibre uses a much higher carrier frequency and hence has a bandwidth that is many orders of magnitude higher. The low optical loss in fibres also allows high-speed transmission across tens of kilometres. This is why optical fibre has played a key role in shaping the Internet of today and it is replacing copper in nearly every aspect of the network, leaving copper to be used in certain cases that need its functionality; the simultaneous transmission of data and power, for instance.

Optical fibre has been steadily growing in terms of share of network deployment, capex spend and geographical reach. Long-haul networks were the first to use optical fibre starting in the mid-1980s, and this expanded to metro and access networks at the turn of the millennium. In the last decade, technologies like passive optical networks (PON) have become mainstream in delivering high-speed FTTH connections.

IN SHORT

- High-speed networks today are expected to deliver a data transfer rate of 1 Gbps or higher.
- Optical fibre is replacing copper in nearly every aspect of the network due to its higher bandwidth and low optical loss.
- Optical interconnects cover a range of products and are essential for transmitting and controlling signals in an actively operating network.
- The optical interconnect industry is expected to see innovation driven by the need for interoperability, the convergence of networks, and emerging trends such as edge computing and datacentres.
- Optical fibre and interconnects are essential for the future of telecommunications as the volume and speed of networks are expected to scale significantly and constantly.

THE OPTICAL INTERCONNECTS

Recently, datacentres have started using fibre both inside their premises, and for interconnections between themselves. Optical fibre cable is one of two key elements in creating these networks. The other is optical interconnects.

The term “optical interconnects” can cover a range of products. Among active components that need power, they can include optical transceivers, multiplexers and demultiplexers, optical switches and more. On the passive side that doesn’t require power, it includes optical connectors, splitters, closures, junction boxes, cabinets, racks and more. These are the points where optical cables are terminated, handled, split or spliced when networks are deployed, and they are also the points where signals are transmitted and controlled in an actively operating network.

While optical fibre hardly varies by geography and operator, optical cables vary a little more because of varying needs for network capacity and deployment scenarios. However, optical interconnects have a large variation both in terms of geography and the choices of a network operator because they cover a larger range of requirements. The examples include capex needed for deployment, installation practices and the availability of skilled labour, operating expenses, and future-proofing needs and flexibility. This complexity of market needs has driven growth in the optical interconnect industry.

The industry can expect a lot of innovation in the optical interconnect industry, driven by operators’ key needs. The first is interoperability with existing and future products. This requires the industry players to come together in setting common standards, as opposed to proprietary solutions that may lock an operator into a single vendor. This often leaves them worse off despite the early advantages offered by the innovation.

Secondly, innovation in optical interconnects will likely have a two-way benefit with corresponding advances in optical fibre and cable, where integrated fibre-cable-interconnect players are expected to lead the way. The industry can also expect that innovation will arise from the convergence of networks, the emergence of edge computing and datacentres, and more.

High-speed data networks are already all around us. Their scale, capability and reach are expected to continue to grow for a long time. Emerging trends firmly point to a future in which both the volume and the speed of networks are expected to scale significantly and constantly. One example – the recent excitement around AI shows how much headroom there is for such growth.

Optical fibre and interconnects are essential to driving this growth, and for the future of telecommunication. 🚀

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Plan your cloud data warehouse migration now

A cloud data warehouse migration aligned with business goals can boost operational efficiency, cut costs, and enable scalability for organisations



BY PURUSHOTTAM DARSHANKAR

Migrating to the cloud is becoming increasingly important for enterprises. It can increase their agility, reduce costs, improve security, increase accessibility, and stay ahead of the curve when harnessing it for digital transformation.

Cloud-based data warehouses offer scalability that can be challenging to achieve with on-premises systems.

However, businesses can easily scale up their storage and compute resources to handle the increasing volume of data. In addition, cloud-based data warehouses can be more cost-effective than purchasing and maintaining their own infrastructure.

Enterprises can integrate with other applications and services quickly and easily, which can improve efficiency

Reviewing the data completeness, accuracy, consistency, and integrity will help identify data quality issues that can be addressed before migration.

Re-platforming involves leveraging cloud-native features and services without significantly changing overall architecture and schema.

and productivity. Many cloud providers have security certifications and compliance standards in place to ensure your data is protected.

While there are many pros, enterprises should consider the cons when deciding to migrate their data warehouse.

GET THE BASICS CORRECT

Cloud-based data warehouses require a reliable and fast network connection, as latency issues can affect the performance of the data warehouse. While cloud providers offer robust security features, there is still concern about data security and privacy. Once an organisation migrates its data warehouse to the cloud, moving to another vendor or platform can be challenging. It is essential for enterprises to carefully assess these factors and ensure that the decision to migrate to the cloud is the right one.

Migrating a data warehouse to the cloud is a complex process that requires careful planning and execution. One should define the objectives of migration, which include understanding the business drivers behind the migration, such as scalability, cost saving, or improved performance. Once the business case is built, you go through the assessment, planning, migration, and optimisation phases of the data warehouse.

To ensure a successful outcome, businesses must follow few important steps as part of their migration plan.

FIRST STEP: ASSESS THE DATA

Assessing the current environment for data sources, data architecture, including data models, schema, relationship, etc., helps organisations understand the complexities involved. The assessment should also include dependencies or integrations between the data warehouse and other applications or systems.

Reviewing the data completeness, accuracy, consistency, and integrity will enable organisations to identify data quality issues to address before migration.

Evaluate the data governance practices, policies, and processes to manage data security, privacy, and compliance.

Businesses also need to gauge the performance of the data warehouse, including query response time, processing time, and data load times, which will help discover bottlenecks. Moreover, understanding the current capacity and storage requirements will help to provision the required resources on the cloud.

SECOND STEP: RE-PLATFORMING APPROACH

There are several approaches to migrating a data warehouse to the cloud, including lift and shift, re-platforming, and re-architecting. The choice of approach depends on various factors such as the level of customisation required, available resources, expected benefit, and complexity involved.

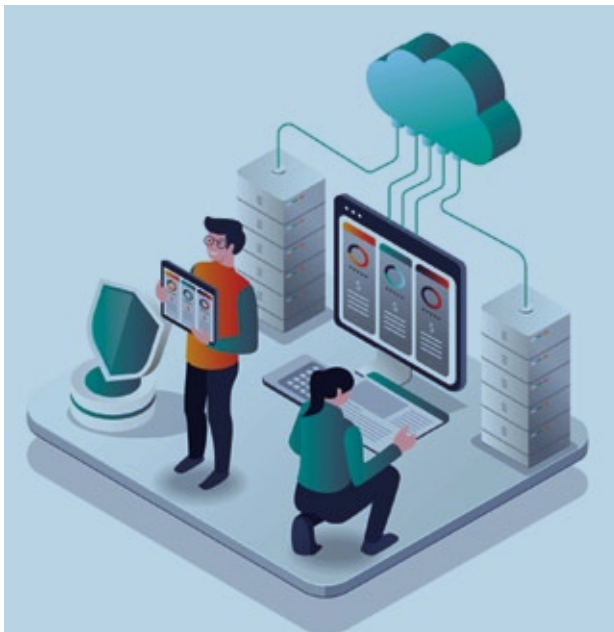
The lift and shift approach is the quickest and simplest option where the data warehouse is migrated without making major changes to the data architecture and schema. However, this approach may not result in significant cost savings and enhancements.

Re-platforming involves making some changes to leverage cloud-native features and services without significantly changing overall architecture and schema. In the re-architecting approach, the data warehouse is redesigned and re-architected to take full advantage of cloud-native features.

The new data model is a better fit for cloud-specific tools for data processing using a distributed architecture. This approach can lead to significant performance improvements and cost savings, but it also requires more time, effort, and resources.

