₹75

www.voicendata.com

VOL 29 ISSUE 04 APRIL 2022

VOICE & DATA

Connecting the Digital World

CyberMedia

V&D 26 YEARS

Telecom Person of the Year Award

Anshu Prakash

Former Chairman, DCC &
Former Secretary, Telecom

10

Pathbreaker of the Year Award

CoWin Platform

[Received by Dr. R S Sharma, CEO, National Health Authority]

14

Lifetime Achievement Award

Prof. Ashok Jhunjhunwala

Dept. of Electrical Engineering, IIT Madras

18

TELECOM LEADERSHIP FORUM

Era of Convergence

Cable testing you trust. Network testing you need.

Scan here
to view our LinkIQ live demo

Fluke Networks
LinkIQ™

Day to day tools for **fiber maintenance** and **troubleshooting**.

Fluke Networks
Quick Clean™

Fluke Networks
Fiberlert™

Contact Us:
www.flukenetworks.com
Phone **+91 80 6715 9000**
Email **indiasales@flukenetworks.com**

GIVE ADVANTAGE TO YOUR NETWORK WITH OWN IP ADDRESS

nixi
Empowering Netizens

irinn

KEY BENEFITS

- Only Indian organization to delegate IP addresses (IPv4/IPv6).
- *Get IPv6 address free of cost along with IPv4 address.

Contact us: nixi.in | customercare@nixi.in | Call us on: 011 48202001

nixiindia | inregistry | nixi | NIXI

For NIXI Technical Trainings: **https://training.nixi.in/#/home**

*Conditions Apply

VOICE&DATA
CONNECTING THE DIGITAL WORLD

Website: www.voicendata.com

EDITORIAL
CONSULTING GROUP EDITOR: Ibrahim Ahmad
MANAGING EDITOR: Thomas George
EDITOR: Gajendra Upadhyay
CONTRIBUTING EDITOR: Pratima Harigunani
ASSOCIATE EDITOR: Vaishnavi Desai
ASSISTANT EDITOR (Online): Supriya Rao
ASSISTANT EDITOR (Special Projects): Ankit Parashar
SUB EDITOR: Manisha Sharma
SR. MANAGER DESIGN & COVER DESIGN: Vijay Chand

VICE PRESIDENT RESEARCH: Anil Chopra

MANAGER CYBERMEDIA LABS: Ashok K Pandey

BUSINESS
SR VICE PRESIDENT: Rachna Garga (rachnag@cybermedia.co.in)
ASSOCIATE VICE PRESIDENT: Harminder Singh
MANAGER: Sudhir Arora (North, East)
MANAGER: Subhadeep Sen (South, West)

MARKETING & ALLIANCES
SR VICE PRESIDENT: Rachna Garga (rachnag@cybermedia.co.in)
MARKETING: Rajiv Pathak

EVENTS, OPERATIONS & COMMERCIALS
GENERAL MANAGER: CP Kalra
SR. MANAGER MIS & DATABASE: Ravi Kant Kumar
MANAGER COMMERCIALS & ADMIN: Ashok Kumar
SENIOR PRESS COORDINATOR: Harak Singh Ramola

CIRCULATION & SUBSCRIPTIONS
HEAD: Rachna Garga
SENIOR MANAGER: Sarita Shridhar, C Ramachandran
ASST. MANAGER - AUDIENCE SERVICES: Alok Saxena
SENIOR PRESS COORDINATOR: Harak Singh Ramola

OUR OFFICES
GURGAON (CORPORATE OFFICE)
Cyber House
B-35 Sector-32, Gurgaon, Haryana – 122 001
Tel: 0124 - 4822222 Fax: 0124 - 2380694

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

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

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

Voice&Data is printed and published by Pradeep Gupta on behalf of Cyber Media (India) Ltd, D-74, Panchsheel Enclave, New Delhi - 110 017, and printed by him at M/s Archna Printers, D-127, Okhla Industrial Area, Phase-1, New Delhi 110020. Editor: Gajendra Upadhyay

For Subscription queries contact rsevoicendata@cybermedia.co.in

April 2022

[CONTENTS]

TELECOM LEADERSHIP FORUM
Era of Convergence

TLF 2022

TECHNOLOGY

INTERVIEW

[NEXT ISSUE]

MARCH 2022

Subscribe

SEND YOUR FEEDBACK FOR US TO SERVE YOU BETTER...

For **subscription** related issues, contact us at
rsevoicendata@cybermedia.co.in

You can also write to
Reader Service Executive, **VOICE&DATA**,
Cyber House, B-35 Sector 32,
Gurgaon-122 001, Haryana
Tel: 98104 99208

FEEDBACK
From Online Readers

Share your views at vndedit@cybermedia.co.in

NEXT ISSUE

How Airtel plans to leverage OpenRAN

—V&D exclusive

For any query: rajivp@cybermedia.co.in

GAJENDRA UPADHYAY

[OPENING NOTE]

Are Private 5G Networks a Security Risk?

The TRAI on 11th April released its much awaited recommendations for auction of spectrum in frequency bands identified for 5G – which covers allocation and pricing of Spectrum for 5G terrestrial networks and some overlapping frequency bands for Satellite Communications. Understandably, it has evoked mixed responses from different sections within the industry.

The newest kids on the broadband block – Low Earth Orbit (LEO) satellite operators like OneWeb – represented by the Indian Space Association or ISpA welcomed the recommendations: "as it calls for coexistence of satellite communications and IMT in the 27.5-28.5 GHz band." ISpA appreciated TRAI's recommending an exclusion zone for satellite earth stations (Earth to Space) in the 27.5-28.5 GHz band to avoid interference with Satellites.

But, ISpA has opposed the inclusion of all available spectrum in the 24.25 - 28.5 GHz bands with low and mid bands for the auction.

"It is a case of oversupply to terrestrial telecom at the cost of the satellite industry." ISpA's stand is that the 28 GHz band should be allocated exclusively for satellite communications for the Space industry – "to fulfil the Hon'ble Prime Minister's vision of making India a major player in the global space domain."

On the other hand, the existing mobile network operators are unhappy about several things. One of them being price - with demands for a further reduction of the base auction price.

The other, is perhaps the most interesting debate that is raging. It relates to "Private Networks" or what the TRAI calls 'Captive Wireless Private Network (CWPN).

Essentially, a private 5G network is a local area network that provides all the features of 5G but caters to a closed group – such as a factory, an industry operation like mining or drilling operations at sea. It does not offer services to the public.

The leading body of mobile operators in the country the Cellular Operators Association of India (COAI) is opposed to CWPNs and has requested TRAI not to reserve any spectrum which has been identified for IMT, for Private Captive Networks.

Some of the largest mobile operators are of the view that allowing CWPNs would hurt the industry. These operators, apart from having to buy spectrum at high rates, have to invest tens of billions of dollars for building a 5G network. With CWPN, they risk losing business from their most lucrative customers – the Enterprise segment which contributes almost 40% of their revenues.

Instead of independent Private Networks, existing operators suggest that they could easily provide the same solutions in one of several ways:

- by using the Network Slicing technique over their own public infrastructure – for differentiated and segregated services to the Enterprises (factories etc);
- by leasing out their Spectrum (which they have bought at high prices) to these enterprises and let them build a private network;
- by simply sub-letting a fully built out network within the premises of the Enterprises. All three are feasible.

However, the strongest argument against allowing private captive networks relates to National Security. Mobile operators argue that Private Networks will neither be secure nor subject to stringent Quality of Service (QoS) that apply to licensed mobile networks.

Globally though, private networks are a reality. The Global Mobile Suppliers Association or GSA in a September 2021 report had identified 55 countries/territories with private network deployments. One of the earliest examples is that of Lufthansa Technik AG which is a subsidiary of Lufthansa Group and provides aircraft maintenance, repair and overhaul or MRO services for engines and components.

In 2020 they announced that they would use their own private wireless network for two innovation projects at their Hamburg base. One project was for using augmented reality to virtually visualize the 3D design data of planned cabin interiors in empty aircraft fuselages.

The second was for the "Virtual Table Inspection". Here customers can remotely attend the inspection of engine parts. Using a video stream they can communicate in real time with the engine mechanics and inspect the dismantled parts in high-resolution on the screen.

All of these applications require high speeds and low latency – which is also used for automating manufacturing lines, using robots and software driven controls etc.

The last word on Private Networks is yet to be written. The debate is likely to be intense, involved and interesting in days to come.

European Union

The other interesting update in this issue relates to how the European Union collaborates with the Indian Standards bodies for cutting edge work on technology Standards -- communications networks and platforms. One of the most recent being in 5G.

Europe has seen 5G commercial services deployed in at least 24 of the EU-27 countries.

5G Standardisation started in early 2016 under the umbrella of the 3rd Generation Partnership Project (3GPP). This is the key Standardisation body for global mobile communication systems.

India's Telecom Standards Development Society of India (TSDSI) is now an Organizational Partner (OP) of 3GPP. This allows TSDSI members to showcase their work globally.

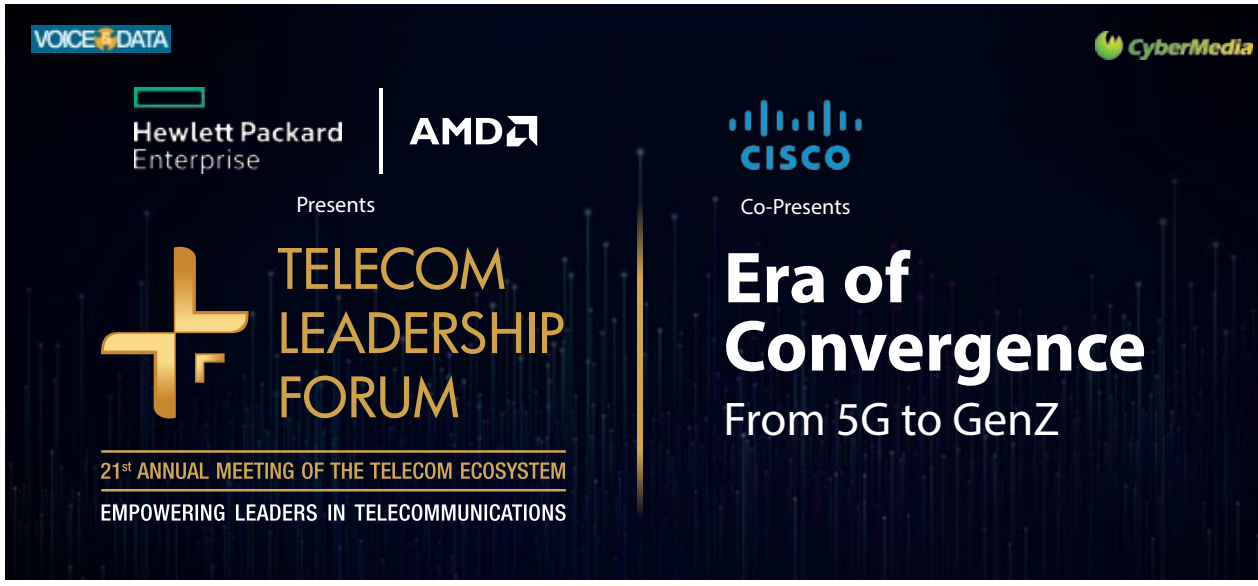
As a result of this, India notched up a great milestone when the indigenously developed 5Gi standard was considered and allowed for discussions to merge with the global 5G standard. 5Gi focuses on enhanced coverage and low power consumption. It benefits rural and remote networks.

The merger process is on and once it is finalized will enable a single common specification, for radio access in 5G deployments in India and globally. A major success for Indian Standards.

gajendrau@cybermedia.co.in

Era of Convergence

The 21st Telecom Leadership Forum, the defining event every year for the industry, saw experts deliberate on the next generation of technologies and peek into the future of the sector



V&D BUREAU

March 22, 2022: India's Oldest and foremost Telecom Industry Magazine, Voice&Data presented the V&D Telecom Person of the Year Award for 2021, to Mr. Anshu Prakash, former Chairman, DCC and former Secretary, Telecom – for his untiring efforts in new policy initiatives that are set to revive the Telecom sector.

The V&D Jury awards were presented at the 21st Telecom Leadership Forum, held virtually on March 22, 2022 and attended by over 1045 participants from the Telecom Ecosystem.

The V&D Jury awarded the Lifetime achievement award to Prof. Ashok Jhunjhunwala, Professor of Electrical Engineering IIT Chennai for his life's work over 40 years – bringing industry and academia together, playing a catalyst's role in the telecommunications revolution of the late 90's through is innovative CorDECT platform, founding Tejas Networks and inspiring generations of new entrepreneurs as a mentor to over 100 start-ups in the technology sector.

The Jury also unanimously awarded the Pathbreaker of the year award, to the CoWin Platform – conceptualized and developed under the chairmanship of Dr. RS. Sharma, CEO, National Health Authority.

Leading from the front, Dr Sharma played a vital role in helping CoWin being set up at short notice – this was at a time of extreme panic in the country due to the Pandemic. The technology-enabled platform had a simple aim – to simplify and speed up the delivery of vaccinations for citizens.

The CoWin platform became the backbone of India's vaccination drive. It literally saved millions of lives by ensuring fast and accurate information on availability and appointments. For this unparalleled feat of bringing an essential service to citizens, at a time of unprecedented crisis, V&D Jury recognized CoWin as a Pathbreaker platform for the year 2021.

Held every year over the past 21 years, the annual V&D awards are the most coveted Telecom Industry awards.

The award process follows a stringent 3 tier evaluation process, including open nomination, research by the V&D editorial research team, and an award Jury process.

The Voice&Data Awards ceremony was preceded by the Telecom Leadership Forum (TLF) event which consisted of panel discussions on hot industry topics, interviews, fireside chats with industry veterans and Policy experts.

The opening session of the TLF featured Anshu Prakash, former Chairman, DCC and former Secretary, Telecom, in conversation with Pradeep Gupta, Chairman, CyberMedia Group. "The philosophy behind telecom reforms witnessed in 2021 was making things simple, promoting ease of doing business, addressing certain legacy issues, ensuring industry has sufficient liquidity, and promoting investment and FDI in the industry," Mr Prakash said. This was needed to deal with enormous challenges that the industry was facing.

Akhil Gupta, Vice Chairman, Bharti Enterprises, one of the stalwarts and earliest movers in the Telecom industry in India said, "There is one common thread that runs among all technological developments, and that is bandwidth. All of them need bandwidth which a telecom operator provides. if it is something like Metaverse it would require large dollops of bandwidth. With 5G, there will be technological developments which would not work without very high bandwidth and that is where Telecom Operators play a major role." He said this in his fireside chat with Mao Mohapatra, CEO, Comviva.

Other panelists and keynote speakers included: Harjit Singh, CEO – Tata Teleservices Ltd; Lt Gen S P Kochhar, DG, COAI; Himanshu Gupta, Country Manager – Telecom Media & Entertainment, HPE India; Arun Karna, MD & CEO, AT&T India; Prateek Pashine, President – Enterprise Business, Jio; R K Bhatnagar DG, Voice; and many others.

49 speakers in all addressed the 1000+ participants at the conference, over 26 sessions. The sessions focused on burning issues in the sector, like 5G, Multilingual Internet for the next 500 million users, OpenRAN, Electronics manufacturing, PLI scheme, Enterprise of the Future, Space Race given the launch of LEO satellites, and many more.

There were another 30 winners of V&D Excellence Awards. These winners were selected and shortlisted based on various parameters like innovation, impact, pioneering work, excellence in services, by a select panel comprising of industry experts and CyberMedia editors.

The categories were Multilingual Internet, Broadband services, 5G mobile devices, Innovation, Mobile handset Exports, Customer Service, and more.

We at V&D would like to thank all our partners. Our presenting partner HPE-AMD, Co-presenting partner CISCO, Gold partners Comviva & Ciena, our Digital transformation partner Accenture, AT&T our Connectivity partner, and Apeejay Education our Academia partner for the unflinching support and professionalism that enabled us to seamlessly host a successful TLF 2022.

We also want to thank the sectoral bodies of COAI, TEMA, SiA-India, ITU-APT, IESA, ICEA, India Space Association (IsPA) and CMAI, for the wide industry support rendered to Voice&Data through the years.

TLF Award Jury

The V&D Jury awardees were selected by a 10 member Jury team consisting of Industry leaders, influencers and CyberMedia editors, who met on January 27th, 2022 for deliberations. The Jury Chair was Prof. Bhaskhar Ramamurthy, Director IIT, Madras, Pradeep Gupta, Chairman, Cybermedia group. The Jury members were Anand Bhaskar, MD, Service Providers business, CISCO; Bharat B Bhatia, President, ITU-APT Foundation; Jagbir Singh, CTO, VI; K S Rao, Group Chief Corporate Officer, STL; Hari Om Rai, CMD, Lava International; Dr. Rajkumar Upadhyay, ED & Chairman, C-DOT; Lt Gen Dr. S P Kochhar, DG, COAI; and Som Satsangi, Sr VP & MD, Hewlett Packard Enterprise

Telecom Person of the Year

Anshu Prakash

5G rollout in FY 2022-23 is expected

TLF 2022, the 21st annual telecom industry event from Voice and Data, featured the who's who from India's Telecom, Internet and digital industries. The event recognised the stellar contributions by individuals who have made a difference in their respective fields and in the sector. Most of these are through work in areas of cutting edge technology, policy development, Regulatory reforms, research and development and public administration (political leadership without which reforms are impossible).

This year the Jury selected Anshu Prakash as the Telecom Person of the Year. Anshu Prakash, is the former Secretary, Telecom and Chairman of the Digital Communications Commission or DCC. His work on creating a new framework in Telecom Policy and Licensing have had an immense and positive impact on the mobile and telecom industry. Anshu Prakash tackled some of the most thorny issues that continued over decades and was a pain point for the industry. By showing a path forward he allowed the sector to focus on more constructive areas of growth for the sector and for the customers.

The Policy framework proved to be a lifeline in some cases and provided room for further growth. In his humility, he acknowledges that the: "credit goes to the team work of DoT. All of us have undertaken the reforms process together. Under the able, constant guidance of the Minister whose support helped us achieve these path breaking reforms."

Reminiscing on these and other important issues during his tenure, Anshu Prakash spoke to Pradeep Gupta, Chairman, CyberMedia Group sharing the thoughts that went into the making of policy. And also on what it means for the future of Mobile operators.

"The philosophy behind the telecom reforms of 2021 was essentially to make things simpler. Promoting ease of doing business, addressing certain legacy issues, ensuring industry has sufficient liquidity, and attracting investments and FDI in the industry with the overall objective to equip telecom to deal with challenges in the coming decades," he said while recollecting the various initiatives.

"These reforms were in keeping with the requirements of the times. But most importantly we had the unstinted support of the Hon. Minister, without which it would not have been possible." The bureaucracy was ready and willing, and we saw the reforms unfold.

What distinguishes the current reforms from previous efforts is the scale and the depth of the reform process. The biggest of which was the issue of Adjusted Gross Revenue (AGR), a format for calculating the revenues of Telecom operators on which a percentage would be levied by the Government as License Fees.

"AGR was the elephant in the room," said Anshu Prakash in his chat. TRAI had given a recommendation long back. And now the Government has adopted this. This matter was in courts over the last decade and a half. "We closed this and resolved this once and for all." Clarity on AGR was a lifeline and the rationalised definition is now the reference point for the future.

Anshu Prakash explained: "We have not favoured any one group or player. This was a general reform, it was a win win for all concerned, especially the investors and the network operators, but also the consumers and we also ensured there was enough competition, nobody went out of business."

More importantly this laid the foundation for the subsequent Financial reforms which permitted the Government to provide a moratorium on interest payments for the impacted operators. Those who needed or wanted to, could avail of the benefits of a moratorium on interest payments or even converting their dues to an Equity stake to be taken up by the Government.

Though this happened a little after Mr Anshu Prakash had moved out, but the groundwork was already done.

All of this was never seen in the past. "In the current reforms package, the government addressed the issue of structural reforms, financial reforms and ease of doing business in a big way." And for all of this Political support was a sine qua non. "No reforms can happen without this support," Mr Prakash said.

Under Mr Prakash, other major structural reforms happened on the Spectrum side. Spectrum usage charges (SUC), which is a quarterly or yearly recurring charge (over and above the cost of the bid for acquiring) were a big burden and amounted to a dual charge. SUC has been done away with for future auctions.

This is a fundamental step as a big burden (of double charging) is reduced on operators. They need to just pay a one time upfront auction fee. Then, since 2012, spectrum was auctioned for a 20-year period. "We increased this time frame to 30 years. A long time, that gives operators certainty, investors better time horizon to plan Capex and build a stable business model. Networks can be built for a longer period without pressure to recover higher prices from subscribers," he said.

And most interestingly, the Spectrum reform policy made it easier for operators to walk away. "Earlier there was a lock-in. But now Spectrum can be surrendered after 10 years by giving 1-year prior notice." It is a scarce resource and should be used optimally.

"Then a bold reform was to remove the requirement for bank guarantees. Earlier, the annual spectrum payments were required to be secured with a bank guarantee. In future such bank guarantees will not be required, this releases liquidity for the operators." All of this will set the foundation and make it easier for 5G auctions to happen more easily. Spectrum bands in the sub-Gigahertz and the most popular mid-band (approximately from 3.3 Ghz to 7 Ghz) should see good response from Operators. "In FY 2022-23, I sincerely hope that 5G rollout happens, not necessarily pan India, since there is a huge requirement for infrastructure."

For 5G there are other major infrastructural requirements like right of way, more towers and fiberisation of towers and use of street furniture for setting up small cell sites to provide better coverage.

On the new and exciting area of Satellite Broadband, he said that this service is seeing good interest from some of the largest Indian and global players. "But, satellite based broadband will never be a competition for GSM networks." Satellite Broadband is likely to be more expensive and focus on remote and unreachable areas. TRAI will address the Spectrum related matters for Satellite Broadband.

Local Manufacturing and Aatmanirbhar

Prakash said: "One area where India is behind, and we are lacking is we do not have the entire value chain of manufacturing in India." Telecom equipment manufacturing is required but such equipment also requires chips, semiconductors, along the entire value chain, he said referring to the SemiConductor Policy that has generated renewed interest.

"Surprisingly, Indians everywhere in the world are the ones involved in doing this, but they are doing it for others. It is high time we start this manufacturing, we cover the entire value chain, from the initial product to the final product, in India itself. "The incentives now being given by the govt and the new Semiconductor policy of MeITy, is very far reaching in its impact."

"We have now a number of Indian companies making mobile phones, and they are making good phones. But, value addition in India is very less. We need to encourage these mobile companies to add value in India, that means, the entire chain of what goes into a mobile, should get manufactured in India. This is also one of the PLI schemes which is happening, and is a step in the right direction."

"We are encouraging foreign companies to manufacture in India. Foreign companies should use India as their preferred site for manufacturing. Create employment here, value addition should be here and we would like patent should be with India/ Indians.

This also has a ripple effect on India's Economy too. "Adding local production for the entire value chain, the contribution of Telecommunications to our Economy will become even more," he said. "Nearly 20% of the non tax revenue for the Government comes from Telecom today." Added to this is the tax revenue from GST which is another 18%. Thus the contribution of Telecommunications to the Economy is significant.

"As the telecom sector grows it will not only contribute to the growth of the country's Economy but revenues for the Government and it will touch all our lives in multiple positive ways," he said.

And it is notable that there is a noticeable positive effect. "The investments, which are taking place now is positively impacting the rate of growth. India as an investment destination is becoming increasingly popular."

Automatic approvals of foreign direct investment (FDI) upto100% is one of the other big reforms. This encouraged international players to be confident and invest.

The production linked incentive (PLI) is creating its own new focus and enthusiasm. The value addition and manufacturing impetus will only accelerate this in the future. If you see Telecom sector in the world, we are growing fastest.

Focused Digital Campaigns...

PCQUEST

VOICE&DATA

DATAQUEST

DQ Channels

CIOL

"IN THE MIDDLE OF DIFFICULTY LIES OPPORTUNITY"

Enable your business in this challenging time with CyberMedia digital offering...

We ENGAGE with your AUDIENCE

Large Enterprise / Medium Enterprise / Small And Medium / Channel Eco-System / Start-up / Developer / End Cosumers / Gaming Community

HOW TO BETTER A DIGITAL BRAND STRATEGY

Branding

Response Generation

Webinar

Virtual Round Table

Custom Program

Virtual Event

Create a successful brand focused campaigns with :

Harminder Singh, Associate Vice President - Online Expert, harminders@cybermedia.co.in

Pathbreaker of the Year 2021

Dr. R.S. Sharma

Our aim was to make this a citizen centric platform for a non technical audience

The Jury of the 21st Voice & Data Telecom Leadership Forum (TLF) unanimously voted CoWIN as a Pathbreaker technology platform of the Year 2021. This platform has touched every citizen in our country. And saved lives.

Conceptualised, built and rolled out in record time under Dr. R. S. Sharma CEO of the National Health Authority (NHA), CoWIN has no parallel in the world of technology platforms.

Beginning

Dr Sharma joined the Indian Administrative Service (IAS) in 1978. He is a Student of Mathematics from IIT (Kanpur) where he became fascinated by the campus Mainframe computer. "The ever blinking lights and automatic readers that swallowed cards seemed straight out of a science fiction movie," he says in his book The Making of Aadhar.

His tryst with computers and programming has continued over the last 35 years. Dr Sharma is quintessentially a serial entrepreneur at heart within the complex machinery of the Government. In 1983 as Joint Secretary in the Department of Irrigation in Patna, he discovered a peculiar problem – transfers, postings and promotions of Assistant Engineers was a nebulous and messy process. He created a system of record keeping using 5-digit codes that infused clarity.

This mindset has been his strength throughout his working life. For example in the early days as CEO of the Unique Identity Authority of India (UIDAI) he had to jump in and write code to avoid delays and bypass the complex procedures in Government for onboarding vendors.

"He would wake up early to write code and put together the first enrolment client we used for our proof of concept," recollects Nandan Nilekani, Founding Chairman, UIDAI, in his introduction.

Dr. Sharma's projects have always broken new ground – at scale and speed – and mostly with billion + users with trillions of transactions daily. A dream for any Startup founder today.

In a conversation with Gajendra Upadhyay, Editor Voice & Data, immediately after the TLF awards, Dr Sharma shared some interesting insights on what went into the planning and building of the CoWIN platform. At short notice, in an atmosphere of utter panic – and with the learnings from Aadhar that stood in good stead for scaling up.

We all know what CoWIN achieved for the country. But at this point when there was a crisis brewing, how did you manage to keep a calm mind and go about the initial planning and design for such a massive project.

There is a bit of history behind this. In the month of May 2020, when I was still at TRAI, the vaccine was still not on the horizon I had realised and then flagged the issue – that if and when the vaccination started, we would need a truly strong technology platform to fulfil the execution, delivery, monitoring and follow up including tracking of progress across the country. Transparency of the entire chain would be of utmost importance. This was just my initial thoughts and then I retired from TRAI in September 2020, and went back to farming in my village. I love this more than anything.

In the meanwhile, the Government had set up a taskforce tasked with the creation of a platform that became CoWIN later. On 7th of January 2021 I got a call from the very top levels in the Government to come and take over the platform and ensure the first vaccine by 16th of January – this was the planned date of launch.

As I have spent my entire life serving the country and the Government, I heeded this call from the Prime Minister's Office (PMO) and returned to Delhi. On 11th of January I started work on CoWIN. As 16th of January was an impossible target, I managed to get an additional 28 days to make this work.

Looking at the architecture of the Platform – I realised it was not perfect. I knew that without a good architecture such a massive platform would never work well. We were talking of reaching 130+ crore citizens in one go. The scale of this was mind boggling.

So I started with some basic steps. What was the first and foremost aim. It was to make this a citizen centric platform – non technical audience, ordinary people who would not be able to manage complexity. It had to be without complications.

So the username and password approach was thrown out of the window. It was absolutely the wrong way for enabling registrations. This would be a non-starter.

To make it easy and seamless the easiest tool was the mobile number. We decided not to restrict the number of registrations as many people do not have access to mobiles. So we allowed multiple registrations on one mobile. Thus we made a simple registration process, using a mobile and an OTP.

Then we had to plan for it to be scalable. The architecture had to be Cloud ready for expansion and rapid growth.

Finally we decided to make the APIs completely open. We published these APIs for entrepreneurs to come and build on it. Publishing of schedules or integrating payment gateways or even downloading of certificates could be enabled from any front end tool or application. Front End was not the biggest concern for me, it was the accurate data in the backend. That was the important driver. My objective was to build this as a platform from the word go, not as an application.

We started with Aarogya Setu as the first set of data for the backend, as it already had 20 crore downloads. CoWIN was integrated into this.

Of course we had plenty of noise about glitches and of course there were some glitches in the beginning. For example, we started informing the pre-existing database of how and where to get the vaccine. But this did not work out - it was ignored by many.

We moved to a demand driven model. Let citizens come and register and ask for vaccines. This was the beginning of the digital journey – which would truly start after the injection was delivered and when the certificate would be downloaded.

In all of this what would you say were the two or three learnings from your work at Aadhar that truly helped scale CoWIN.

This is really interesting. Because one of the biggest learnings from Aadhar was that we could not build a monolith system. It had to be a aggregation of many smaller parts.

Let's look at the components in CoWIN. There is registration, booking of slots, identifying the nearest vaccination centers / hospitals where the vaccine would be delivered, and then the download of certificates.

These are individual components that needed to work together seamlessly. This is no different from a train journey. When a person makes a booking, you first need to know which trains are running.

In CoWIN the hospitals were the trains. We have no control on them. They have to show their location, timings and availability – the vaccine timetable.

We therefore worked on the concept of loose coupling and asynchronous integration of all of these components. We were not controlling the components or the data. The loose coupling concept was a learning from Aadhar and helped.

The other was scale and sanitised data. In Aadhar when a person enrols, we have to ensure that this data is not pre-existing. We had to do de-duplication on the person's data. For this, anonymised data would be sent over to the deduplication centres. This involved checking the entire database against 12 different data points (10 biometrics and 2 iris scans) of the new person. This verification had to be done for millions daily against all parameters and on the continuously growing Aadhar database. This kind of thing cannot be done in an assembly line mode. One after another. The transaction numbers were in trillions daily.

This was a polynomial problem. With every new enrolment the number of checks would keep multiplying. This learning was also applied in the CoWIN platform to make it scalable faster and accurately.

Then there was the inclusion factor, a key requirement. We developed the access in 17 languages and all scripts.

So, inclusion, scale, speed, planning for diversity, asynchronous mode of implementation all came from Aadhar.

For the scale, you mentioned leveraging the Cloud infrastructure. How was this planned

We were aware of the problem already. So we tested the system initially for receiving upto 45,000 hits per

CoWIN Platform

In the history books of Black Swan events, the catastrophic Covid-19 Pandemic of 2020 and 2021 will surely always rank among the top. As the pandemic hit Indian shores there was disbelief, panic, confusion, and then pandemonium. The whole world was caught unawares. The country was grappling with the problem and desperately looking for a solution to save lives.

Winning over Covid through a Covid Vaccine Intelligence Network became a priority.

CoWin was a technology-enabled platform with a simple aim – to simplify and speed up the vaccination process by:

- Creating a facility that enabled hassle-free Vaccinations for citizens.
- Provided vaccination centre & availability information quickly, accurately and within reach
- Provided online vaccination booking slots without difficulty – simply using a mobile phone number
- And finally issued a Universally verifiable digital certificate

After the registration and the appointment, the platform would track the progress. And send reminders or confirmations. Enabling all of this for a population of 1.4 billion, in a matter of months, anticipating the enormous volumes and scaling up in real-time to accommodate this wave, was a herculean task.

But it wasn't long before CoWIN was registering 20 million requests daily and enabling appointments for 4-5 million vaccinations. At one point CoWIN delivered 2.78 crore SMSes in a single day (that is 30 million messages a day, unheard of for one platform). The CoWIN website was receiving 55,000 hits per second and 1000 registrations. Only a highly robust and resilient architecture would be able to endure this without crashing.