THIRD STEP: THE MIGRATION PLAN

Based on the approach, organisations must define a detailed migration plan, including timelines, milestones,



IN SHORT

- Before migrating to the cloud, enterprises should carefully assess factors such as network connectivity, data security, and vendor lock-in.
- A successful data warehouse migration involves assessing the data environment, identifying performance bottlenecks, and provisioning cloud resources accordingly.
- Organisations can choose from several migration approaches such as lift and shift, re-platforming, and re-architecting.
- Executing a migration plan requires defining detailed timelines, identifying skilled resources, and leveraging third-party tools.
- After migration, businesses must validate the data, monitor the performance of the cloud data warehouse, and optimise it according to business needs.

After migration, organisations must monitor and optimise the cloud data warehouse to ensure that it continues to meet business needs.

and specific tasks and activities. Businesses need to identify skilled resources who are trained in relevant cloud technologies for a successful migration. Additionally, they can leverage several third-party tools to fast-track their migration efforts. The choice of tool depends on the data warehouse platform, cloud provider, and migration requirements.

FOURTH STEP: DATA PREPARATION, TESTING

Besides moving data from source to target, migration involves optimising ETL pipelines for the target platform and migrating them. It is important to test the migration process on a sample dataset by setting up a proof-of-concept lab to ensure that everything works as expected.

Businesses must adopt an incremental approach for data warehouses containing a large amount of data. In this approach, the on-premises data warehouse can remain operational while data is being migrated. During this transition phase, organisations need to synchronise the data between the on-premises data warehouse and the cloud data warehouse.

FIFTH STEP: VALIDATION, OPTIMISATION

Once tested successfully, organisations can execute the migration plan. It is important to test and validate the migrated data to ensure that everything works as planned. After migration, the organisation must monitor and optimise the cloud data warehouse to ensure that it continues to meet business needs.

Overall, the success of cloud data warehouse migration depends on how well it is aligned with the business goals. If planned and executed appropriately, it can lead to significant operational efficiencies and major cost-savings to help organisations realise maximum returns and help scale the business. 🍀

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The next game changer for telcos

Adoption of the SaaS model in the telecom sector can drive network evolution, reduce operational costs, and improve customer experience

BY GUHARAJAN SIVAKUMAR

The telecom sector has seen a significant rise in the adoption of the SaaS model, which is projected to boost the overall SaaS market growth. With the telecom industry undergoing a disruptive transformation, the incorporation of SaaS integrations is becoming increasingly crucial for telcos to enhance their efficiency and minimise operational costs.

The demand for SaaS integrations in the telecom sector has further surged due to the emergence of AI-based technologies. According to industry data, SaaS

investments in the telecom space have witnessed a 5X jump in 2022 alone, and the market is expected to grow by 16.8% in 2023. This growth is expected to drive network evolution, with the implementation of technologies like network automation paving the way for self-healing networks.

DRIVING NETWORK AUTOMATION

One of the key areas where SaaS models are expected to drive significant change in the telecom sector is in the area of network automation. With the advent of artificial intelligence or AI-based technologies, telcos



SaaS investments in the telecom space have witnessed a 5X jump in 2022 and the market is expected to grow by 16.8% in 2023.

are increasingly able to automate many of the tasks associated with managing and optimising their networks. This includes tasks such as network monitoring, troubleshooting, and capacity planning.

By automating these tasks, telcos can significantly reduce operational costs and improve network performance and reliability.

The emergence of edge computing: Edge computing reduces latency and enables faster, more efficient data processing. It can be deployed to support the development

of new services that require real-time processing and analysis of large amounts of data.

As more devices and applications are connected to the Internet of Things (IoT), the demand for localised data processing at the edge of the network is also increasing. Telco SaaS such as network intelligence is crucial in managing and optimising these distributed computing environments, which are critical to support emerging technologies such as autonomous vehicles, smart cities, and industrial IoT.

Greater focus on customer experience: SaaS models are poised to bring about a major transformation in the realm of customer experience. Today's customers are more demanding than ever before, particularly in terms of the quality of their telecom services, thanks to the proliferation of digital channels such as social media and mobile apps. To meet these expectations, telcos can leverage SaaS models to gain access to a range of tools that enable them to quickly and efficiently launch new digital services and applications in a variety of areas, including the provision of an optimised in-home connectivity experience.

As service providers continue to focus on delivering a superior customer experience through their SaaS-based solutions, they will be able to leverage customer data to develop highly personalised services and offer intuitive and easy-to-use interfaces that enable customers to access and use services more easily.

SaaS integrations can also help telcos adopt and leverage emerging technologies such as AI and machine learning (ML). These technologies can help telcos to improve network performance, optimise resource utilisation, and enhance customer experience. It can provide the expertise and tools necessary for telcos to incorporate these technologies into their network operations.

Through SaaS models, telcos can deliver a range of advanced services and applications to customers, such as Voice over IP (VoIP), Unified Communications (UC), video conferencing, and mobile device management. These services can be delivered over the Internet or through a private network, depending on the needs of the customer.

Accelerated use of AI and ML: The use of AI and ML is becoming more prevalent in real-time network data analysis. This enables the identification of patterns and



THE SAAS ADVANTAGE

- SaaS integrations can help automate network management tasks, including network monitoring, troubleshooting, and capacity planning.
- Edge computing is becoming more prevalent in supporting emerging technologies such as autonomous vehicles, smart cities, and industrial IoT.
- Telco SaaS solutions such as network intelligence are crucial in managing and optimising these distributed computing environments.
- SaaS models can help telcos adopt and leverage AI and ML, which can help improve network performance and resource utilisation.
- SaaS models can provide automated, self-healing networks that can identify and resolve issues in real time without human intervention.

anomalies and the prediction of potential issues before they occur. In the future, network intelligence will heavily depend on these technologies to improve network performance, enhance security, and facilitate the development of new services and applications.

Increased focus on security: With the increasing complexity and sophistication of networks, security has become a major concern for communication players. No wonder then, network intelligence is expected to play a crucial role in identifying and mitigating potential security threats, as well as ensuring compliance with regulatory requirements.

SELF-HEALING NETWORKS

With the increasing complexity and scale of telecommunications networks, there is a growing need for automated, self-healing networks that can identify and resolve issues without human intervention. This is where SaaS models come in, playing a crucial role in enabling self-healing networks.

In the past, telcos have relied on manual methods to detect and fix network issues, which can be time-consuming and result in significant downtime and dissatisfied customers. On the other hand, self-healing networks can detect and resolve issues in real time, leading to reduced downtime and improved network performance.

SaaS models leverage advanced analytics and machine learning algorithms to analyse network data and identify potential issues. With the deployment of various SaaS solutions, telcos can collect and analyse vast amounts of network data in real time, allowing them to detect potential issues before they become major problems. This approach can save time and resources, and improve the overall customer experience.

It also provides telcos with the ability to deploy automated remediation processes that can quickly resolve network issues. By leveraging AI and ML algorithms, these automated processes can learn from past network issues and develop solutions that can be deployed in real time, without the need for human intervention. In addition, SaaS ensures that updates and upgrades are delivered to the network infrastructure in real time.

Unlike manual processes, SaaS providers can deliver updates and upgrades automatically, ensuring that the network is always running on the latest and most secure technology. The model also allows telcos to offer more advanced network security features as a service, including intrusion detection and prevention, malware detection and removal, and data encryption. These features provide telcos with a more efficient and cost-effective way to secure their networks. 🧩



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Making the most of the fifth-gen telecom

The potential of 5G in the supply chain and logistics extends beyond its primary benefits, opening up a plethora of novel opportunities for the industry

BY NITISH GUPTA

The advent of 5G technology is anticipated to significantly impact the supply chain and logistics industry. With its ability to facilitate swifter communication between vehicles and roadside infrastructure, 5G promises to enhance traffic flow and bolster security through advanced encryption capabilities.