Simultaneously CoWin created many user-friendly features like a dashboard for transparent data sharing with citizens, linking it to passports for easy international travel documentation, easy to download certificates anytime and availability in all major Indian languages.

It has enabled 1.6 billion vaccinations as of today. The highest in the world. CoWin served as the backbone of India's vaccination drive – it has helped save millions of lives.

second. This was massive. Though in reality we ended up recording about 1000 hits per second for registrations and bookings. But this was solved by using the AWS Cloud which has been flexible and able to rise to the challenge of managing huge surges and peaks.

What is your next goal at NHA in leveraging new technologies for the Health sector.

The ultimate goal of the digital mission which was launched by the Hon. Prime Minister in September last year, is to leverage Information Technology (IT) and all allied digital technologies to deliver affordable, ubiquitous and prompt health solutions.

For example, teleconsultation, using digital IDs like Aadhar, digital payment mechanisms and leveraging the India Stack, use of Electronic KYC and Digital Signatures will all be integrated for the best outcomes.

There is also the digitisation of health records – which is a huge transformation. It will be beneficial for patients in ensuring our public health records are easily accessible, verifiable for settling insurance claims and then integrating the HMIS (hospital management information systems).

Essentially, we will use all technology platforms. This will lead to huge cost and time savings for people. Before a patient visits a hospital physically – there are a range of consultations, like examination, diagnosis, analysis and prescription, these can be solved using technology and preventing long distance travel.

Lifetime Achievement Award

Prof. Ashok Jhunjhunwala

Prof. Ashok Jhunjhunwala was awarded the V&D Lifetime Achievement award by the eminent Jury at the 21st Voice & Data Telecom Leadership Forum (TLF) event. The 10-member Jury consisted of veterans in the Telecom industry and leaders in both Policy as well as business.

Prof. Ashok Jhunjhunwala's life long contribution in Academia, industry and research is unparalleled. He is a pioneer in every sense of the word. Over the last 45 years, he has been a force multiplier for technology R&D in India. He has helped create solutions for Bharat and transferred them to many other countries across the globe – most of them customised and tweaked for local conditions.

In the Telecom sector, Dr. Jhunjhunwala is most widely known for his outstanding work in leading the development of corDECT a wireless in local loop (WLL) technology platform through partnership with Midas Communication Technologies.

corDECT solved one of the biggest problems of the 1990s – that of bringing VOICE & DATA to remote and rural regions on wireless networks and at affordable prices.

It was not only one of the lowest cost wireless systems in the late '90s, its switching exchange and Base Stations (located on towers) could work in hot and humid climates – at 55 degrees centigrade. CorDECT required less than 10% of power (compared to other systems at that time), and provided seamless integration of both voice and Internet. CorDECT is now deployed in many other parts of the world, including Argentina, Brazil, Tunisia, Madagascar, Kenya, Angola, Nigeria, Yemen, Fiji, and Iran.

It has been a long but fulfilling journey. Dr. JhunJhunwala completed his B.Tech in Electrical Engineering from IIT Kanpur and pursued his PHD from University of Maine in US. He then returned to join IIT Madras in 1981 as a faculty and later went on to head its Department of Electrical Engineering.

It is at IITM that he really started some of his path-breaking research work. He was one of the very first movers to bring industry and academia together to create practical solutions for the country.

Following the great success of corDECT, Dr Jhunjhunwala helped startup Banyan Networks which aimed to provide data over digital subscriber lines (DSL) on copper wires and suited for the uneven quality of copper in the Indian networks at that time. Optimising for practical local conditions on the ground was once again the key for Banyan Networks.

Dr JhunJhunwala then helped set up a company called Tejas, which went on to break many new grounds in design and innovation. Tejas developed software-based converged networking solutions for Telecom Operators – it also developed hardware that aggregated and distributed bandwidth for Internet users and helped build Intelligent networks in the early and mid-2000s. Tejas was ahead of the curve in Indian telecom technology and built a presence in over 100 countries.

Tejas is now part of the Tata Group and has become a beacon of Aatmanirbhar Bharat.

The Telecommunications and Computer Networks Group (TeNet) at IITMadras created under the stewardship of Dr. Jhunjhunwala leveraged these core strengths built over the years to develop technology and products suited for Indian conditions. Among some of the innovations of TeNet are:

- A low-cost ATM
- A remote medical Diagnostic Kit
- A low Bit Rate Video Conferencing Software
- A multi-language Office Suite
- And many others

Another brainchild of Dr. Jhunjhunwala was the Center for Excellence in Wireless Technology (CEWiT), a public-private platform. Its objective is to make India one of the global leaders in wireless technology and ensure that international standards bodies incorporate Indian requirements and solutions in specifications.

Dr. Jhunjhunwala chairs the Rural Technology and Business Incubator (RTBI) at IITM. It is a technology incubator focused on initiatives for rural markets. He holds numerous patents in wireless and broadband communications. He was a member of the Scientific Advisory Committee to the Prime Minister (SAC-PM) in 2005. Dr. Jhunjhunwala was conferred the Padma Shri Award in 2002.

Professor Ashok JhunJhunWala – Lifetime Achievement Award winner – on wireless communications and the digital divide

Prof. Ashok Jhunjhunwala has been an insider in the Indian Telecom sector for close to 40 years. At his keynote address during the Telecom Leadership Forum (TLF) in March, he shared some insights that only he could with his intense and close up involvement in the sector.

He has spent most of his life strengthening the R&D foundations of the country. He offered immense food for thought on telecommunications, wireless communications and the rise of affordable Internet in India.

Prof. Ashok Jhunjhunwala received the Lifetime Achievement Award by Voice & Data in recognition of his yeoman's service to the sector and the country.

His journey started when he returned from the US and joined the Indian Institute of Technology, Madras as a faculty. He was instrumental in setting up the research and development work there in areas like Optical Communication, Computer Networks, Wireless Communication and Decentralised Solar and Electric Vehicles.

Wiping out the Telephone Wait Lists

There was a time when customers had to wait as long as 8 years to get a telephone line. The networks were not ready or took long to roll out. Even till as late as 1994, there were barely 5 million fixed phone lines in India and no mobile phones.

Prof. Jhunjhunwala took a nostalgic trip down this road into the late '80s when investments to add one telephone line was upwards of forty thousand rupees. "Add to that a 15 per cent interest, 8 years depreciation rate and a ten per cent investment of annual maintenance charges. Back-of-the envelope calculations would show that the revenue to break even would be Rs 1200 or more per month."

This was something most Indians could not afford. Queues were long for telephones because the demand was low in most regions. Cost of rolling out networks was not practical. A telephone line often was a highly subsidized investment. "We realized that this will not change unless we brought in different thinking," he said in his address.

This scenario changed with two key developments in the late 80s – the introduction of long distance public call offices (PCOs) where people could walk in and make calls. The two most common terms used then were subscriber trunk dialing (STD) for national calls and International Subscriber Dialing or ISD for international calls. The setting of PCOs enabled people to use phones at affordable rates for their requirements. It also resulted in making telephones available widely.

There was also another unique phenomena – that of differential charges for calls made during the evenings and nights as most of the trunk or long distance telephone lines were relatively free at this hour.

"Our aim was to bring down the cost to Rs.10,000 per line from 40k," he remembered. "We needed to look at different parts of the network - the backbone or long distance network. For this we targeted optical fibre and digital multiplexing. Then, there were the switches where we started to explore digital switches. And finally, there was the last mile or local loop - where cost of digging and laying of copper was high."

Prof Jhunjhunwala felt wireless would be an optimal solution instead of wired last mile. "We focused on bringing down prices of components using software. We took upon ourselves the task of making a wireless in local loop (WLL) solution –our talented young engineers went to work on designing, developing and going into production." This was the revolutionary corDECT WLL solution that changed the face of Indian rural telecommunications.

"We saw another turning point in the hinterlands." Village Internet kiosks using corDECTs were mushrooming. Telephony and Internet reached villages at 35kbps / 70kbps – slow by today's standards but a marvel at that point. Using Internet-based services services like education, telemedicine, financial inclusion, government to citizen services and agriculture started becoming available.

"When we achieved the milestone of 100 million phones, we were faced with new challenges." Base stations, switches, hand-sets etc. were all being imported. "3G was knocking on the door. We realized that it would now be a standardization game - time to convert patents into standards."

Prof Jhunjhunwala focused on centres of excellence starting 2005 onwards. "We also got several hundred young faculties and PhD scholars to work in this area." Our objective was to come up with new techniques and cement an edge in standards."

Though they managed to get patents in 4G patents, but could not break the platform standards game. "We never gave up – we took support from government and kept going."

Finally these efforts paid off and as we move into the 5G era, India has now got into the standards game. The 5Gi standard has been recognized and adopted by the 3GPP. "But we need to accelerate our progress." Also, fortunately, focus on manufacturing is now strong with Aatmanirbhar. Handset manufacturing in India is gradually increasing value-addition.

Prof Jhunjhunwala also touched upon the growth of mobile payments in India – an area in which his multi-faceted research also made a difference.

"We realized that branch banking was more expensive than ATM, which, in turn, was more expensive than digital banking and cards. But card payments had a four percent fraud world-wide. We came up with the concept of OTP in India and used messaging in a reliable and real-time way to bring down costs. We wrote down the specs of new protocols suited for the digital age. We also disrupted the space with UPI. One of the largest successes in this segment." However this still covers only 15 – 20% of the users in our country.

Finally, he addressed the still lingering problem of Digital Divide. "This challenge is an unfinished task in India," he said. Low-income students have not been able to attend schools over the last two years due to lack of resources to connect or devices to use. Prof. Jhunjhunwala remains optimistic that we will find ways to solve these remaining issues. Mobile and communications will play a big role in this. "Everything would be on the Internet and accessible on communications networks."

Next Gen Telecom – Scripting Growth through Digital

Insights and Perspectives from Akhil Gupta, Vice Chairman, Bharti Enterprises on Next Gen Telecom, during the Voice & Data Telecom Leadership Forum held on 22nd March 2022

Akhil Gupta, Vice Chairman, Bharti Enterprises, has been an inseparable part of the Telecom Industry in India since the mid-1990s. Ever since the first 2G mobile licenses were issued in the four major metros, he has been an integral part of the growth story of the sector through multiple generations of mobile technology – 3G, 4G and now 5G. Akhil Gupta's encyclopedic knowledge and understanding is easily reflected in this Fireside Chat where he breaks down some of the more complex aspects of Policy and Business and the multiple issues faced by the sector, as he peers into the digital future of the sector.

Below are excerpts from his conversation with another veteran of the telecom sector, Manoranjan (Mao) Mohapatra, CEO, Comviva, who started his career at the Bell Labs of India, the Centre for Development of Telematics (C-DoT) and has spearheaded the evolution and adoption of new applications and digital value-added services by the industry.

Mao Mohapatra: Very good morning. Happy to have you with us Akhilji and looking forward to learning from your vast understanding of the sector and the challenges in 5G that operators are likely to face.

> Should Telecom Operators be focusing on networks or should they become digital content providers. I think those are the two big opportunities (networks and applications). But of course, there's nothing to beat the opportunity on the network side.

> 90% of customer satisfaction is network, network, and network. If, as a telecom operator, I can provide a great network, and a great platform where developers, applications, and content providers can come and plugin and these can be made available to my customers seamlessly, I think that will really enhance their experience.

Akhil Gupta: Thank you, Mao. Lovely to be on this fireside chat, I think this is a very relevant topic.

You are, of course, the master in dealing with 5G. So I do not know who learns from whom.

Mao Mohapatra: Sir, the first question I have for you is: These are exciting times and new technologies like the Metaverse are driven by 5G, faster broadband networks, and digital platforms. How do you see operators prioritizing and monetizing these opportunities and what are the challenges?

Akhil Gupta: So let's look at all the new technologies. Metaverse comes right on top and is perhaps the biggest in the coming few years. There is one common thread in all of these. And that is bandwidth. All applications need bandwidth, which a telecom operator provides. Something like a Metaverse will need huge dollops of bandwidth.

And that's where I think telecom operators play a major role. There has been a big debate about whether telecom operators should also venture into applications and content. That is the battle. Should Telecom Operators be focusing on networks or should they become digital content providers. I think those are the two big opportunities (networks and applications). But of course, there's nothing to beat the opportunity on the network side.

Mao Mohapatra: Sir, customer centricity and customer experiences have become ever more important today. Airtel of course has been at the forefront on this. What is the opportunity for monetizing customer experience – whether leveraging high bandwidth and low latency of 5G or the Metaverse or selling more data.

Akhil Gupta: From a customer point of view, what do they need. More content, more applications – like video which has seen a quantum jump. From an operator's point of view, to keep the customer happy, I have to provide a great network. 90% of customer satisfaction is network, network, and network. If, as a telecom operator, I can provide a great network, and a great platform where developers, applications, and content providers can come and plugin and these can be made available to my customers seamlessly, I think that will really enhance their experience.

Mao Mohapatra: Absolutely, sir. Network is the core – everything else can revolve around it. What are some of the early use cases that you envisage? And when do you think the benefits of 5G will reach teachers, farmers and health workers in remote villages and schools?

Akhil Gupta: Let me deal with your question about what could be the use cases. Very clearly, a driverless car or robotic surgery may not be the right use case for India immediately. Maybe at a later date, but for now, I can clearly see two, or maybe three big use cases. The first is mobile communications itself. We all come from the 2G era, then we had 3G, 3.5G, GPRS, 3.75G and 4G. Now we are in the 5G age. The speed of data has progressively improved. This is the first one. And I do hope operators are actually able to monetize as 5G is high cost.

The second big use case, in my mind, is to serve the needs of this country. National Digital Communications Policy (NDCP), aims to bring broadband Internet to everybody. That, as you all know, is impossible on wireline. 5G can fill in that gap. Wireless broadband can really be a killer app of 5G. Finally, Wi-Fi inside buildings and premises, 5G for backhaul can be the other very good use cases.

Mao Mohapatra: There is a fear of the unknown in my mind, if you look at the G technologies 2G was of course ahead because it provided mobility to people. I personally think 3G was not that great of a success. 4G has done well. The other phenomenon that I have observed is every incremental G, the time to recover investments is short. Because the next G comes quicker. 5G has a lot of investment requirements. Is there a chance that like 3G, where not many people recovered their investments, 5G will simply be overtaken by 6G?

> You buy the best, at the most efficient pricing and the most efficient performance. It is good that we are getting into the era of OpenRAN, which means operators' dependence on proprietary technologies is going away. And then it doesn't really matter who's providing the equipment.

Akhil Gupta: I'm sure 5G would have a lot of potential. There was the other part of the earlier question: Can 5G reach the hinterland? I think that is the key question before the operators and the government. I have been advocating that this time around let us walk the talk. The communication policy says that maximizing revenue is not the aim of the government. Providing Internet is.

If that is the case, 5G pricing should encourage rural rollouts. So a lot will depend on the 5G policy.

It needs to bring the Internet to every part. Reasonable pricing will ensure that operators are able to deploy more capital into rolling out networks into smaller towns not just the large metros. And over a period of time, there'll be a lot more applications particularly suited for far-flung areas – example health services. If a doctor has to examine (not just prescribe medicines) but do a remote examination – you will need 5G. It will benefit society.

Mao Mohapatra: There is a new trend. Service providers are transforming into platform providers. Rakuten is an example. Closer home, I've read media reports that Jio has a fully developed 5G stack which they would offer to others. I also read about joint initiatives by Tatas and Airtel in 5G.

What is the long-term thinking in becoming a platform provider? Is that just enriching your network? Or do you see a separate line of business altogether?

Akhil Gupta: Well, first of all, there is a difference between a platform provider and an equipment provider. I think what many Telcos are trying to do is get into the equipment side. Every company will have its own philosophy. We believe, we can partner with the best. We have done this all along.

Whether we want to get into production ourselves? Maybe not, we are better off confining ourselves to services. It will be an individual choice. As an operator, these are separate hats.

You buy the best, at the most efficient pricing and the most efficient performance. It is good that we are getting into the era of OpenRAN, which means operators' dependence on proprietary technologies is going away. And then it doesn't really matter who's providing the equipment.

Mao Mohapatra: OpenRAN enables you to stay away from proprietary technologies. But on the Cloud side there are only a few large platforms like Microsoft, Google or AWS. Does that bring over dependency into the sector?

Akhil Gupta: Not at all. In fact, even in the traditional world, we always had Ericsson, Nokia, Huawei, and were never dependent on only one equipment supplier. Similarly, on the Cloud side, we will have Amazon and Microsoft and Google.

The investment by Google (in Airtel) does not provide any kind of exclusivity. There will be enough competition not to be really worrying about getting trapped.

Mao Mohapatra: Right. What is your thought behind investing in emerging technologies in-house? For example in AI or through incubation. Is it because you don't find competent partners to lean on or you want to create differentiation vis a vis competition?

Akhil Gupta: There is no dearth of competent partners. I think in every field, we see more and more talent and more and more specialization. Why we have been doing some incubation, like I said, is because we want to have a platform, which is in the middle. People can just come and plugin without worrying about APIs being different.

And then we can seamlessly give this to our customers. In order to do that, the best is to incubate and get the real experience of how it is done. What can we do to make it an open platform?

That's the thinking. We have no illusions that we can

> IP-1 licenses have been mandated to get into some parts of active network sharing. For instance antennas. They can definitely have common antennas, common radios. I think some regulatory work is going on. But again, I always believe that the infrastructure provider must never compete with the operator, who is their customer.

be the best in AI or other technologies. We will definitely partner with the best in class.

Mao Mohapatra: You now have a completely new initiative – OneWeb. The Low Earth Orbit (LEO) satellite broadband system. It complements the mobile network but would that be a competition to your own mobile business?

Akhil Gupta: No. I think no satellite communication, at least in its current form, can be a threat to terrestrial networks. It is purely complementary. The use case of LEO satellite services will be to provide backhaul services to operators in places where it is not feasible. Or services in very remote places, where connectivity is difficult. But that's far and few. The other use cases are Enterprise Services, government, defense, aviation, marine. Those are the big use cases. Yes, I do envisage and I do hope that one day, the customer devices are able to support both terrestrial and satellite connectivity. Operators can then actually bring the satellite services behind them and make sure that the customers will always get a signal. But it's never going to replace terrestrial. It could be a backup for an operator to give customers a much better experience.

Mao Mohapatra: I'm sure it will happen. I know Thuraya in the Middle East has a service where they have roaming with the GSM networks. A lot of startups are working in that arena, particularly for IoT and data devices.

Akhil Gupta: But that won't help because unless the device becomes widely available, there will be very limited applications. So, the key would be, if the device, which is a normal mobile phone can also connect to the satellite. I think that is when the trued benefits of these services can be visible to the telecom operators in a big way.

Mao Mohapatra: Which brings me to a question that is very close to your heart. Airtel has always innovated and disrupted the market. From completely outsourcing the network, managing only customers and the brand. Creating the minutes factory, bringing down the price of voice & data. Many of them are driven by you personally. What is it that we can expect to see next?

Akhil Gupta: Well, first of all, let me dispel the doubt, Airtel has never been a disrupter. I think everything which we did, in terms of innovation, has arisen out of two things, either there is a lot of inefficiency. Or there were areas where we did not have enough resources or capabilities. And it always stemmed from our belief that in this world, you must partner and let specialists in any particular area provide the services. It was never a vendor relationship. We tried to make them partners. We extended this to our competitors. While we compete on the front end, we can collaborate on the backend. We have tried to see how all of us can benefit. Example by sharing infrastructure or supplementing where I lack. Comviva, for instance, is very good at some things. I'd partner with you. Why would I want another Comviva in my system?

So that has been the philosophy that guides us. And with that philosophy, as you can imagine, possibilities are always endless. Hopefully, we will continue doing efficient things like that.

Mao Mohapatra: My last question. You have personally done a lot of pioneering work on passive network sharing across operators. 5G makes active network sharing a possibility. Do you really see that happening?

Akhil Gupta: Yeah, I think again, it is very much in the digital communication policy. IP-1 licenses have been mandated to get into some parts of active network sharing. For instance antennas. They can definitely have common antennas, common radios. I think some regulatory work is going on. But again, I always believe that the infrastructure provider must never compete with the operator, who is their customer. Therefore, we have been suggesting to TRAI and DoT, on the scope of this sharing. There should be conditions that they will not offer services to the end customer. They must offer services to licensed operators only. And I think that's a win-win for everybody.

Stalwarts in the Telecom Ecosystem Honored with V&D Excellence Awards at TLF 2022

This year, Voice&Data received 100 + nominations from India's Telecommunications and Digital Ecosystem under various categories

30 of these were accepted by the Jury for Excellence Awards

The panel comprised of Experts from the industry and CyberMedia Editors – who evaluated the nominees on multiple parameters like innovation, impact on the sector, pioneering work, and ongoing excellence in services.

Some of the more stand out categories were – Multilingual Internet – enabling access in local languages, Broadband services, 5G mobile devices, Platform Innovation, Mobile handset exports, Customer Service, and more.

Apple was awarded the 'Highest Smartphone Exports under PLI scheme' category award. As per insights from CyberMedia Research (CMR), Apple's share of iPhone exports from India grew a whopping 192% YoY in 2021, with exports to Europe, Japan and Middle-East among others. Apple's share of iPhone exports from India stands at >4.6Mn units in 2021.

National Internet Exchange of India, NIXI, received the V&D Excellence award for leading the charge in 'Multilingual Internet and IDN'. NIXI is playing a nodal role in helping proliferate Multilingual Internet – critical for the next 500 million (non-English speaking) Internet Users in India. NIXI launched Internationalised Domain Names (IDN) in 22 Indian languages – a first for any country – together with emails in regional languages.

Reliance Jio Infocomm was selected for the V&D Excellence awards under 6 categories:

- **'Internet Services'** – for empowering homeowners and SMEs with digital connectivity and transformational broadband in India;
- **'Network Infrastructure'-** for empowering the country with 4G LTE and 5G-led transformation that made an impact on many people through easy digital access, connected enterprise, indigenous technology and fibre backbone;
- **'Content Services' -** for developing Future-ready content for new-age devices with compelling affordability and versatility for users;
- **'Marketing Solutions' -** for arming businesses with the power of cloud-first and cloud-native tech to leverage online avenues for growth and digitalisation;
- **'Enterprise Business Services' -** For building an affordable, and simple, integrated digital service that strengthens small businesses on efficiency and growth with enterprise-grade connectivity and solutions;
- **'CSR'** category for building solutions like an indigenous healthcare app, a novel Chatbot, powered with easy connectivity and data, that helped users during pandemic.

Vodafone Idea Limited won the V&D Excellence awards in 4 categories:

- **'Innovation' -** For spawning the Transferable Best Practices Model for continuous excellence in supply chain areas – it resulted in 60 best practices and 1200 improvement opportunities;
- **'CSR' -** For deploying a significant intervention for Continuous and Uniform Health, Safety, and Wellness training in Logistics areas;
- **'IoT/AI' -** For introducing a Policy Compliance Portal for injecting more transparency, robust governance for vendors;
- **'Security' -** For rolling out the 'Privacy By Design Framework' that addressed the challenges of managing personal data and built proactive awareness.

Bharti Airtel won the V&D Excellence Award in 'Marketing', for their BLACK initiative which brings

simplicity and user-power in management and experience of its mobile services.

Tata Tele Business Services also won the V&D Excellence award in Marketing for its cloud communication suite that was ideal during the pandemic-led work culture. But caters to the communications need of big giants in multiple industries.

NEC Corporation India Pvt Ltd won the '5G Innovation' category award for driving innovation in 5G solutions — for the rest of the world and created from India. NEC implemented the world's first 5G commercial network for Rakuten in Japan from its India support and services team — it deployed BSS/OSS, 5G R.U., and 5G core solutions for Rakuten.

C-DOT was the unanimous choice in the 'Indigenous Technology Innovation category — for "injecting real self-reliance (aatmanirbhar-ta) in the telecom sector and the data networking space – with high-end local R&D, Standards innovation and promotion of local startups.

Mavenir bagged the V&D Excellence Award for 'Network Software'. Mavenir's Converged Mobile and Packet Core solution solves a core problem of operational efficiency for mobile operators. And makes it easier to leap to 5G – with scale-up, scale-down flexibility.

The V&D Excellence Recognition Award 2021 for other categories were as follows:

ONEOTT iNTERTAINMENT LIMITED in 'Internet Services' category, for empowering users during the pandemic with 99 percent network consistency and fast Internet. Its projects for Dharavi and Delhi-free Wi-Fi were also.

Tejas Networks in the 'Innovation' category, for enabling enterprises with a breakout architecture for dynamic capacity scaling with no extra hardware costs.

Tech Mahindra in the 'Enterprise Business Service' category, for empowering a Telco Operator with automation CoE and RPA that resulted in a drop in operating costs and a jump in Telesales.

AT&T Global Network Services India Private Limited in the 'Network Infra & Innovation' category, for building Total Access Orchestration platform at prominent IDC sites for multi-service integration, network transformation, and aggregation.

Aeris Communications India Pvt. Ltd 'Business Process Innovation' category, for developing IoT solutions that enable reduced MTTR, less IoT service downtime, faster response time, and enhanced application monitoring.

Shyam Spectra Pvt. Ltd, in the 'Network Infra' category, for building network solutions that bolster visibility and enable application performance, managed Wi-fi, SD-WAN, and security.

ACT Fibernet, in the Marketing category, for executing a successful 360-degree Internet campaign (on SmartFibre Technology during the pandemic) that had an impact on 24 million people.

Zerone Microsystems Pvt. Ltd, in the 'Mobile Payments' category, for a successful solution on Massively Scalable Cards Acceptance that saw a 13,700 percent jump in 12 months and empowered the under-served merchant community in India.

Dixon Technologies in the Make in India category, for excelling in local manufacturing in the telecom and networking products like phones, modems, routers, and set-top boxes through capacity expansion, R&D focus, and automation.

Mozark in the 'Innovation-Mobile Banking' category, for accelerating mobile app testing on real devices platform for a major multinational bank – with a unique developer focus and elevated digital experiences.

OnePlus in 'Market Leader-5G Smartphone player, went to for shipping the most 5G-enabled smartphones in CY2021, and paving the way for a 5G-device ready ecosystem in India.

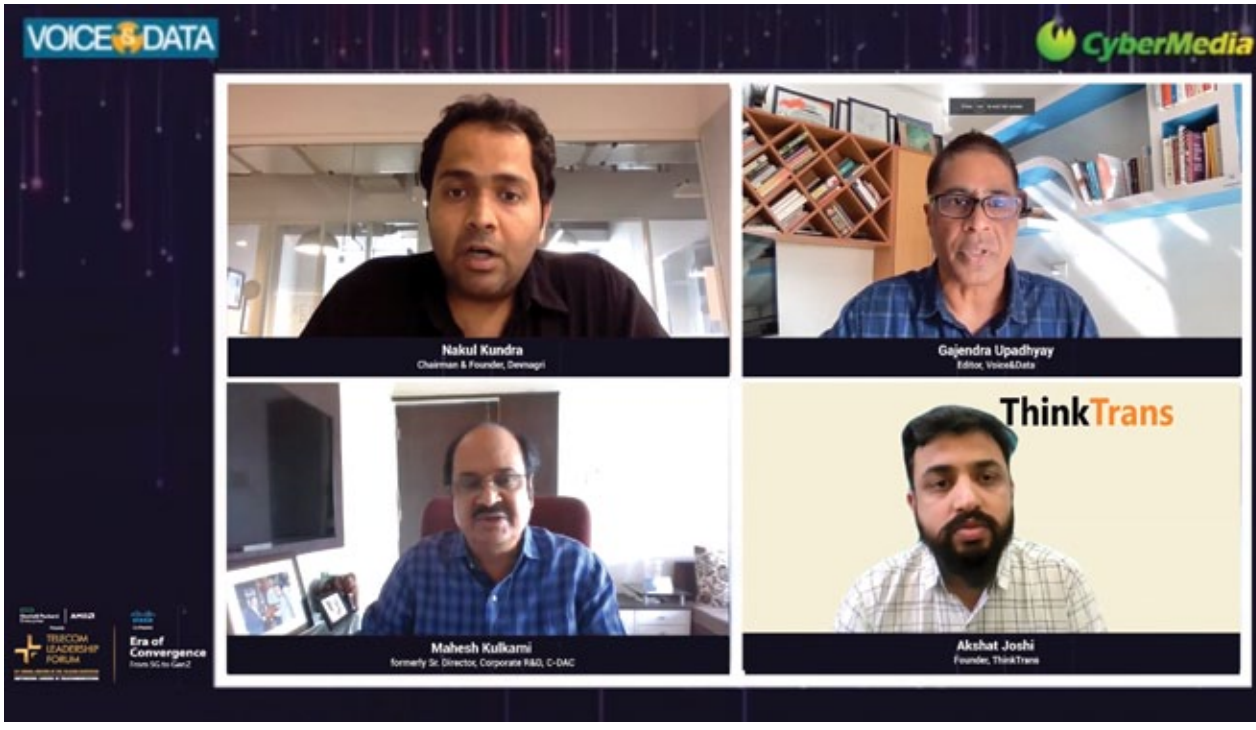
Xiaomi in the 'Market Leader- Smartphone Player' category, for shipping the most smartphones in CY2021, and furthering smartphone accessibility and availability. Xiaomi enabled Indians everywhere to be connected to the digital economy.

Lenovo in the 'Market Leader- Tablet Player' category, for shipping the most tablets in CY2021, and making an array of consumer and enterprise use cases possible amidst the pandemic.

Sify won the 'Network Services' award for deploying the managed SDWAN platform which helps in separating high priority traffic from less crucial traffic.

Multi-Lingual Internet – For the Regional Language Users

The multi-lingual Internet will bridge the Digital Divide



Internet content in Indian languages for the non-English speaking majority will define the next phase of growth in India and other regions.

A lot of work has already been done in India towards development and standardization of content and translation. Internationalised Domain Names (IDN) in all major Indian languages for websites and email. Several startups are solving problems in this area.

A panel consisting of India's best brains in Language technologies and IDN got together to discuss the achievements and successes so far and the long road ahead.

Mahesh Kulkarni, formerly Senior Director, Corporate R&D, CDAC, and currently on a mission to promote adoption of Artificial Intelligence (AI) and Machine Learning (ML) in language technologies has been tirelessly working in this field for nearly 3 decades.

Akshat Joshi, is the founder of ThinkTrans which is working in the area of Indian languages. Akshat has done some pioneering work in Indian Language computing

> Voice-driven applications would be on the top, backed by ML transformation. Accessing Internet will help people with not just entertainment but services, education and healthcare. A good example is that of Voice Assistants in banking. These systems can understand the intent of customers in a good way now.

> To read an email from a different language, understanding of script needs both a technology and policy-level solution.

– code conversion, font engineering and machine translation during his 11 year stint at CDAC.

Nakul Kundra, is the Founder of Devnagri, that offers a translation platform for all Indian languages.

The panel was moderated by Gajendra Upadhyay, Editor, Voice&Data.

What are some of the major initiatives by the Government in the Multi-Lingual Internet space.

The Integrated Devnagri terminal was a major step forward according to Mr Kulkarni. "Encoding for Indian languages, making key boards available with Indian fonts - were foundational."

Standards and keyboards for Indian languages gradually evolved. Slowly, a lot of companies started realizing the importance of Indian languages and started working in this direction. The Technology Development of Indian Language (TDIL) Programme of the Government is another example – it was set up with a mission to promote awareness of Indian languages. Many other projects with the best institutes of India bolstered this focus. Government has played an important role with many initiatives for standardisation and compliance.

Akshat felt that adding to the depth was availability of apt content, Internet-based services in Indian languages, democratizing Internet access points with internationalized domain names and emails. But there is still a gap.