With the rolling out of the new technology standard, the industry stands to reap several benefits from the increased bandwidth that 5G offers. And the diverse advantages and opportunities that technology brings to this sector are also expected to impact the bottom line of the players adopting it.

The advent of 5G technology further promises to bring about a radical transformation in the logistics

and transportation industry through its advanced inventory and fleet management capabilities. With the ability to process data at lightning speed and with greater efficiency, 5G can optimise the entire logistics process, ranging from warehousing to last-mile delivery. Such a paradigm shift is bound to result in improved efficiency, reduced costs, and enhanced customer satisfaction.

5G allows for more precise tracking of vehicle locations in real time, which can have a significant impact on transportation. This newfound visibility can empower companies to make informed decisions that will further enhance their operational efficiency and mitigate risks. Overall, the potential of 5G in the supply chain extends beyond its primary benefits and opens up a plethora of novel opportunities for the industry.

5G connectivity allows for the integration of multiple wireless devices, resulting in faster and more precise warehouse management systems.

#1

SUPPLY CHAIN EFFICIENCY AND VISIBILITY

The primary advantage of 5G networks in the logistics industry lies in their ability to enhance supply chain visibility and efficiency significantly. This feature facilitates seamless tracking of items from their origin to destination, even if they are located across oceans. Additionally, 5G networks offer improved inventory and parts tracking, which results in fewer instances of out-of-stock items and more efficient order fulfilment.

Real-time data provided by 5G networks can be instrumental in enabling companies to identify bottlenecks in their supply chain and make necessary adjustments promptly. This, in turn, will lead to more efficient routing, superior fleet management, and ultimately, cost savings.

#2

BETTER PROCESSES AND COLLABORATION

The integration of 5G technology in logistics is poised to benefit all stages of the supply chain, particularly in the realms of inventory management and intelligent transportation systems. By embracing digitalisation, the supply chain can achieve more streamlined processes and foster better collaboration among stakeholders.

In warehouses, 5G connectivity allows for the integration of multiple wireless devices, resulting in faster and more precise warehouse management systems. Internet of Things or IoT sensors on 'smart shelves' provide real-time inventory visibility, ensuring that stock is continuously available without overstocking. Digital warehouse management systems can also facilitate better labour management, resource allocation, and overall process optimisation. The net result is greater supply chain resilience, accelerated digitalisation, and enhanced efficiency.

#3

NEW TECHNOLOGIES AND NEW OPPORTUNITIES

5G technology offers more than just swifter data handling. It also enables network slicing, leading to the creation of

unique and efficient networks tailored to specific business requirements. This feature can be leveraged in fleet management to facilitate secure data exchange between vehicles and relevant infrastructure entities. Moreover, 5G can support new applications such as virtual reality (VR) and augmented reality (AR), which can enhance warehouse operations by providing technicians with real-time guidance and reducing downtime.

Another emerging technology that stands to benefit from 5G connectivity is blockchain, which can help boost transparency and traceability in the supply chain, enabling better collaboration among stakeholders and reducing the risk of fraud and counterfeiting.

#4

SAFER AND MORE EFFICIENT TRANSPORT SYSTEM

The implementation of 5G in logistics has the potential to significantly improve driver and vehicle safety by enabling low-latency, high-speed communication through vehicle-to-everything (V2X) technology. This innovation allows vehicles to communicate with other vehicles, infrastructure, and pedestrians, helping to prevent accidents and optimise routing. V2X technology can also assist with predictive maintenance, ensuring that vehicles receive timely service and reducing the risk of breakdowns or mechanical failures.

Overall, the adoption of 5G technology in logistics presents a valuable opportunity to improve safety on the roads and minimise risks associated with mechanical failures or accidents. With the aid of V2X technology, logistics companies can create a safer, more efficient transport system, benefiting both drivers and the industry as a whole.

#5

REAL-TIME MONITORING AND DATA ANALYSIS

The implementation of 5G technology in logistics provides businesses with the invaluable ability to monitor operations and analyse data in real time. With real-time monitoring, companies can make informed decisions based on current information, leading to better insights into supply chain performance, operational optimisation, and faster responses to changes or disruptions.



5G'S IMPACT ON THE LOGISTICS SECTOR

- 5G technology enhances supply chain visibility and efficiency, resulting in more efficient routing, superior fleet management, and ultimately cost savings.
- Supports new applications such as VR and AR, which can enhance warehouse operations with real-time guidance and help in reducing downtime.
- Vehicle-to-Everything, V2X technology can help create a safer, more efficient transport system, benefiting both drivers and the industry.
- Enables logistics companies to make data-driven decisions, optimise their supply chain performance, and respond quickly to changes or disruptions.
- Helps improved routing and fleet management leading to a reduction in fuel consumption, greenhouse gas emissions, and overall wastage.

Additionally, 5G-powered predictive analytics can help businesses anticipate and address potential issues before they become critical, such as forecasting demand and capacity planning.

Overall, the use of 5G technology in logistics enables businesses to make data-driven decisions, optimise their supply chain performance, and respond quickly to changes or disruptions. With real-time monitoring and data analysis, companies can remain competitive in a constantly evolving industry and position themselves for long-term success.

#6

LOW FUEL CONSUMPTION AND EMISSION

The implementation of 5G technology in logistics can have significant environmental benefits. 5G technology enables more efficient transportation systems and logistics operations, leading to a reduction in the industry's environmental impact. Improved routing, fleet management, and real-time data analysis can contribute to reducing fuel consumption, greenhouse gas emissions, and overall waste.

Real-time monitoring and tracking of shipments can also help minimise the risk of lost or damaged goods, reducing the need for replacement shipments and additional transportation. The adoption of electric vehicles in logistics is another area where 5G technology can play a crucial role. 5G-enabled charging infrastructure and communication systems can help streamline the charging process and provide real-time information on charging station availability.

Overall, the environmental advantages of 5G technology in logistics can be significant and contribute to a more sustainable future.

The incorporation of 5G technology into logistics operations is poised to facilitate the widespread adoption of collaborative robots, Cobots, and automation. Cobots can operate alongside human workers to enhance productivity, efficiency, and safety in logistics settings, including warehouses. Moreover, automated guided vehicles, AGVs and autonomous mobile robots, AMRs are additional examples of automation in logistics that can offer benefits.

The integration of technology as an enabler for individuals has proven to be a significant boon for society. The advent of modern technology has streamlined daily routines, allowing people to achieve more in less time and with fewer resources. By leveraging new-age technology tools driven by 5G, the supply chain and logistics sector too can accomplish a lot more. 🍀

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Laying a solid foundation for cloud security

Deploying cryptography, especially cloud key management solutions, provides organisations with a high level of privacy, control, and flexibility



BY RUCHIN KUMAR

The rapid increase in cloud adoption rates can be attributed to several factors such as lower capital expenditure, faster deployment, and the ability to meet the same cryptographic requirements as on-premises HSMs. As a result, more and more organisations are choosing to migrate to the cloud. However, as established trends continue to gain momentum, newer trends are beginning to emerge.

Organisations are now seeking novel ways to enhance the efficiency of their cloud infrastructure and maximise

its functionality. Specifically, many companies are now searching for cloud cryptography providers that can deliver high levels of compliance.

EMERGING CONCERN: CRYPTOGRAPHIC SPRAWL

Enterprises tend to run hundreds of applications that utilise cryptographic functions in some way or the other. The use of client libraries, third-party tools, and cloud solutions can lead to a proliferation of unmanaged secrets, cryptographic solutions, encryption keys, and applications. An emerging concern in enterprise security

Companies are seeking novel ways to make cloud infrastructure more efficient, maximise its functionality, and deliver high levels of compliance.