One of them is the issue of access of these websites due to the technical discrepancy in top level domains. "It is a chicken-and-egg problem because most people have to use an email ID as a gateway to create a profile on these sites. But there is a barrier in acceptance of language email with IDNs. Universal acceptance (UA) initiative of the ICANN will help to address the gap.

"Ninety per cent of Indians," said Nakul, "are not fluent in English."

But content availability in Indian languages is abysmally low. Nakul has created a translation engine with contextual capabilities. "We help translate content for domain-specific needs - this area is a huge opportunity." There are many government mandates for every industry and there is a push to go vernacular now.

Mr Kulkarni also emphasized that data cannot be seen in isolation as we see the impact of AI, ML and new paradigms like Metaverse. "Voice-driven applications would be on the top, backed by ML transformation. Accessing Internet will help people with not just entertainment but services, education and healthcare. A good example is that of Voice Assistants in banking. These systems can understand the intent of customers in a good way now."

Pain areas in multi-lingual transformation are technology enablement and policy aspects, in Akshat's view. Services and people-interaction are driven by policies at various layers of the organization.

"To read an email from a different language, understanding of script needs both a technology and policy-level solution."

Nakul also had a view on this. Colloquial translation gaps create a need for catering to use-cases beyond mobile apps, real-time voice translations, ticketing services etc. "Once this ecosystem is created for Indian languages, businesses can think of this area in a different way."

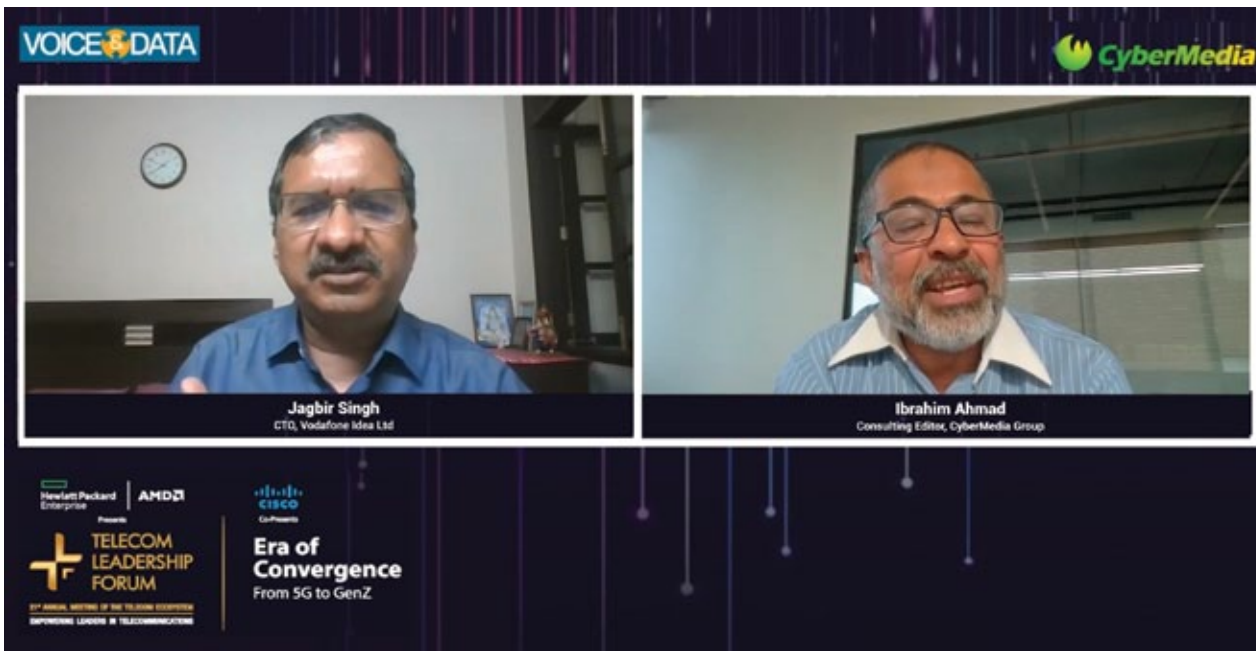
Mr Kulkarni drew attention to some policy areas that need to be mandated. For e-governance platforms, availability of language keyboards, various fonts that reduce data loss, universal acceptance, three-language formula for government websites etc.

Developing the three-language formula for mobiles is required. Collection of data and solutions through crowd-sourced models will capture the nuances in a comprehensive manner. "These issues, with constant work, and over a period of time, will be resolved."

Nakul felt that this is how we can bring the next billion on the Internet.

5G at Network Level - Are we Ready?

At this year's Voice&Data Telecom Leadership Forum, held on March 22, 2022, during a fireside chat, network architecture for 5G Rollout was discussed, excerpts below



Ibrahim Ahmad, Consulting Editor, CyberMedia Group chatted with Jagbir Singh, CTO, Vodafone Idea on the alignment of current networks, challenges and opportunities for operators, the partnership needed at ecosystem level.

Jagbir Singh has built some of the biggest networks in the world. He has held senior leadership positions with multiple operators and brings over 32 years of experience in the industry.

His current role involves planning of network architecture, network lifecycle, engineering, deployment and operations.

Operators have invested big money in networks but are current networks compatible with 5G? Would a hybrid model of 4G and 5G work?

"Until 5G happens, we need a base coverage of 4G to support voice services," said Jagbir Singh. Co-existence of both will continue for the next five to seven years. Similarly co-existence of radio access network or RAN for dual connectivity for 4G and 5G will happen.

5G is not as backward compatible as 3G and 4G were. This dual connectivity will ensure seamless coverage for the customer. Jagbir Singh also touched upon what happens when we divide RAN it into

> We have Cloud systems which are fully ready to update to 5G. Having this network gave us flexibility and scalability.

> Public networks are more secure due to regulatory aspects and compliance than private networks. Network slicing is highly secure as well. Slicing enables dedicated resources – making SLAs better.

classical RAN and Open RAN where disintegration brings new outcomes.

"Whatever equipment Vodafone has deployed in the last five years is capable of being ready for 5G with a software upgrade. For OpenRAN, we have been doing trials and it is maturing with time. It is a good architecture for machine learning, data analytics and it is a flexible architecture. Most architectures today are classical but Open RAN is evolving fast.

However, classical architecture is equally capable of 5G services. 4G can continue to co-exist with 5G. So benefits of seamless coverage will continue.

The industry is deploying cloud-based architecture with virtual machines.

"We have Cloud systems which are fully ready to update to 5G. Having this network gave us flexibility and scalability."

5G investments

Ibrahim asked, why — not so long ago — there was stiff opposition from operators as they had just finished investments in 3G and 4G?

Jagbir Singh explained that the industry has seen confidence with maturity of technology. All investments in infrastructure, equipment and transport is being done with a 5G-readiness in mind.

Specifications have become clearer. Pilots have been completed. This has sharpened understanding of technology. Proven technology across the globe helps to deepen this confidence. Of course, spectrum pricing is a challenge. There is also need for more fibre connectivity, robust transport networks, more base stations which all adds up to more Capex. "There is not too much upside on ARPU, so the challenge will remain," he said.

5G enables Private networks.

Jagbir Singh explained that this can happen through slicing and we would get efficiency for spectrum-usage and capex optimisation. "Even devices are going to support eight slices. With different bandwidth for different uses with 5G.

On concerns about security and latency, Jagbir said, "Public networks are more secure due to regulatory aspects and compliance than private networks. Network slicing is highly secure as well. Slicing enables dedicated resources – making SLAs better. We also need to address redundancy in private networks with high degree of efficiency, reliability and security."

The industry also needs enough money for Capex – in light of ARPU challenges. With the Make-in-India effort and fast 5G roll-out, we can navigate these aspects.

5G Power

Jagbir shared lessons from trials in Pune and Gandhinagar by Vodafone Idea.

"Any use case is going to be part of an ecosystem – like network providers, integrators, device providers. All the use-cases will not come from vendors or operators but from the entire ecosystem. We learnt a lot too."

Vodafone Idea implemented several projects like connected ambulances, remote medicine etc. with third-party applications. 5G provides native capability for low latency so it is best suited for AR, VR, Gaming etc.

"It will have a maturity curve. It will take some time," he felt. It is ideal for B2B, remote education, remote healthcare, remote monitoring of infrastructure, factory automation, remote surveillance.

That said, how to make money and make these areas popular would be a challenge. But with industry collaboration and ecosystem co-operation – this would become possible.

Maturity level of technology, cloud-native investments, realistic pricing of spectrum, device availability in ecosystem, and ROI are issues that this industry and regulators need to address. But we have to begin at some point.

VOICE&DATA

CyberMedia

Hewlett Packard Enterprise | AMD

Presents

CISCO

Co-Presents

TELECOM LEADERSHIP FORUM

21st ANNUAL MEETING OF THE TELECOM ECOSYSTEM

EMPOWERING LEADERS IN TELECOMMUNICATIONS

Era of Convergence

From 5G to GenZ

22 March 2022 | 09:30 - 5:30 PM

Follow us: @VnDIndia

#TLFIndia | #TLFAwards | tlfindia.in

PARTNERS

Gold: comviva | Gold: ciena | Digital Transformation: accenture | Connectivity: AT&T | Telecom: Vi | Internet Service: one | Academia: APEEJAY EDUCATION

SUPPORTING PARTNERS

CMAI | COAI | TEMA | SIA INDIA | ITU-APT Foundation of India | LESA | ICEA | Indian Space Association

Team Voice&Data thanks all the speakers, delegates, partners for making the 21st edition Telecom Leadership Forum a stellar success.

1045 Delegates | 49 Speakers | 26 Sessions | 3 Voice&Data Leadership awards
30+ Excellence Awards | 50K+ Engagements | Networking Lounge | Virtual Booths

Welcome Note

Pradeep Gupta, CyberMedia Group

Telecom reforms & new paradigms

Anshu Prakash, Former Secy, Telecom

Leaders' Keynotes: High Performance and Adaptive Computing leadership

Manik Kapoor, Telco COE I AP,J&I, AMD

Leaders' Keynotes: Surviving in rapid technological change

Harjit Singh, Tata Teleservices Ltd

Leaders' Keynotes: AtmaNirbhar India - Manufacturing locally

Dr. Rajkumar Upadhyay, C-DoT

Leaders' Keynotes: 5G for a better tomorrow

P Balaji, Vodafone Idea Ltd.

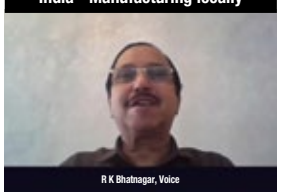
Leaders' Keynotes: Internet for the Future

Anand Bhaskar, Cisco India & SAARC

Leaders' Keynotes: A Key to unlock India's potential

Hari Om Rai, Lava International Limited

Leaders' Keynotes: AtmaNirbhar India - Manufacturing locally



R K Bhatnagar, Voice

Leaders' Keynotes: Next Gen Telecom - Scripting growth through digital

Lt Gen Dr. S P Kochhar, COAI

Fireside Chat: Next Gen Telecom - Scripting Growth Through Digital

Manoranjan 'Mao' Mohapatra, Comviva

Akhil Gupta, Bharti Enterprises

Fireside Chat: Network Architecture Needed For 5G Rollout In India

Jagbir Singh, Vodafone Idea Ltd

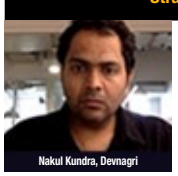
Ibrahim Ahmad, CyberMedia Group

Fireside Chat: Enterprises of Tomorrow

Gajendra Upadhyay, Voice&Data

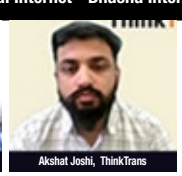
Prateek Pashine, Jio

Strategy Track: Multilingual Internet - Bhasha Internet



Nakul Kundra, Devnagri

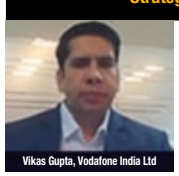
Mahesh Kulkarni, C-DAC



Akshat Joshi, ThinkTrans

Gajendra Upadhyay, Voice&Data

Strategy Track: Wifi -6: Impact And Industry Approach & IoT



Vikas Gupta, Vodafone India Ltd

Amitabh Singhal, ex ISPAI, NIXI

Suryanarayan CS, HPE India

Rakesh Upadhyay ONEOTT INTERTAINMENT LTD

Industry Keynote: Fibre To Home - Future To The Home

Yugal Kishore Sharma, ONE Broadband, Hinduja Group

Industry Keynote: It's Time We Recognise India's 5G Dream- With Make In India

Digvijay Sharma, Ciena Communications, India

Technology Track: Re-Architecting Datacentre & Cloud Infrastructure With 5G

Sunil Rajguru, Dataquest & PCQuest

Dr. Sayed Peerzade, Yotta Infrastructure

Vinay Jain, ,Cisco India

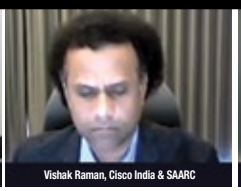
Sudhir Kunder, DE-CIX Interwire India

Himanshu Gupta, HPE India

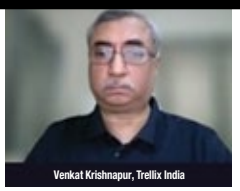
Technology Track: Artificial Intelligence (AI) & Cybersecurity - In The Network

Anil Chopra, CyberMedia Reseach

Abhish Kulkarni, HPE India



Vishak Raman, Cisco India & SAARC



Venkat Krishnapur, Trellix India

Priya Kanduri, Happiest Minds Technologies

Mathan Babu Kasilingam, Vodafone India Ltd

Technology Track: Keynote Address: Space Race And Ground Realities

Rajiv Arora, Siemens

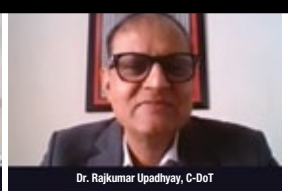
Pravir Dahiya, Tata Teleservices Ltd

Deepak Sanghi, Airtel

Sukanta Dey, Sdela Consulting

Technology Track: Open RAN And The Journey Of Enterprise Networks

K S Rao, STL



Dr. Rajkumar Upadhyay, C-DoT

Arun Karna, AT&T India

Rohit Chaudhari, HPE India

Faisal Kawoosa, TechArc

Technology Track: Future of 5G & Future With 5G

Sandeep Gupta, Airtel

Bharat B Bhatia, ITU-APT Foundation of India

Prabhu Ram, CyberMedia Research

Technology Track: Keynote Address: Space Race And Ground Realities

Rahul Vatts, Bharti Airtel

Anil Prakash, SIA-India

LT Gen Anil Bhat, ISpA

Gajendra Upadhyay, Voice&Data

Voice&Data Jury Awards

Telecom Person of the Year

ANSHU PRAKASH
Former Chairman, DCC & Former Secretary, Telecom

Lifetime Achievement Award

PROF. ASHOK JHUNJHUNWALA
Dept. of Electrical Engineering, IIT Madras

Pathbreaker of the Year

CoWin Platform
[Under Leadership of DR. R S SHARMA, CEO, National Health Authority]

Write to us for the post conference report

Rajiv Pathak I Manager, Marketing | rajivp@cybermedia.co.in I +91 8010757100

Make-in-India – Aatmanirbhar in Telecom network equipment and Research

Covering the uncovered areas, procurement of equipment manufactured locally, incentivising local R&D

In the Leaders' Keynote session at TLF 2022, Dr R K Bhatnagar, Director General of VOICE, spoke on how Indian industry has been striving towards self-reliance.

"The Atmanirbhar spirit in the Telecom sector is very important, given the PM's vigorous thrust and the current state of import bill in the telecom sector. We are about to see, in the coming weeks and months, that we will attain a game-changing position as far as India is concerned. Already, we have a Make-in-India policy that covers all sectors, including telecom. This can resurrect the domestic manufacturing industry. It can enable design houses and start-ups in a strong way. To add to that, domestic industry related public procurement is a good initiative from the government."

He underlined the impact of priority for domestic players in terms of practical market scenarios. "We (VOICE) have already shared a list of products with items where multiple suppliers and adequate competition are present. This is where domestic players can give competition to foreign competition both in terms of quality and pricing."

He flagged the problem of policy-bypass by some

> We (VOICE) have already shared a list of products with items where multiple suppliers and adequate competition are present. This is where domestic players can give competition to foreign competition both in terms of quality and pricing.

> We need to establish private networks for coverage of such areas and village clusters. They can create independent networks and explore active and passive network elements as a shared resource.

sections who managed to avoid the specified compliances. "We need to segregate products. Policy circumvention needs to be aborted. Sometimes it is on grounds of interoperability issues and sometimes for introduction of proprietary products."

He explained how clarity and direction can pave the path for priority and traction for Indian players. "Like - the government can issue a list of FAQs to take care of different interpretations by different departments and committees. The policy has provision of grievance management. Even before finalisation of tenders, time delays and litigation etc. can be avoided."

While all this is great, we cannot turn our eyes away from the constraints of actual reach. We have already passed 75 years of independence, and still we have 25000 villages that do not have mobile connectivity or Internet. As network coverage and services can only be provided by License service providers, it is not open for innovators to bring in new solutions, he lamented.

"We need to establish private networks for coverage of such areas and village clusters. They can create independent networks and explore active and passive network elements as a shared resource. Many chunks of spectrum can be deployed for private networks- like spectrum allocated for Railways."

He mentioned the provisions in the recent Budget which provides for funding coverage of rural areas using the USO fund and helping reach uncovered and remote locations of the country.

He elaborated on the significance of 5G research and the impact of the PLI scheme. "We cannot miss the bus on 5G, the way we missed it in 3G and 4G. With the right efforts, we can be in a position to be a technology force and in the 5G revolution."

Technology transfers should be supported from government. Market access is an important area – which is a unique problem in the telecom sector, because large established players already have entrenched deployments.

Incentives to network and services providers in the private sector for procurement of local systems should be explored by the government. Government should create a common infrastructure so that equipment can be tested by plugging-in.

"Champion initiative schemes for each vertical can be ushered in – like quantum apps, rural apps, optical networking etc. – where each vertical can have one champion leader who should be fully supported for local as well as export activities".

With the industry and government working hand in hand, we see a very positive outlook in the coming weeks." The Government has already announced a policy towards this recently.

"The government is interacting well with the industry now. We have submitted some whitepapers which are being studied and witnessing action based on their recommendations."

He concluded that India will be a global leader in 5G.

Aatmanirbhar India - Manufacturing locally

Dr. Raj Kumar Upadhyay, Executive Director, C-DoT, delivered a keynote address at the TLF 2022. He focused on the concept of becoming Aatmanirbhar or self-reliant

"Our Hon. Prime Minister's clarion call for Aatmanirbhar Bharat has witnessed unprecedented enthusiasm and energy from the Telecom ecosystem to make India self-reliant," Dr Upadhyay said. "Undoubtedly, the road to Aatmanirbhar Bharat is long and arduous. And this calls for a concerted effort and perseverance from all of us."

He gave two reasons why India should become self-reliant in the telcom/ electronics segment.

> The demand for telecom equipment and electronics in this country is massively increasing over the years. As per government estimates, this will go to USD 300 billion by 2024-25.

> Government of India has been taking various initiatives to boost indigenous manufacturing, including for R&D, for support through incentive schemes for making locally, MSMEs and Startup schemes.

The first reason being economic, and the second reason being strategic.

"The demand for telecom equipment and electronics in this country is massively increasing over the years. As per government estimates, this will go to USD 300 billion by 2024-25."

Because of this imports were increasing, "Exports are growing, but imports are growing faster in this country," said Dr. Upadhyay. "There has been considerable growth in indigenous manufacturing of electronic equipment and mobile phones. "Our exports have increased from 0.2 billion$ in 2018 to 1.7 billion$ in 2021," said Dr. Upadhyay.

He touched upon the country's trade deficit. "The trade deficit in the electronics segment alone, which covers telecom equipment is approximately $50 billion. So, if we start manufacturing locally, some of this trade deficit can be reduced"

Dr. Upadhyay also talked about the multiplier effect of local manufacturing -- on jobs, better opportunities, the economy, and benefits to other industries as well.

Local manufacturing also had a strategic aspect. "Security is of paramount importance and with the increasingly complex networks of today – 5G, software defined, new applications – many areas of national security can be protected using our own designed and manufactured equipment" he said. "Therefore, Aatmanirbhar Bharat is not only an economic consideration, but strategic consideration as well."

He also referred to the initiatives by the Government to boost local manufacturing. "Government of India has been taking various initiatives to boost indigenous manufacturing, including for R&D, for support through incentive schemes for making locally, MSMEs and Startup schemes."

The Production linked Incentive (PLI), and the recently announced Design Linked Incentive (DLI) schemes were also helping in the local manufacturing. "PLI is a tailor made scheme to promote manufacturing in this country. Government has put around 12,195 crore for incentivizing manufacturing."

About the DLI scheme, Dr. Upadhyay said: "Today 50% of the global manufacturing happens in China, but then there are other firms like Qualcomm and Broadcom, that are fabless companies. A lot of money from the value chain is going to them too. We as a country also need to invest into the design part. Design Led Incentive or DLI scheme was announced. Government also came up with the semiconductor policy wherein Rs 76,000 crore was allocated for supporting and investing to help the semiconductor ecosystem."

"Under DLI, the Government has said it will invest in making the infrastructure for semiconductor in this country and will promote both semiconductor design as well as the display ecosystem in this country. I'm sure this is going to usher in a new era in electronic manufacturing and definitely it is going to pave the way for India's technological leadership in these areas of strategic importance and economic self reliance."

The DLI scheme is aimed at helping different stages of development of semiconductor design, integrated circuit, chips, SOCs, IP code, semiconductor link design, etc.

He also spoke of the support from the Universal Services Obligation Fund. There is a plan to use 5% of the USO fund to promote R&D. This has already been announced in the budget and translates to around Rs 500 crore per annum. To be distributed for R&D to the industry.

Industry partners need to come forward and collaborate with the Government to develop and design for India, manufacture here for domestic consumption as well as for the rest of the world.

5G for a Better Tomorrow

P. Balaji, Chief Regulatory and Corporate Affairs Officer, Vodafone Idea spoke on 5G for a better tomorrow at the recently held 21st edition of Voice&Data Telecom Leadership Forum

In his leaders keynote address Balaji said, "We are at the cusp of 5G rollouts in the country. Therefore, it is important that we deliberate on this very important technology evolution to make it a success in India. Frankly, 5G is more than a technology revolution. It is a catalyst for collaboration, and innovation across sectors and players, that will change the lives of citizens and enterprises. "India is already experimenting and testing 5G. I believe this is necessary to build a strong foundation for 5G and to drive Digital India."

According to Balaji, "For 5G to be a success, there is a need for facilitation in several areas, including the development of India specific use cases for enterprises and consumers. Enabling government policies around spectrum to drive network investments, backhaul and

> It will also be necessary to have spectrum gaps to avoid spectrum concentration in one or two operators along with the option of E and V band for backhaul spectrum. At an industry level, there is a consensus that valuation of the mid band 3300- 3670 megahertz spectrum should be reduced by about 90% or more.

The start-up ecosystem is a hotbed of innovation. They have had a significant role to play already in the growth of the economy. And with the government's enabling policy, it will further drive more growth in this vibrant ecosystem with 5G Coming.

devices. Industry players supported by the government have taken some concrete steps towards the path of 5G rollout in the last one year."

Vodafone idea's 5G strategy has been centred around collaboration and partnership. "We believe 5G will be a success only if all ecosystem players come together to bring use cases of relevance to consumers and enterprises," was Balaji's assertion.

"During the 5G trials in Pune, and Gandhinagar, VI brought together technology leaders, domain experts, start-ups to curate a wide range of use cases in areas such as public safety, connected health services, connected schools, smart cities, smart construction and connected workers, drone based surveillance, sports in terms of smart sports training, and immersive cloud gaming. As per estimates, there are over seven lakh 4G base stations in the country that will need to be augmented and upgraded to 5G. Add to that, a need for an additional few lakh sites due to the densification of network for the next few years. All this requires massive investments. In fact, the government's own national digital communication policy estimates investment requirements in the tune of $100 billion. For this, a financially healthy telecom sector is essential", claimed Balaji.

It is critical that policymakers look at the economic growth that 5G will drive rather than just the revenue from spectrum sale. The government's key initiatives and programs, whether it's Make In India, the production linked incentives(PLI schemes), Digital India, startup India, a $1 trillion digital economy target – all of these will be driven faster by 5G.

Balaji spoke about the multiplier effect 5G will have on the economy, and the country. "5G will surely have a multiplier effect on economic growth and generate significant employment in the country. As India gets ready for 5G rollout and spectrum auctions, it is imperative that policymakers plan an auction process that benefits 1.3 billion population in the country and gives them operator choice, that it stabilizes the industry so that people who are in the sector: the players, the telcos can invest into 5G networks" said Balaji.

The spectrum auction planning should ensure that all four telecom players get adequate spectrum with significantly lower pricing than the present reserved prices. During the TRAI consultation, the industry proposed no upfront fee, and a few years of moratorium to ensure that all the investment goes into network deployment of 5G.

"It will also be necessary to have spectrum gaps to avoid spectrum concentration in one or two operators along with the option of E and V band for backhaul spectrum. At an industry level, there is a consensus that valuation of the mid band 3300- 3670 megahertz spectrum should be reduced by about 90% or more," continued Balaji.

"We are hopeful that the industry's requests will be addressed by the regulator, and the government. Since there's been intensive consultation that has taken place in the matter recently. Taking these steps will also enable to create the right digital infrastructure for 5G so that it triggers a multiplier effect on the economy and meet the larger national objectives," said Balaji.

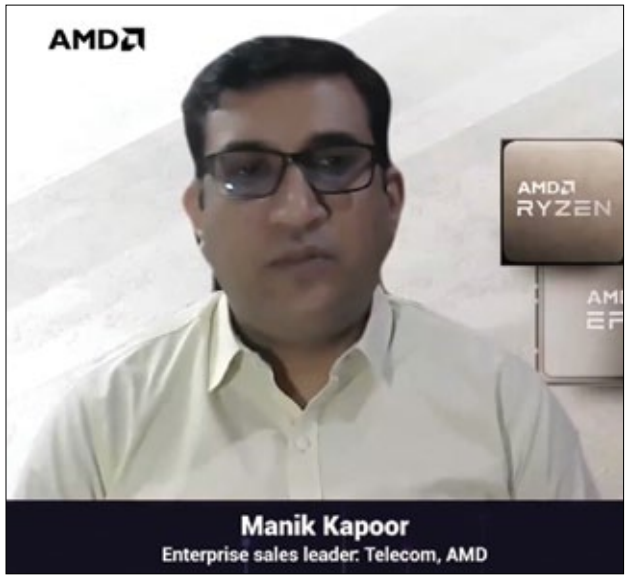
Startups Innovation Hotbeds

Balaji emphasised the point of the start-up ecosystem being the hotbed of innovation and its role in the economy's growth. "The start-up ecosystem is a hotbed of innovation. They have had a significant role to play already in the growth of the economy. And with the government's enabling policy, it will further drive more growth in this vibrant ecosystem with 5G Coming."

In conclusion, Balaji mentioned about VI's role with start-ups for Industry 4.0. "Vodafone idea, is working with several innovative start-ups to build up propositions for industry 4.0 Smart Cities and smart citizens. To make Vodafone Idea ready for 5G we are modernizing our network with 5G Ready technologies such as massive MIMO, dynamic spectrum sharing etc. We are deploying 5G radio equipment on both radio and core and with our early moves in open band adoption cloudification of core and with the largest edge cloud deployment in the country. Vodafone idea network is now ready for 5G rollout in the future".

Richer Data Services require strong data center technology

Manik Kapoor, Vertical Sales, – Telco COE I APJ&I, AMD, talked about HPC and adaptive computing solutions, at the Telecom Leadership Forum 2022



AMD has a compute architecture roadmap for sustained, high-performance leadership. This starts from 14nm Zen in 2017, upto 5nm Zen 4 in 2023. We are increasing the already impressive leadership. AMD EPYC is the new data center leader. There is a leadership roadmap, with constant execution, performance, and architecture for accelerated computing.

There are significant technology opportunities. In data center, we are leveraging strong AMD relationships and AMD EPYC processor momentum. AMD has leadership AI, SmartNIC, and workload-specific accelerator solutions. In 5G and wired communications, AMD is driving the adoption of EPYC processors in wired and wireless infrastructures. In embedded, AMD has enabled differentiated solutions for Xilinx's broad customer base and distribution platform. It now has an expanded portfolio of CPUs, GPUs, FPGAs, and adaptive SoCs. We need to process data more efficiently at the edge.

AMD is also looking at telco solutions domain. These are across various categories, such as AI and edge, content delivery and gaming, operational and business support systems, policy, control and security, platforms, core and cable, RAN, etc. Video data will form the majority of Internet traffic by 2028, and in future. There are increasing expectations of businesses and consumers.

Telco CTOs are also viewing video and gaming as critical for their success. 5G is well placed as the first technology to offer richer services. Telcos are also recognizing the needs of Industry 4.0 for smart cities. They are enhancing smarter coverage. 5G software scales with the cores.

We have also made great traction with data centers. AMD is delivering leadership compute differentiation for data center growth. In supercomputing, we are leading the exascale era by winning top deployments. In cloud, AMD is expanding deployments with leading providers. In enterprise, there are large-scale deployments with growing pipeline.

Let us look at the third-generation AMD EPYC processor. We are extending the per socket core density and per core performance leadership. It is currently the world's highest performance server processor. There is higher performance in HPC, cloud, and enterprise workloads. We have built advanced security features with AMD Infinity Guard. The AMD EPYC processor is built on powerful, efficient Zen 3 core.

The second-generation EPYC broke over 250+ world records. These were spread across data management, business apps, infrastructure/HCI/SDI, and HPC/engineering/technical. AMD also helps in reducing the TCO, as compared to competitors.

In conclusion, AMD is offering the complete portfolio. There is innovation from the data center to the edge. AMD EPYC has leadership in x86 CPUs. AMD INSTINCT has the best compute-optimized GPU architecture today. In adaptive acceleration, there are the Xilinx Alveo, Versal, and Zync platforms. These are leadership FPGAs and adaptive SoCs. They are accelerating evolving workloads, including AI, smart networking, and software-defined infrastructure.

Enterprises of Tomorrow – Hybrid, Flexible and Leveraging Technology — will expand the Work Force

Prateek Pashine, President – Enterprise – at Reliance Jio shared insights on the Enterprise of tomorrow and the changing workplace in a conversation with Gajendra Upadhyay, Editor, Voice & Data.

Prateek was with the Tata Group for over 20 years in senior leadership positions. Including at Tata Teleservices and Tata communications. Prateek was the chairman of the Wireless Broadband Alliance, a global body and on the board of the WiMAX forum, the global standard for fixed wireless broadband. He is an adventure sports enthusiast, a squash player and an avid cyclist.

V&D: The pandemic was nothing short of a Black Swan event. It changed lives for both corporates and individuals in multiple ways. What in your view has this done to enterprises especially for the work-from-home situation.

Prateek Pashine: The pandemic has truly tested the human spirit. It forced us to think out of the box and create solutions for continuity of business. Every corporate has a BCP - business continuity plan. Before COVID, that meant two things. One was to ensure disaster recovery and safety of your data centers (separated by distance and location) and the core data. The other was not to allow the top two or three senior leaders to travel together on the same plane. There wasn't much else. COVID showed how inadequate this BCP was. It wasn't any longer about the CEO or CFO. If employees cannot come to work, cannot be connected to the resources or infrastructure that the company provides, then that was a serious BCP issue.

It is no longer about flying on the same plane it is about how to make sure that each and every employee can work. That was, I think, the first rude shock. Companies were ill prepared. For example in the call center industry, every desktop accommodates two or three agents who come in shifts. One desktop is used multiple times. Now, when agents couldn't come to work, enterprises had to provide for three instead of one. The ratio of workstations to employees multiplied.