To ensure exclusive access to their data, organisations can deploy the cloud key management solution BYOK, Bring Your Own Keys.

is the issue of cryptographic sprawl, which can increase potential security risks and management overhead.

The term cryptographic sprawl refers to the widespread and uncontrolled proliferation of unmanaged secrets, cryptographic solutions, encryption keys, and applications within an enterprise. This condition may initially seem commonplace since the priority is usually given to utilising resources rather than cleaning them up.

Despite its gradual onset, cryptographic sprawl can have a significant impact on an organisation's operations and costs. Unmanaged secrets can result in potential security threats, while unmanaged keys and cryptographic resources can increase management overhead, causing unnecessary complexities and challenges for the organisation.

According to the Salesforce-Mulesoft Connectivity Benchmark Reports from 2021-2023, enterprises have experienced a 26% increase in the number of applications used, accompanied by a 171% increase in integration labour costs. As most applications have a lifespan of around four years, this necessitates the need to address cryptographic sprawl.

Fortunately, organisations can quickly tackle cryptographic sprawl by implementing a cloud key management solution. As hundreds of applications generate, distribute, and delete thousands of encryption keys, it is important to assess the level of key management maturity within the organisation.

Organisations can begin by conducting a self-evaluation and analysis of their level of key management maturity. For example, they need to find out whether there is a key management solution in place and where

the keys are stored. The organisations must also ask whether they are storing keys in an application database, in software, or with full hardware-backed protection. They must also find out whether the keys are partially or fully indexed, and whether they have firm policies to enforce key lifecycles.

If the answer to any of these questions is no, then it is time for the organisation to have a serious talk with a trusted cloud key management solutions provider.

EMERGING SOLUTION: CLOUD KEY MANAGEMENT

Cloud key management is an area that requires attention from many organisations, as not all have deployed effective key management in the cloud, even though they have realised the benefits of moving data security to the cloud. Cloud HSM, which can be launched on-demand, provides a quick solution for encryption. Furthermore, cloud key management offers a high level of privacy, control, and flexibility, and eliminates the risks of cryptographic sprawl.

For instance, organisations running applications on a major cloud service provider like AWS or Google have encryption keys to secure their stored and transmitted data. However, in this setup, the cloud provider has access to the keys. This may not be sufficient for organisations with sensitive data. To ensure exclusive access to their data, organisations can deploy the cloud key management solution BYOK, bring your own keys. It allows organisations to create and manage encryption keys that only they can access. Organisations deploying BYOK can dictate how their data is accessed and stored.

External key management (EKM) is another solution that provides organisations with complete control over their keys. With EKM, a third party manages an organisation's keys, but the organisation still has the

The industry can expect to see more demand in the South Asia region for cloud cryptography solutions that can comply with data localisation policies.



DEALING WITH CRYPTOGRAPHIC SPRAWL

- The emergence of cryptographic sprawl is a growing concern that can lead to potential security risks and management overhead.
- Organisations can implement cloud key management solutions to eliminate the risks of cryptographic sprawl.
- Solutions like BYOK, external key management, and client-side encryption can enhance data privacy, access control, and key provenance.
- CSE encrypts data in a user's web browser before it can be sent to a cloud provider's servers, where it is stored in an encrypted form.
- Compliance objectives are driving the demand for trustworthy cloud cryptography providers in India, which has robust cybersecurity regulations.

ultimate control over the keys. EKM allows organisations to create, store, and manage keys in a separate environment from encrypted data, which enhances data privacy, access control, and key provenance.

Client-side encryption (CSE) is a related cloud key management solution that is gaining traction. With CSE, data is encrypted in a user's web browser before it can be sent to a cloud provider's servers, where it is stored in an encrypted form accessible only by the organisation using CSE.

EMERGING DEMAND: CLOUD COMPLIANCE

There are exciting new cloud solutions, but for companies to deploy these solutions, they need a trustworthy cloud cryptography provider that can meet their compliance objectives, particularly in countries in the South Asian region. India, in particular, has become a global payments hub, with a fast-growing fintech sector that seeks innovative cloud technology.

India is well-known for its robust approach to cybersecurity, as demonstrated by regulations like the RBI Directive 2017-18/153, which mandates that organisations store payment data within India. This has resulted in the demand for cloud providers to expand their global reach and provide cloud solutions locally in India. This involves the establishment and maintenance of cloud datacentres in India to offer data localisation compliance, lower latency, and high availability to the fast-growing Indian payments sector. Key localisation, which involves storing encryption keys locally, is an important requirement.

Local laws in India are also driving the need for data security measures such as public key infrastructure (PKI), a system for managing digital certificates. Digital certificates validate digital objects' authenticity and can establish non-repudiation of messages and transactions. Non-repudiation provides evidence of delivery, ensuring that neither party can deny their involvement in a transaction or message.

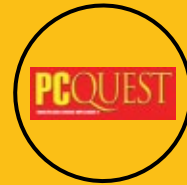
The threat of cyber risks is ever-increasing, but so are the cybersecurity solutions. Deploying cryptography, especially key management, in the cloud can help organisations enhance their security while saving on costs. The cloud also opens the door to cutting-edge solutions like BYOK and EKM.

Going ahead, the industry can expect to see more demand in the South Asia region for cloud cryptography solutions that can comply with data localisation policies. Organisations will also search for solutions that assist them in centralising and consolidating their infrastructure, leading to more efficient management. The future of cryptography may well be in the cloud. 🌩️

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Vishal Rally
SVP and Head – Product and Marketing,
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*Vishal Rally, SVP and Head – Product and Marketing, Tata Teleservices, is an industry veteran with over two decades of experience. At Tata Teleservices (TTSL), he is responsible for designing the product strategy and roadmap which includes creating new products and managing the lifecycle of existing product lines. In an interaction with **Shubhendu Parth**, he talked about the TTBS offerings, including the suite of connectivity solutions, as well as the interplay between core connectivity and security products, and cloud-based services. Excerpts:*

Tata Teleservices has evolved from being a mobile player to offering enterprise solutions under the brand name Tata Tele Business Services or TTBS. How is the company leveraging its telecom experience?

The company has undergone a massive change since the time Tata Teleservices had Tata Docomo brand with a strong consumer SIM business. While the mobility business was sold off our B2B enterprise services continue to be a part of the organisation. Our B2B business has been very strong for the last 15 years, especially in key

“We focus on the interplay between voice and data connectivity”

The next big area is services, which includes everything from productivity and security applications to specialised software like HRMS or accounting.

markets like Mumbai, Pune, Bangalore, and Delhi. Our fibre infrastructure is a key asset for business because it enables us to offer fibre-based voice and data services to customers.

Unlike other telcos that are involved in various businesses, we are solely focused on B2B. Our management bandwidth is entirely focused on our B2B business, and we do the best we can to make it successful. Over the last three to four years, we have been building differentiated skill sets by hiring relevant people with the right background and understanding of the space. We have also been recruiting channel partners from IT services backgrounds to ensure a good mix of IT and telecom expertise.

Overall, we provide a suite of connectivity solutions and cloud services that are helping customers understand the interplay between telecom and IT services.

Businesses have undergone a massive transformation during the last few years with technology driving the change. What are the pain points of enterprises in the cloud, data services, and collaboration space?

During the Covid period, many small and medium businesses (SMBs) struggled since they had not invested sufficiently in remote work technologies and due to financing. This resulted in a high mortality rate for SMBs and many businesses had to shut down.

Businesses that survived, realise the power of technology solutions for remote work, customer communication, and service delivery. Hence, investment in technology solutions has improved, and the relationship between SMBs and service providers like TTBS is becoming stronger. Our comprehensive services and advice on product selection help SMBs choose the best solution for their industry and requirements. As a

result, trust in our brand has increased. Customers have started to seek our advice on new services. This two-way communication helped us define the product roadmap and enable SMBs to run their business effectively.