But the blessing has been technology. Companies that adopted technology faster, were able to take advantage

> Soon you will see everything as a service. You are going to see new models emerging, moving from capex led decisions to platform / service led.

and make it a seamless, borderless, BCP secure organization. There are some great examples of how companies were able to immediately use technology to tide over the pandemic.

I'll give you our example, at Jio, we have about 6000 employees who handle 450 million mobile customers. Most of them were working out of call centers or corporate offices. Overnight, 6000 employees had to start working from home. We did this without a blip in services. Only because of smart use of technology. On the reverse side, the impact on approximately 75 million small businesses in our country was hardest. Those who were not able to leverage technology went out of business. We saw close to 10 million businesses shutting shop.

V&D: The pandemic hit just when these core building blocks of technology, like 4G networks of Jio, broadband services and smartphone devices were beginning to be widely used. How do you think these different elements came together.

Prateek Pashine: You've asked a very interesting question. If this pandemic had happened a decade earlier, I'm not sure we would have fared that well. It was a great combination of technologies, ubiquitous broadband, 4G networks covering pretty much all villages and towns and cities that Jio enabled from 2016 onwards. It was a perfect combination, which enabled us to tide over this event. I dread to imagine how it would have been if these enablers were not in place.

V&D: This helped the employees to connect. What about the network operators? Did it impact your roll outs. What was the impact on your own employees as an Enterprise.

Prateek Pashine: I'll talk about the shift that's happening. Whether you call it reverse migration from the Enterprise hotspots – places like a Nehru Place in Delhi or a DLF Cyber Hub in Gurgaon or Nariman Point / Bandra Kurla Complex (BKC) in Mumbai. That's where enterprises were located. And Service Providers concentrated on in terms of rolling out networks and coverage. Even sales and support staff were focused in those hotspots. But now these are no longer hotspots. As employees went back to work from home, the hotspots shifted. It's not Nehru Place, but probably GK-II or Rohini in Delhi. It's not BKC, but Goregaon or Ghatkopar in Mumbai. Now it is not an Enterprise strategy, but a home strategy – we are rolling out ubiquitous broadband in every nook and corner of the country, starting with 1600 towns. Those who had a very coherent strategy of fiber to the home actually have been beneficiaries. And when we go back to a hybrid way of working, these hotspots will come back into the Enterprise clusters. So ubiquitous coverage is one of my key elements of the new normal. This shift of hotspot has also meant that all the rules, norms, security, privacy have now become important , not just for the corporate clusters but for the 2000 residential homes of their employees. That's where the data is getting transacted.

Each home is now an office premise. We are having very interesting conversations with our customers. Earlier their conversations with enterprises was about SLA, uptime, redundancy, in those office locations. Today, the enterprises have started saying can you give me SLA on my employees home connection.

Can you give me a redundant connectivity, one fiber, one 4G?

Those conversations you wouldn't have imagined happening just two or three years back. Earlier people talked about software defined wide area networks SDWAN limited to those clusters. People are now saying can I have the software defined networks and services extended to my home. It will transform the CIO conversations.

It's also going to lead to not just hybrid way of working but hybrid networks as well. And I think that it augurs well, for the enterprises. Because earlier, the enterprises were spending far higher money in creating what you call VPN networks. Now, with the shift, what you basically want to say is, bring your own internet, I will put the security protocols, I'll put the traffic prioritization protocols on top of that. It doesn't matter that in some locations, it's a fiber connectivity in some locations, 4G, in some locations, it's a home connection, all of these get federated through one unified security layer, one unified, prioritization layer that gets managed by the Enterprise. I think that is the joy for any CIO because you're no longer tethered to that one service provider. Now, connectivity, connectivity can come from any source, I can apply that layer of control. And that's going to be one big shift.

V&D: This is basically the distributed enterprise. But as this reaches the employees' home, there are likely to be challenges of managing the technology. Be it simply fixing an email or a laptop crash. There is no tech support at hand. Are there any interesting situations of this nature cropping up.

Prateek Pashine: I think you bring a very important aspect of what's going to happen. The journey had started, but got accelerated with the pandemic. And that's everything moving as a service. I don't want just a laptop, I want to support as well. I don't want just some software, I want it to be managed and supported. And I think soon you will see everything as a service. As you rightly said, how do I provide that technology support? In one premise, I could have two support staff. But now you have to provide remote infrastructure management. Now we are seeing Enterprises asking if we can manage it – don't just be a supplier just manage the whole thing. I'm in the core business of banking, I'm in the core business of textile manufacturing, manage my infrastructure for me. Can we bring all of these together as service? This impacts one other problem that a CIO worries about – technology obsolescence. Upfront capex is not an easy decision. Everything as a service solves that problem. So that is fundamentally the shift that you're seeing of device as a service, connectivity as a service, Infra as a service. You are going to see new models emerging, moving from capex led decisions to platform / service led.

V&D: Working from home has actually been a boon for many employees. People have more time, they don't need to commute for four hours a day. How has it impacted workers? How has it helped you personally to spend more time on things other than work.

Prateek Pashine: This work from anywhere has opened up new avenues for people who had to opt out of the regular workforce. For example, there are graduate and post graduate mothers, who are not able to step out because they've got young kids. But they have time, say four or five hours in a day. That can be gainfully used, their skills can be leveraged. And that has completely democratized and made the workforce more inclusive.

You no longer need somebody who's coming in five days a week, eight hours a day. If I have talent and capability, 25 hours in a week is better than 40 hours. There are millions of such jobs. So the contract between employee and employer is changing.

It's no longer one monolithic, rigid contract. And this is real. We've deployed about 20,000, such hitherto, not in the mainstream workforce, mostly women in Jio. Some who can work three days a week or a few hours a day. We train them using digital technologies and then let them manage our customer relationships. We found 20,000 talented people just like that. And it didn't matter whether they are in Mumbai or Bhopal. This is a challenge to the CHROs of companies – they have to think of flexible models. Is 20 year old person full time better than a very experienced person who can give only three hours a day? The pandemic has unleashed a new workforce.

Productivity has also gone up. People have extra time for family, Health, hobbies.

But the flip side is – as one CEO of a Philippine company said – you can close deals remotely, win contracts but what about relationships? Relationships can't be built remotely. Face to face interaction is equally important. There is also the sense of belongingness to the organization. Whether it's the institution, the premises, the canteen conversations, waiting in queue for lunch or coffee, the two minutes with a colleague a their desk all of these are equally important. So I think we will ultimately move to a hybrid model.

I've personally claimed three and a half hours of commute time back. A large chunk of that has gone into cycling and health.

V&D: What in your view, are the tools and platforms that will dominate in the future for this kind of a hybrid enterprise of tomorrow?

Prateek Pashine: Technology is a great catalyst for reducing the hurdles that small and medium businesses faced earlier. It truly gives them a plank to compete with large Enterprises. For us, both the large enterprise and the small, proprietor run, founder run, businesses are important for enabling with technology. What does any organization need? You need productivity tools, you need marketing tools to reach your customer. You need CRM for customer data records, you need accounting and you need HR.

If I can bring these solutions to the company in everything as a service manner to be the glue, that brings it all together then the digital divide would significantly reduce. We at Jio are truly trying to be a digital enabler at a cost that is easy to manage. We are removing the technology constraint for SMEs.

OneWeb will add immense value to Telcos: Rahul Vatts, Chief Regulatory Officer, Airtel

We will distribute this through our partners. Our aim is to start services in the country later this year. We have also entered into an agreement with ISRO, where we will be using ISRO's PSLV and new rocket GSLV Mac III

Rahul Vatts, Chief Regulatory Officer, Bharti Airtel, shared his perspectives on the topic Space Race and Ground Realities at the TLF event this year. He appreciated the theme "Era of convergence: from 5G to GenZ".

"India is set to join the 5G league of nations this year and at Airtel we are really excited as our network is 5G ready."

In the space segment the Bharti Group has taken a giant leap by investing in OneWeb, a global constellation of low earth orbit (LEO) satellites for beaming down broadband and Internet into the remotest parts of the world.

"We are partnering with the best to bring connectivity to hitherto unconnected parts of the world through our LEO satellites," said Vatts.

> Private participation in Space communication sector opens up multiple opportunities for India. The Indian share is hardly 2.6% in 2020, whereas India's Space economy is likely to reach $12.8 billion by 2025 with a CAGR of more than 6%

> We have submitted our inputs to the government on the draft Spacecom Policy. We have also been participants in the TRAI consultation papers which have been very timely.

Space the next frontier

Space is the next frontier for mankind. From inter planetary travel to setting up broadband networks in the sky, the aim is to connect everyone to a better future.

India has been one of the world's leading Space innovators and is an important international player in space technology. We are moving towards increasing our country's capacity and capability to use space technology products and services for societal applications as well as commercial space activities.

The Indian space program is one of the world's fastest growing. India's Space sector has grown in the last decade to include TV and broadband services, Space science, exploration, Space-based navigation, defence and security applications, applications in schools and hospitals. Overall, we have seen an increase in investments in Space technology, products and services.

The government of India, under the visionary leadership of Prime Minister Narendra Modi, has unleashed bold reforms for the Space industry. These include setting up of the Indian National Space Promotion and Authorization Center (IN-SPACe) which is the nodal regulatory agency under the Department of Space. The PM had also asked the industry to look at forming an Association that can complement the efforts of the Government and unlock the benefits of the Space reforms process. One of these is to encourage participation of private enterprises and ease of doing business.

This is a fresh approach to generate participation and views from the private sector to accelerate the growth of India's space industry and make it a global hub.

The industry responded to this demand. The Hon. PM, at the launch of ISPA or Indian Space Association, appreciated this and said that the Government was following an approach that had four pillars: freedom of innovation to private sector, Government as an enabler, Future-ready talent and Space as a resource for the citizens and common man.

The time for linear innovation is over. It is time for exponential growth. "We strongly echo the views of the Government that India has the potential to become a major player in Space," said Rahul Vatts.

Space is a $360 billion industry globally. India has the potential to become a technology leader in this "Space". We are at a tipping point for satellite industry's growth in India. All industries and technologies need to work in harmony to fulfill the vision of global connectivity, and broadband for all.

The Space race has started and accelerating every day with powerful, large countries moving their Space agenda. Government support is therefore critical. We have the skills and infrastructure in the form of ISRO to grow our share of global marketing, bring high end technology into the country and create skilled jobs.

Private participation in Space communication sector opens up multiple opportunities for India. The Indian share is hardly 2.6% in 2020, whereas India's Space economy is likely to reach $12.8 billion by 2025 with a CAGR of more than 6%.

On the possible conflicts with Mobile and existing operators, Rahul said, "Our view is that Satellite companies and Telcos can co-exist and work together." In fact this is of immense value for Telcos and critical for satellite services.

A final clarity on the new Spacecom policy is awaited. "We have submitted our inputs to the government on the draft Spacecom Policy. We have also been participants in the TRAI consultation papers which have been very timely."

OneWeb Launch

"As a major investor in OneWeb, Bharti group is leading the private satellite revolution in India. OneWeb will bring connectivity to every square inch of the country, connect the remotest and most difficult to reach parts from Jaisalmer to the hills of the Northeast. And, from

> It is absolutely critical that we follow the global best practices. We should follow the ITU radio regulations and prioritize satellite spectrum allocations in the way that the ITU has decided,

the Indian Ocean all the way up to the North. OneWeb has already launched nearly 400 satellites, and a total of 650 plus LEO satellites will be finally launched," he said.

Rahul also said that OneWeb services can add immense value to Telcos in the form of backhaul for 5G in remote areas – thereby serving industry for better delivery of services. It will also be an enabler for use cases in maritime, aviation and defense.

"We will distribute this through our partners. Our aim is to start services in the country later this year. We have also entered into an agreement with ISRO, where we will be using ISRO's PSLV and new rocket GSLV Mac III.

Policy and Regulatory Mechanisms

There are some important Regulatory areas that need attention.

Demand for satellite-based communications is considerable. It will grow with the implementation of initiatives like 5G, IoT. The space communications sector will be able to harness these opportunities with enabling policy and regulatory frameworks.

Our National Digital Communication Policy, clearly identified the complementary role of satellites: "It is necessary to explore and utilize the opportunities presented by next generation networks like 5G and other pioneering network technologies, including satellite communication," We are hopeful and positive about the space sector.

To launch the services in India, we would need landing rights and set up ground stations. For setting up a Gateway, we are required to apply for a service license. The time has come to change this perhaps to a registration certificate, and the service license may be used for providing a service in retail. The regulatory approval process should also be simple. IN-SPACe is going to ensure that processes are not duplicated. It should address the genuine concerns of a single window system for getting clearances. We are at very advanced stages of discussions for approval with the Government, the Department of Telecom and ISRO.

India needs a policy mix that nurtures and secures the private industry. A policy that promotes ease of doing business, keeps cost of rollout low and reduces cost of compliance. The sector is being opened for the first time for private ecosystem.

We have to have a simple and predictable policy regime. Therefore, policy must ensure a level playing field, be non-discriminatory, fair and consistent.

Spectrum critical

Rahul Vatts also said that Spectrum is a very critical part as spectrum capabilities will be the lifeline for the Space and Satellite sectors. "It is absolutely critical that we follow the global best practices. We should follow the ITU radio regulations and prioritize satellite spectrum allocations in the way that the ITU has decided," he said.

Existing regulatory changes also need to be rationalized including the cost of expensive bandwidth. There should be support available from the USO fund subsidy to connect the unconnected villages and rural remote areas on satellite services.

With Aatmanirbhar Bharat, the focus has again shifted to achieve sustainable development through local manufacturing. Thus, for Space sector in India, the time is ripe for formulation of industry friendly policies.

We need to make the Regulatory Impact Assessment a standard practice from day one to assess the benefits to industry and country.

Role of Data Centres and the Cloud infrastructure in 5G and the next era

Mumbai and Chennai, due to factors in favor of these geographies, will command 70 percent of the investments for Data Centers, says Sudhir Kunder

Data Centres and Cloud infrastructure ultimately support nearly all of the applications in today's always on environment. This was the focus of one of the panels at the Voice & Data Telecom Leadership Forum.

Eminent panellists, experts in the field who shared their views were: Vinay Jain, Director- Regional Sales, Service Provider Architectures, Cisco India; Dr. Sayed Peerzade, Executive VP & Chief Cloud Officer, Yotta Infrastructure; Sudhir Kunder, Country Director, DE-CIX Interwire India; Himanshu Gupta, Country Manager, Telecom Media & Entertainment, Hewlett Packard Enterprise.

Sunil Rajguru, Editor Dataquest and PCQuest moderated the session.

Can India become a global dat a center hub?

"Holistically, the role of data centers has never been more important than what we have seen in the last 2-3 years. We are witnessing a big spike in capacity. If we look at investments coming in, we can see that Mumbai and Chennai, due to factors in favor of these geographies, will command 70 percent of the investments. But we see a lot of growth for India – especially in rack power capacity" said Sudhir Kunder.

Data Centers would also play a bigger role with the hyper-scalers (that is the large Cloud infrastructure providers), increasing their activities and Cloud providers turning towards co-location footprints. Interconnection will play a critical role for applications in the new age.

Swift connectivity for service providers and Cloud players to data centers (DC) will be a key determinant for success of DCs. "With less legacy infrastructure, we can leapfrog, integrate new technologies and not be at a disadvantage as we were earlier, as compared to global counterparts," said Sudhir Kunder.

When we think of 5G Cloud game-changers, we are looking at more industry collaboration, Edge applications

> We have been exploring 5G with service providers and there have been lots of use-cases globally. 5G should start soon. The industry is getting its infrastructure ready. They have realized the transformation required at various layers in-network.

becoming more dominant, cloudification of networks, Cloud playing a critical unifier's role in enterprise digital infrastructure.

According to HPE's Gupta, today there was cooperation between hyper-scalers and Telcos – but after five years, who will win the race – that would be something to watch out for.

The panel touched upon other possible ultra-low latency (critical) applications that will emerge and the role of Private 5G networks.