TTBS has a very diverse portfolio of services and solutions. Is there a common thread binding them together as a whole?

Over the last two years, we have witnessed the evolution of the needs of enterprise customers. Traditionally, telecom companies have only provided voice and data and assumed that the customer would figure out their own equipment to set up the service. However, we realised that many customers do not want to invest in hardware. We also noticed that many of the workloads are moving onto the cloud. Hence, we introduced Smartflo, a multi-tenanted PBX in the cloud that enables all communication features a customer may need. We also created a platform and services solution, which allows the customer to use services seamlessly and work from anywhere. The common thread or sweet spot is the interplay between core connectivity products, security products, and cloud-based services.

In an era of super-specialisation, how does TTBS manage to focus on customer-centricity and innovation with such a wide range of services?

It is a huge space, and it is important to focus on what we do best. We do not want to spread ourselves too thin and try to do everything. If you look at where most businesses spend their money, about 35-40% is on hardware like laptops and other devices. We have decided to stay away from that because it is not an area where we can add much value as an organisation.

The next big area is services, which includes everything from productivity and security applications to specialised software like HRMS or accounting. We have decided to focus on areas that are adjacent

Smartflo is a cloud communication layer that includes Whatsapp for Business, along with voice, video, SMS, and chat capabilities.

to our core offerings of productivity, collaboration, and security. These are areas where the interplay is stronger and where we can bring the most value to our customers. We are not yet ready to get into financial and accounting software, because that is a specialised area, which requires different expertise.

Our focus is on the interplay between the core voice and data connectivity, the services domain, and the infrastructure as a service domain. This covers about 60-70% of all ICT requirements that most businesses have. We have brought in domain specialists, solution architects, product specialists, and others who can bring the best of both worlds to our customers and provide them with a comprehensive solution. We have undergone a complete DNA change as an organisation to make sure we bring the right expertise to the table.

In terms of business, portfolio expansion, and achievement, how would you describe the year 2022 for the company?

The financial year 2022-23 has been one of the best years for us. During the year, SMBs started investing again and in newer services. Fortunately, there was no new COVID wave and the business boomed. The H1 was really good in terms of growth, even compared to the pre-COVID period. However, we faced some headwinds in Q3.

The effects of the layoffs in the global tech space and the funding crunch for startups are evident. We are seeing a bit of a slowdown in business from startups. There is a dependence on the global economy, but India's story is still strong. Nevertheless, we have done much better than the pre-COVID period in October to December, as well as in January. We are cautiously optimistic about the new FY, as we are seeing some headwinds coming in.

The government has projected the GDP growth for FY2024 at 6.5%, with the IMF projecting it at 6.1%. Hence there may be a slight dip compared to FY2023, and then it will take off again. We have to wait and watch how things pan out in the bigger markets like Europe and the US.

And what about the major strategic initiatives taken up by the company, including partnerships?

We have key partnerships with Microsoft, Google, Meta, and Zoom and are working closely with their product and solutions teams to create bundled services and solutions, rather than just point products.

Our focus for the next 3-4 quarters will be on creating unique bundled propositions, such as the SmartOffice solution or the Smart Internet solution, which bundles security with the data layer. Another example is Smartflo, which is a cloud communication layer that now includes Whatsapp for Business, along with voice, video, SMS, and chat capabilities. While many customers currently take point solutions, such as Microsoft 365 or Azure, we are innovating along with some of the global product teams of these global OEMs to create unique solutions that can cater to the market in India.

Does that mean we can expect TTBS-branded products?

Let me give you an example of WhatsApp for business. We sell this service independently, enabling customers to use the service by deploying and managing it for them. Our Smartflo proposition has been in existence for two years, focusing on voice connectivity and hosted contact centres, and we have recently added chat. Rather than creating another brand, we are enhancing the scope of the Smartflo proposition by integrating Zoom into it. This integration allows for instant video calls between agents and customers with a simple click, in addition to voice calls.

We are also integrating WhatsApp for business into the Smartflo proposition, making it easier for customers to have conversations with agents or others. Instead of offering separate products, we are bundling all of these services together under the Smartflo proposition, which will include voice, video chat, and WhatsApp. We are also working closely with the product teams in these organisations to create a unique offering that will differentiate us in the market. While we may not announce new brands, our offering will be our asset. 🍌

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The discussion will also focus on the India's cybersecurity market, e-Commerce and digital payments, Health-tech, especially cloud-based solutions and remote diagnostics and telemedicine solutions, Emerging technologies like AI, Blockchain, Industrial automation including IoT and Industry 4.0.

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Add blockchain power to data integrity revolution

India can capitalise on blockchain's many benefits to prevent fraud, facilitate identity management, and monitor and streamline supply chains

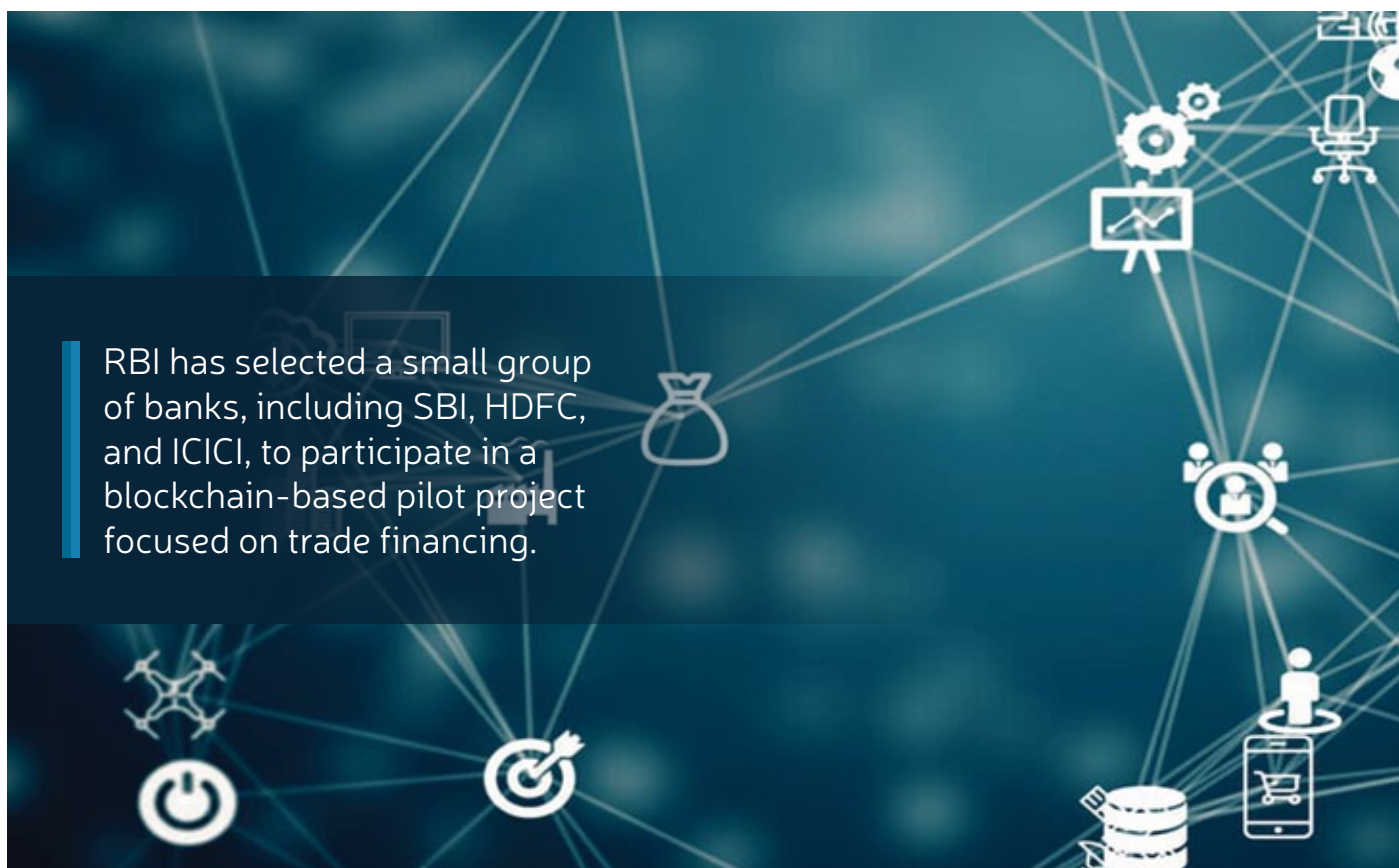
BY KIRAN VANGAVETI

Blockchain is often referred to as a silver bullet for lapses in data integrity. It is an immutable, decentralised, distributed, and public shared ledger or database that enables verified network participants to record transactions, track assets, and share other digital information across a network transparently. This promotes trust and traceability among all stakeholders.

The immutability of blockchain, or its resistance to manipulation, makes altering it a futile effort. Being a

distributed registry, transaction records are held not by a single person, entity, or institution or within one legal boundary, but by multiple entities across the world. Thus, a single change would require changes and updates across the records of all these entities, making changes to blockchains computationally almost impossible to implement. This has made the adoption of blockchain technology an indispensable feature of the current discourse on data integrity.

India can also capitalise on blockchain's many benefits



RBI has selected a small group of banks, including SBI, HDFC, and ICICI, to participate in a blockchain-based pilot project focused on trade financing.

The adoption of blockchain can help propel the rapidly evolving insurance segment in India by automating processes and reducing insurance fraud.

to prevent fraud, facilitate identity management, and monitor and streamline supply chains. The public sector has long been plagued by issues regarding the accuracy of records. Fraud is a recurrent problem tied to physical recordkeeping and human involvement at the registrar's office. Blockchain's real-time information-sharing capacities can help in fraud detection and prevention by reducing opportunities for fraud and the costs and time involved in its detection.

MANAGING THE BUSINESS NEEDS

Blockchain technology has many more use cases, as pretty much all transactions can be validated through it. This would help the government do away with petty disputes, which is a major issue clogging judicial and administrative

pipelines. This, in turn, will boost ownership and trust in records.

Web 3.0 is an effective means by which the public sector and governments can identify the beneficiaries of their schemes. Unfortunately, account duplication and impersonation are also rampant in government schemes such as Jan Dhan Yojna, with most cases of fraud occurring in the last mile. With millions of accounts being opened, how does one know that an account belongs to a particular person and not someone else? Moreover, how does one know that this person hasn't enrolled themselves multiple times in these yojanas? We often come across reports of money being transferred to the accounts of deceased individuals. This again demonstrates the vast scope for the application of blockchain technology in India.

It is these same data integrity functions of blockchain that can help overcome financial fraud in banks. Frequently, the same assets are mortgaged across multiple banks, but banks have very little opportunity to verify this. Not only that, they have a tough time validating the integrity of even a single asset that is mortgaged. Blockchain can help authenticate relevant personal and property data and information quickly and reliably.

Today, using blockchain, a loan process can be completed in a matter of hours. If a bank can validate the blockchain identity of someone's certificate, their land records, identity, and credentials can be verified easily, thereby substantially minimising the manual labour that goes into processing bank loans. Consequently, the use of blockchain provides ample opportunity for the public sector and the private sector to streamline their workflow and processes.

DRIVING THE FINANCIAL SECTOR

The adoption of blockchain technology can help propel the rapidly evolving insurance segment in India, as recently highlighted by Debasish Panda, Chairman of the Insurance Regulatory and Development Authority of India (IRDAI). Blockchain can enhance data integrity to stem insurance fraud and help automate processes. Moreover, eventually,





DATA INTEGRITY AND FRAUD DETECTION

- Blockchain is an immutable, decentralised, distributed, and public shared ledger that promotes trust and traceability among stakeholders.
- India can capitalise on blockchain to prevent fraud, facilitate identity management, monitor and streamline supply chains, and validate transactions.
- It can help do away with petty disputes, boost ownership and trust in records, and authenticate personal and property data quickly and reliably.
- The adoption of blockchain technology can help propel the rapidly evolving insurance segment in India and curb the circulation of counterfeit currency.
- Blockchain's real-time information-sharing capacity can help in fraud detection and prevention by reducing opportunities for any such incident.

SEBI has asked depositories to adopt blockchain technology to monitor security creation and the covenants of non-convertible securities.

insurers' beneficiaries can be paid in stablecoins, a type of cryptocurrency whose market value is pegged to an external reference asset, such as fiat money, exchange-traded commodities, or some other cryptocurrency. However, it is too early to make projections on stablecoins, with India still considering launching a digital currency.

The adoption of blockchain technology, along with stablecoins, has the potential to block the multiple channels through which counterfeit currency is brought in and circulated. With almost 60% of India's transactions being digital, moving closer to 90% could make it possible to roll out a cryptocurrency that is centrally managed within India, with transparency and accountability for where the money is going.

Considering the far-reaching benefits that blockchain technology can have in asset and transaction management, the call for the adoption of blockchain technology in India should be louder. There has been some progress, with the Reserve Bank of India (RBI) in 2022 selecting a small group of national banks, including SBI, HDFC, and ICICI, to participate in a blockchain-based pilot project focused on trade financing.

In addition, in 2022, the Securities and Exchange Board of India (SEBI) asked depositories to adopt blockchain technology to monitor security creation and the covenants of non-convertible securities. These initiatives can help create a more resilient system with better threat protection, due to the distributed nature of blockchain technology.

A more immediate and widespread adoption of blockchain technology could revolutionise India's data integrity framework, preventing criminals from exploiting the system and saving the country millions of rupees. 🍀

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Transforming the media industry

Driven by the availability of high-speed connectivity and the increase in mobile devices, OTT platforms are changing the way the world looks at the media industry



BY SUPRAKASH CHAUDHURI

Over-the-top or OTT services are on-demand platforms that offer streaming of audio and video content over the Internet without the need for a traditional television subscription. By giving users access to a variety of information that can be viewed at any time and on any device, these platforms are revolutionising the way people consume media.

On the technology front, OTT players rely heavily on the digital infrastructure for the service framework, operator engagement, service delivery, and hyper-personalised user experience. In fact, technology has played a massive role in the evolution of the media industry and OTT platforms. Unlike traditional television, which requires expensive infrastructure and

OTT platforms have taken advantage of technological advances, including the rise of high-speed Internet, better compression algorithms, and cloud-based services.

equipment, OTT services rely on the Internet, which is more accessible and affordable. This accessibility allows for a greater level of diversity in content, which can be tailored for specific audiences.

The OTT platforms have also been able to take advantage of technological advances, including the rise of high-speed Internet, better compression algorithms, and cloud-based services. These have led to better user experience, thereby contributing to the expansion of the overall industry.

SERVICE FRAMEWORK OF OTT OFFERINGS

With the growing dominance and popularity of smart devices such as smartphones and smart TVs, the rising demand for video-on-demand or VOD content and rising user payment rates are the main reasons for the rise of streaming services. The service framework of OTT offerings typically consists of three tiers: free, freemium, and premium. The free tier offers basic content that is supported by advertising.

While the freemium tier offers a wide range of content, often without ads, it requires a subscription. The premium tier on the other hand offers the highest quality content, including live events and original programming, and requires a higher subscription fee. To improve engagement on platforms, operators can offer a range of features, such as personalised recommendations, social media integration, and interactive content. These characteristics promote user interaction and add a sense of community, which in turn fosters better loyalty and retention.

TECHNOLOGICAL SCOPE FOR SERVICE DELIVERY

Technology has been the major force behind OTT service delivery and constant innovation in the industry. One of the most important technological advances is the use of Artificial Intelligence (AI) and Machine Learning

(ML) in powering personalised content discovery. This technology is critical for providing a faster content search and enables stickiness to the platform. This also helps in creating user profiles for better market automation to reduce churn, and enable the targeting of subscriptions, content and advertisements for advanced monetisation.

API-based integration is another important technology that is increasingly being used by OTT providers for OTT app content aggregation. This technology enables content from partnered OTT apps to be presented in the apps more efficiently and effectively while enabling SSO and content discovery of choice in a single app rather than downloading multiple applications.

By leveraging content aggregation technology, providers can easily scale their services to meet changing content demand, without the need for significant investments in content acquisitions.

USER EXPERIENCE AS A PRIORITY

The quality of experience is critical for any OTT service. With consumer viewership being driven more towards digital as well as connected devices, traditional devices delivering linear streams are on the decline.

Subscribers are now streaming content on a variety of screens. Multiple screens also allow users to share the same streaming service while enjoying their favourite shows. Therefore, the platform should be compatible with a wide range of devices while supporting multiple profiles of users.

They also need to personalise their entire journey, retrieving information from various devices while ensuring the experience is seamless across all touchpoints. To achieve this, OTT providers are making significant investments in creating user-friendly interfaces that

Technology has been the major force behind OTT service delivery, including the use of AI and ML in powering personalised content discovery.



API-based integration is an important technology that is increasingly being used by OTT providers for OTT app content aggregation.

facilitate finding and viewing content better. Factors like identifying the right target groups, understanding user challenges, and implementing a data-driven design to create an optimal and personalised user experience thus become imperative.

FUTURE GROWTH OF OTT AND TRENDS

OTT has a promising future and is likely to move ahead on the growth trajectory in the years to come. The transition towards Advertising-based Video on Demand or AVOD has been fueled by the success of platforms like Jio Cinema which attracted 32 million viewership for the FIFA World Cup final and the successful adoption of Free, Ad-supported, Streaming TV services or FAST in the US. This is one of the most important trends in the ever-evolving media industry.

More providers are likely to focus on the AVOD-driven service offering, especially for Live sporting events and there will be continued growth in originals to draw in

and keep users. Other future trends include OTT app aggregation, proliferation in user-generated content, deployment of 5G technology, development of virtual and augmented reality technologies, and more interactive and tailored content.

In conclusion, OTT services have revolutionised the way people consume digital content. With their focus on digital and technological advancements, service frameworks, improving user engagement, and personalised content recommendations, they have established themselves as a major player in the entertainment industry. As the demand for digital entertainment continues to grow, we can expect OTT platforms to play a more significant role in the coming years. 🍀

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Tech Data, Cloudera to help address data in motion gaps

Tech Data, a TDSYNEX company, has announced an expansion of its partnership with hybrid data company Cloudera in the Asia Pacific and Japan region. Under this strategic alliance, Tech Data will leverage Cloudera's hybrid data platform to empower enterprises to address data in motion gaps and manage their entire data lifecycle with greater flexibility from Edge to AI. By harnessing data in motion, businesses can gain control of and leverage data as a strategic asset, allowing them to address customer needs in a timely manner and offer accurate promotions.

The Cloudera Data Platform's Shared Data Experience (SDX) offers businesses an integrated set of security and governance technologies built on metadata to secure, monitor, and govern their data consistently. Cloudera's Data-In-Motion offering provides two core services – DataFlow, which enables developers to connect any data source anywhere with any structure, and Stream Processing, a complete, enterprise-grade stream management and stateful processing solution.

Bennett Wong, Vice President, Advanced Solutions - Modern Datacentre and Analytics, Tech Data APJ, said that Tech Data is delighted to enhance its partnership with Cloudera to empower enterprises in the region to expand their data business opportunities. Meanwhile, Remus Lim, Vice President, Asia Pacific and Japan, Cloudera, said that business stakeholders today want more real-time visibility to derive insights to make faster data-driven decisions.

Qualcomm to power Leapmotor's next-gen vehicle cockpit

Chinese electric vehicle (EV) manufacturer Leapmotor and Qualcomm Technologies have signed a non-binding Memorandum of Understanding (MOU) to collaborate on creating the next generation of intelligent cockpit products. Under the agreement, the companies will use the latest Snapdragon Cockpit Platforms from Qualcomm to develop a range of intelligent features for Leapmotor's vehicles. With this, Leapmotor will become one of the first automakers to use the platform, with the first vehicle featuring the solution expected to launch later this year.

The new Snapdragon Cockpit Platform is Qualcomm's premium digital cockpit solution that uses a 5nm process node to deliver high-performance computing, graphics rendering capabilities, and a powerful artificial intelligence (AI) engine. Also, Furthermore, the platform was designed from the ground up to support the integration of multiple distributed computing components in the vehicle, in line with the central-compute electrical/electronic (E/E) architecture. This design is intended to aid Leapmotor's new-generation intelligent connected vehicles to evolve towards the central-compute architecture.

The platform supports the integration of multiple electronic control units (ECUs) and domains, including AR-HUD, infotainment, rear-seat displays, e-mirrors, and in-cabin monitoring. The company also plans to use the Snapdragon Car-to-Cloud Services' Soft-SKU capabilities to provide consumers with the latest features and capabilities via over-the-air (OTA) updates.

The collaboration will also explore extensive opportunities in cockpit, automotive connectivity, and intelligent driving with Snapdragon Digital Chassis solutions. The companies aim to bring premium experiences in intelligent voice processing, heavy-workload multi-tasking, complicated multimedia, contextual awareness, and security enhancement to their users. The companies believe that the new technology collaboration will allow Leapmotor to evolve towards the central-compute architecture and create greater value in safe mobility and smart life for its users.



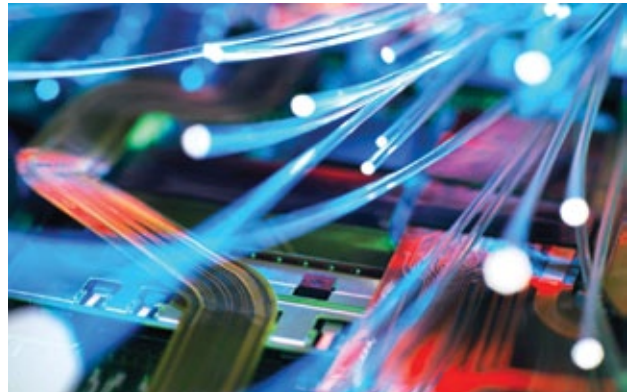
Hongtao Zhou, Senior Vice President and Head - Electronic Product Line, LEAPMOTOR (left) and Wei Shi, Senior Director, Sales, Qualcomm

Nokia expands OpenColo's datacentre site connectivity

Nokia and OpenColo have successfully completed the first commercial field trial to transport a 1.6 Terabit per second traffic flow over an 800 Gigabit Ethernet (800GE) link aggregation group with 800GE FR4 optics. Based in Silicon Valley, OpenColo is an innovative provider of datacentre connectivity and colocation services with locations in Santa Clara, California and Miami, Florida.

The initial trial included the Nokia 7750 SR-1se router equipped with FP5 silicon to enable 800GE interfaces, and the Nokia 1830 PSI compact modular optical transport platform equipped with Photonic Service Engine (PSE) coherent interfaces. Nokia is the first vendor commercially shipping 800GE routing solutions in volume from 2022. This trial marks the industry-first application of 800GE link aggregation for high-capacity datacentre interconnect, including both full link resiliency with coherent optical transport.

800GE routing is the next generation IP networking technology enabling operators to upgrade router interfaces to 800 Gb per second. It leverages the most recent QSFP-DD interface module specifications to support high-density 800GE pluggable optics with backwards compatibility for existing 400GE, 200GE and 100GE optics.



Jeff Jakab, Vice President, IP Hardware Product Management at Nokia, said: "We are pleased to achieve this important milestone with OpenColo as it further demonstrates the maturity and added value of our 800GE routing technology to solve real customer challenges today and tomorrow. The economic advantages of 800GE in comparison to 400GE are clear, being cost neutral to 400GE today and providing up to a 40% power savings versus 400GE today. Adopting 800GE routing is a simple and clear solution to the immediate power concerns our industry faces."

Ericsson, MediaTek expand 5G deployment options for CSPs

Ericsson and MediaTek have successfully merged four channels – one frequency division duplex (FDD) and three time division duplex (TDD), to deliver a downlink speed of 4.36 Gbps, the highest known speed based on this band combination. This four-component carrier (4CC) aggregation combination will increase the 5G deployment options for communications service providers by blending different frequency bands.

In an interoperability development test, the two companies completed the 5G data call using one low-band and three mid-band channels in the sub-7GHz frequency range bands, where typically most of the 5G data traffic is carried. The higher throughput that this 4CC combination enables will enhance user experience with faster downloads and seamless video streaming for smartphone users and fixed wireless access subscribers. For service providers, Ericsson's flexible Carrier Aggregation solution will allow them to maximise use

of available spectrum assets to deliver high-quality 5G connectivity.

Carrier Aggregation is key to deploying high-performing 5G networks. It provides the unique capability to combine many frequency bands, enabling higher speeds and increased cell coverage that improve capacity and user experience. The speed boost can mean better audio and video quality for streaming users, faster file downloads, and a better working environment for digital nomads. By combining FDD spectrum with TDD spectrum, more users can benefit from carrier aggregation gains.

The downlink peak rate of nearly 4.4 Gbps was reached by combining 20MHz of Advanced Wireless Service band, 80MHz of Citizens Broadband Radio Service band and 200MHz of C-band spectrum. The test was carried out using MediaTek M80 5G modem, Ericsson's Baseband 6648, TDD Massive MIMO radios AIR3268, AIR3239, and TDD Radio 4426.

Cisco, Telenor to explore new as-a-service business models

Cisco and the Telenor Group have announced an expanded relationship through the fifth iteration of their Joint Purpose Agreement (JPA) to advance strategic priorities that benefit markets in which the companies jointly operate, including Environmental, Social, and Governance (ESG); as-a-service and automation innovations; and cybersecurity and multi-cloud as-a-service.

The two companies will explore an everything as-a-service (XaaS) flexible and scalable model to reach a broader partner ecosystem and customer base. Cisco and Telenor plan to accelerate the flexibility, scalability, and availability of cybersecurity solutions as-a-service for both business and consumer customers. The companies will also work to design and demonstrate how multi-cloud as-a-service can help business customers use multiple clouds more effectively and efficiently through end-to-end orchestration, maximised observability and cybersecurity, cloud cost efficiency, and cloud resource optimisation.

Cisco and Telenor will also build upon the success of Security Touch-Free Operations, an initiative established to increase Telenor's security offering through automation and operational efficiency, helping to substantially reduce cybersecurity threat response times. Moving forward, teams will work on developing cybersecurity automation in Telenor's Bangladesh operations, Grameenphone, and will also explore the potential of developing use cases for the broader enterprise market.

Cisco and Telenor have common ESG values and share a focus on helping people build future digital skills to address societal challenges. The companies will focus on initiatives related to digital skills and inclusion, safe connectivity, youth empowerment and education, and sustainability.



HPE announces new data services offering



Hewlett Packard Enterprise (HPE) has unveiled new file, block, disaster and backup recovery data services to help customers reduce data silos, improve performance and lower costs. The new file storage data services provide scale-out, enterprise-grade performance for data-intensive workloads, while the expanded block services offer mid-range economics for mission-critical storage. Customers can store, manage and protect all data types from one unified platform across the hybrid cloud through HPE Alletra Storage MP's flexible architecture. The new services provide a cloud operating experience that makes it easy to transform data lifecycle management and "thrive in the age of insight," according to HPE.

HPE's modular storage solution offers a disaggregated infrastructure with multiple storage protocols on the same hardware that can scale independently for performance and capacity. A single, unified cloud platform allows customers to deploy, manage and orchestrate data and storage services, regardless of the workload and storage protocol. The flexibility of HPE Alletra Storage MP provides better price for performance today and cost-effective scalability on the same hardware in the future. The intuitive cloud experience, powered by AIOps, enables the provisioning and management of storage without specialised skills.

Tom Black, executive vice president and general manager of HPE Storage, said the new data services and expanded HPE Alletra innovations make it easier and more economical to manage multiple types of data, storage protocols and workloads, so customers can focus on accelerating innovation and driving business results.

AWS to help Experian scale its product innovation

Amazon Web Services (AWS) has announced that Experian, the global information services company and credit reporting bureau, has named it as the preferred cloud provider to power its multiyear information technology (IT) modernisation initiative.

As part of the company's cloud-first strategy, Experian will move core business operations, consumer-services products, analytics tools, and on-premises servers to AWS. Centralising these critical technology platforms on the world's leading cloud will enhance Experian's IT security and reliability, decrease operating costs, and improve time to market for new offerings. Experian will also expand its use of AWS's broad set of cloud services to create customised programmes and deliver real-time financial services to consumers and business customers.

AWS provides Experian with resilient and secure IT infrastructure that will accelerate the introduction of new financial services products for consumers and businesses. Working with AWS, Experian will continue to use the most advanced services and apply machine learning and analytics across its vast amount of data. This will enable Experian to identify trends and insights that will help them rapidly create innovative services to meet and exceed customer expectations.

By running its largest divisions on AWS, Experian can expand its service offerings, empowering businesses and financially underserved consumers to build, improve, and take control of their financial future. AWS will also help Experian integrate data across its business, providing new and faster insights and predictions that will allow businesses and consumers to improve their financial health and save money.

Ciena Supports Colt's launch of long-haul networking services



Ciena has announced that Colt Technology Services (Colt) is now able to run high-capacity services across long distances spanning more than 500 km using its industry-leading coherent technology. With Ciena's 6500 Reconfigurable Line System (RLS), Waveserver 5 compact interconnect platform powered by WaveLogic 5 Extreme (WL5e) coherent optics, and Manage, Control and Plan (MCP) domain controller, the upgrade more than doubles Colt's network capacity.

"We continue to improve our service offerings on the Colt IQ Network, enabling us to better respond to the explosive traffic demands in Japan and drive faster service launches. The Colt IQ Network is designed to provide high-bandwidth, on-demand connectivity, and we continue to deliver on this promise by collaborating with industry pioneer Ciena," said Masato Hoshino, Representative Director and President, Head of Asia, Colt Technology Services.

With the Ciena 6500 RLS, Colt can simplify deployment, operation, and troubleshooting with built-in tools like Zero-Touch Provisioning (ZTP), network auto-discovery, and real-time network monitoring and visibility. Network adaptability is also enhanced with automated calibration.

"Throughout Japan, there is a growing ask to support the connectivity needs required to run cloud-based applications and bandwidth-heavy video content. Designed with programmability, performance, and scalability in mind, Ciena's 6500 RLS enables Colt to deploy C&L-band optimised equipment with no service interruptions, empowering Colt to bring the digital universe to its customers faster than ever before despite the distance," said Kazuyasu Takahashi, Vice President and General Manager, Ciena Japan.



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