Cisco's Vinay Jain explained that we are fortunate to be at the best of times to be able to leverage technology enablers and global supply chains. The global lessons from 5G can be available to India. The demand for fast deployment of Industrial IoT will be a big competitive advantage in the industry.

"As wireless technology expands, industrial IoT must learn how best to leverage this shift. We also see that businesses across the globe are investing billions of dollars in cloud-based transformation.

They are investing heavily in operational technology through wireless for improved productivity. Convergence is a big factor that allows for advanced analytics and automation for massive gains in efficiency and productivity – which has been seen by most early adopters. Ultra-low latency will lead to innovations in process control and automation in private networks."

Whether 5G is likely to be launched soon.
It all depends on the auction of spectrum to operators and once that is done, the next steps would follow.

Vinay Jain of Cisco said "We have been exploring 5G with service providers and there have been lots of use-cases globally. 5G should start soon. The industry is getting its infrastructure ready. They have realized the transformation required at various layers in-network."

"Lots of disruptions are going to happen for sure. We need to be prepared on the Edge side. And also enhance cloud capabilities to address the data flow in 5G. Over the next six months to a year, we will see the 5G revolution start in India," said Mr Peerzade.

Sudhir Kunder was of the view that 5G is not far off, and when it does happen, it will change the tech industry. "The kind of digital transformation journeys which we envisaged for our customers would only be possible when the entire roll-out happens."

Himanshu Gupta traced the history of wireless networks.

5G was launched globally, it started somewhere in 2016 but if we look back; India was laggard for 2G, 3G, and 4G. With 5G, we will be a tad late, but not so far behind. It is a big leap that will give immense opportunity for everyone to build an ecosystem in a very collaborative manner. Initial deployments would be around enhanced mobile broadband."

Moderator asked the panel for their thoughts on disruptions brought in by edge computing in the area of data centers and Cloud.

Dr. Peerzade was of the view that the growing adoption of IoT, Industry 4.0 will drive Edge requirements.

We will see more enhancements and a better user experience with the Edge revolution. 5G is definitely going to be a catalyst for Edge Computing.

It presents a huge opportunity for data centers and cloud service providers to build strong Edge data center footprints. This will help everyone to use 5G technology to the fullest and cater to various regions across India.

Overall, we are in a sweet spot. The time to tap 5G for enhancing the Data Center and Cloud Services infrastructure could not have been better.

Artificial Intelligence (AI) & Cybersecurity- in the network

At the recently held Telecom Leadership Forum, 2022, a panel of industry experts discuss Artificial Intelligence (AI) & Cybersecurity- in the network. The intricacies, power and fears of AI/ ML in the security realm

Artificial Intelligence, also known as AI is an ally, an adversary, a force multiplier, an offensive tactic – everything and anything today. It is being used for contextualised, faster and more powerful attacks. So should Telcos be worried, prepared or still be sitting on the fence when it comes to developing capabilities for security with AI? Some experts from the industry dissected how strong is the offensive and defensive side of AI, what constraints can data availability bring in, why modelling plays a key role in tapping AI's potential and where AI can bring in real value.

Data –The Real lever of AI's power

The panel – that was moderated by Anil Chopra, VP-Research and Consulting, CyberMedia Research, started

> AI-ML is being used for defence as well as by adversaries. Of course, it is a worrying trend because the adversary's models are strong – there are no boundary conditions for them. However, on the defence side, we are limited with the quantum of information- especially with data sets needed for the training of models.

> Malware detection and behaviour analysis are good ways to use AI. Identifying malicious activity and predictive activity work can be done with specific algorithms.

with the question of how worrying the trend of offensive AI is?

"AI-ML is being used for defence as well as by adversaries. Of course, it is a worrying trend because the adversary's models are strong – there are no boundary conditions for them. However, on the defence side, we are limited with the quantum of information- especially with data sets needed for the training of models. Quality and availability of information on the defender's end are lesser than the ones present on the offender's side. That puts us on the back foot. The context and use of AI would depend a lot on the boundary we operate in." Mathan Babu Kasilingam, CISO, Vodafone Idea Ltd. explained.

Venkat Krishnapur, VP, Engineering, MD, Trellix India added some more layers here. "AI is not new. The ability of computers to match human capability has been in discussion for many years. What has made AI a reality today is the advent of computing power, assisted with the proliferation of Data and the emergence of Cloud. In the past, computer power drove output, today it is the other way around- with data driving compute power. The variety, velocity and veracity of data are tremendous today.

Where-How to use AI?

AI-ML can now be put to a lot of use-cases, as illustrated by Priya Kanduri, CTO, VP- Cyber Security Services, Happiest Minds Technologies. "Advanced areas like a honeypot for luring attackers, using simulated environments to analyse their strategies with sandboxed set-ups – all these can be, and should be, de facto security approaches. Similarly, gathering information and threat prevention can be strengthened as well as transaction-level fraud protection can be fortified with AI. Models can help customers with better protection. We work closely with data scientists to catch stock impersonation, account take-over etc. Wide usage of technology can help with context-aware authentication here."

Abhish Kulkarni, Practice Manager Advisory and Professional Services (AI, Data Analytics), HPE India gave a perspective of accelerating innovation here. "We have three major areas of focus- hardware, software and services. On the hardware infrastructure, for instance, we work on solutions that can be custom-made and for accelerated training, for quickly churning maximum data to come up with models, and for fast inference. AI is an exploration and not a journey- because you will keep on learning as you go along. We also need to be aware of the anonymisation of data, the bias around data, the knowledge of what data can be shared and what not – which is where software helps. On the service side, we help customers to quickly start this path of ML and AI adoption and fast deployment of models."

"Malware detection and behaviour analysis are good ways to use AI. Identifying malicious activity and predictive activity work can be done with specific algorithms." Vishakh Raman, Director, Security Business, Cisco India & SAARC pointed out some specific use-cases which help Telco players when we think of AI for security.

The Flip Side of AI

All these possibilities are flanked with challenges and what-ifs too. Especially around the level of expertise to understand data-sets and to convert them for analytical models. And also on vertical-specific models to enhance usability. Looking from the shoes of a typical attack strategy can also help. Using internal approaches for understanding how the offensive side operates- would elevate security with AI. The industry also needs to stay up to speed with new technology- so that attackers do not have an advantage. Especially when attackers are using reverse engineering, using their models to understand defence-side models, and using technology to confuse with data manipulation. Threat modelling and attack simulation are some of these ways to think like criminals and change data where the exposure and vulnerability get high.

Can CIOs and CISOs leverage AI to fight back? Especially with the large attack surface that a Telco has?

That's a question that is no more on the back-burner now. And it's time to dial up attention and action here.

5G Encryption will be more Secure and Be less Prone to Interception

Anand Bhaskar, Managing Director, Global Service Provider Business, Cisco India & SAARC delivered a leader's keynote address on the future of the internet and 5G, at the recently held 21st Edition of Voice&Data's Telecom Leadership Forum

Quoting Marshall Goldsmith, 'what got you here, won't get you there,' Anand mentioned the quote as a constant reminder of the need to change, evolve and accelerate the cadence of innovation in order to continue to be successful.

Prior to the pandemic, thanks to 4G, internet traffic was already growing at a fairly rapid pace. "Now, in the new normal, and the two years in between, we need to acknowledge and commend the stellar role that our service providers across the world and especially in India have played to help us all pivot to some sense of semblance of a new normal", had it not been for them, Anand continued, the economic impact of not being connected would have been nothing short of catastrophic.

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

Businesses are facing a completely new set of priorities. First, they have to reimagine how they design, develop and deploy their applications. That was true before too, but it has only got heightened on account of the pandemic. Applications are how services are delivered and consumed by customers, by employees and the entire ecosystem. Applications earlier on used to be an adjunct or an extension to the business, but in a lot of cases, today, they are the business. "It's so critical for CTOs and CIOs to reimagine how they transform their entire infrastructure. Second, in the connected world, the network is the nervous system that allows everything to work together and in a seamless manner. So while on the one hand, it has created limitless possibilities. On the other hand, it has introduced incredible complexity. Third, security has always been of critical importance to customers and to businesses across and now, it has become even more important, even more complex with the pandemic expanding the attack surface almost exponentially. So securing the data becomes another critical imperative for the CTOs and CIOs. And last, if the pandemic taught us anything, it is that work is not a place you go to. In fact, it's something that you do from anywhere. Given that, change in perspective, customers will have more employees than ever working remotely, either permanently or in hybrid work. So customers must be able to empower their teams irrespective, in this entire hybrid work scenario. These four priorities that I outlined have a significant impact on the network and Cisco has been helping service providers transform the entire network economics.

We are doing this by helping our customers grow their revenue through new market opportunities, either in the enterprise space or in the consumer space. We help them by reducing their costs, by reducing the complexity of the network, automating operations, mitigating the risk with trust, and security support, and last but not least, also providing financial structuring for the overall proposition.

Let's start by taking a hard look at the internet today. Quite frankly, the underbelly of the internet is horrifyingly messy due to the legacy and the issues that rapid growth brings along with it. The biggest problem, IP and optical networks operate in silos and are often in conflict. A tradition of using separate networks with multi-layered architectures is now unproductive, complex, and expensive to operate.

What's the solution? Routed Optical Networking allows us to converge IP transport functions with optical interconnects, simplifying these network layers, which drives a huge amount of savings. We must simplify the Internet to deliver future experiences and the immense and significant need for bandwidth going forward. More importantly, with the economics being managed, an opportunity to connect the underserved and close the digital divide.

If you look at these two areas, we see a shift happening on four broad dimensions. First and foremost is the flattening of the network, which means de-layering complex service provider networks that is currently there, ensuring that there is an end-to-end software-defined network, there is an end to end automation to enable intelligent services, telemetry, IoT, so on and so forth. That is a very important portion if you have to improve the network economics. Second, very important is the data center transformation. As we proliferate mobile broadband networks, data happens at the edge. And the second major transformation is all about creating disaggregated data center architectures to capture the data where it gets produced. That is the most important priority. Data is perishable. If you delay processing, you lose value. Mobile edge compute, service edge compute, wherein data is analyzed at the edge, processed, security applied, and then value extracted and given back to the consumer. To enable that operators are resorting to leaf and spine architectures so that they don't have to bring data all the way back to the core.

Traditionally, this was done at the core, but now more and more data gets processed, and sort of value extracted at the edge. So this is the second important transformation that we're seeing. The third one is the uberisation of the OSS/BSS. Historically, we have built monolithic fault management and field management, ticketing and billing systems. Now, we are in an age of digital value creation. Consumers should now have the ability to provision their bills payments online. This calls for a shift to a very different model. What in my view, we call the 2.0 of OSS/BSS. Lastly, as data becomes our mainstream business, enabling enterprises and critical structures becomes very much mainstream, and to enable that we have to take care of data at every stage of the network. Hence, ensuring security is front and center of every change we make on the network.

Now let me explain how 5G helps solve these priorities and at the same time, opens up new opportunities. Firstly, it will help CTOs and CIOs reimagine their application. With the ability to transmit huge amounts of data at faster speeds. 5G will help bridge the gap between customers, apps, and business technologies. Second, 5G will also help transform the overall network infrastructure. 5G is designed to support an almost close to 100x increase in traffic capacity and deliver network efficiency. With 5G businesses will be able to create multiple virtual networks with just one physical system. It will also help boost real-time predictive maintenance, and smarter automation, which in turn will enable developing new business models.

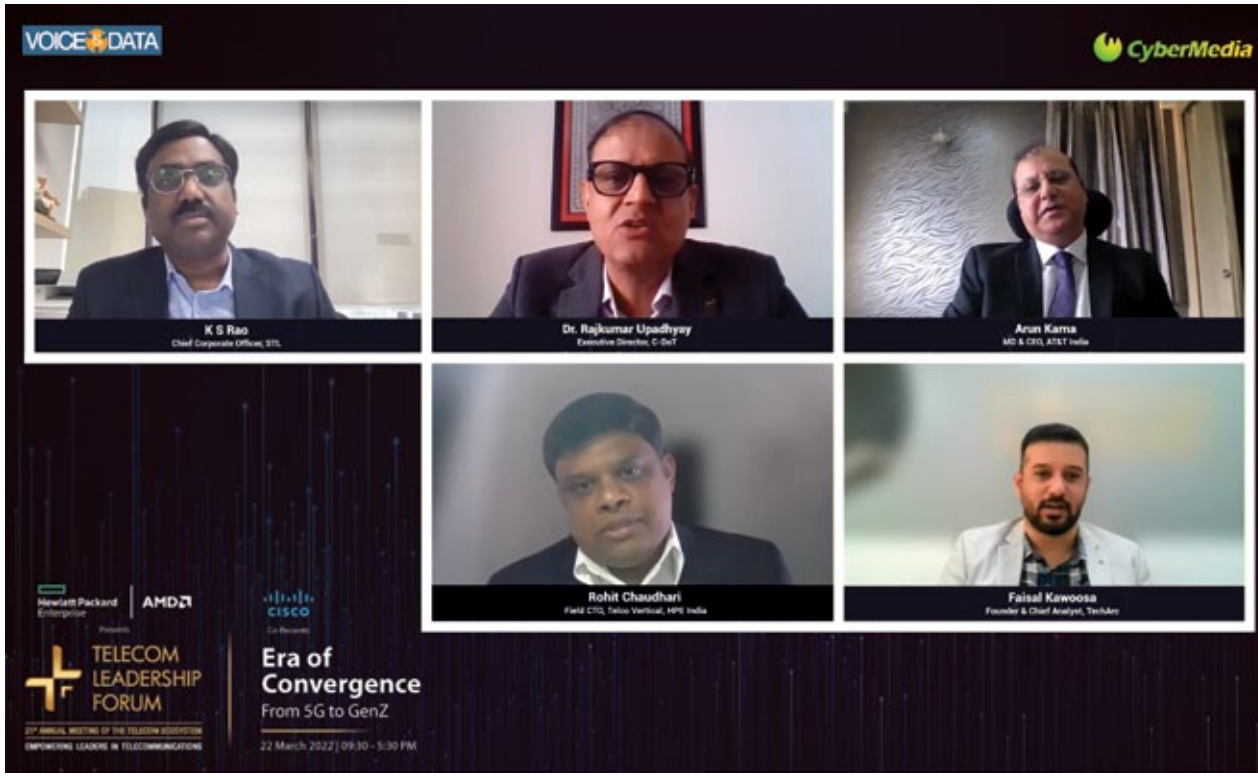
5G will also help secure data. 5G encrypts more data, it is more secure and less prone to interception. 5G is also much more software and cloud-based system than the previous wireless networks, which will allow for better monitoring and spot potential threats much in advance. Last but not the least, 5G will also help empower teams, because 5G allows millions of devices to connect simultaneously. And in addition, given the fact that by nature it delivers much higher data speeds, much lower latency, and higher reliability, it helps provide a much more uniform experience to all users, especially in a hybrid world.

In summary, as we redefine the future of the internet in the 5G era, it will be marked by a transformation of monumental significance. Long ago, data ran over voice networks, dial-up modems over telephone lines at higher speeds, the economics inverted and voice over IP ran over data networks. IP services will no longer primarily run over optical networks. Instead, optical services will join the rest of the legacy services and primarily run over IP networks.

The advent of 5G opens a new world of possibilities for every industry. The benefits are spread across industries that are on the cusp of their digital journeys, be it manufacturing, logistics, education, financial services, smart cities, you name it, and we will be able to transform that. These networks play a crucial role in providing a competent platform to support the widespread adoption of critical communication services and driving the digitization agenda. We at Cisco are engaging in 360-degree partnerships with all leading service providers to help prepare their networks for 5G by enabling an open, intelligent, and secure network platform. Secondly, by helping digitize their operations, and last but not the least, enhancing their go-to-market strategies to help build the internet of the future and secure much better returns on their investment.

Open-RAN – More than a Network Makeover

At the 21st Voice&Data Telecom Leadership Forum, held on March 22, 2022, the session on Open-RAN and Journey of Network Enterprises, had the following panellists: Dr Raj Kumar Upadhyay, Executive Director, C-Dot; KS Rao, Chief Corporate Officer, STL; Arun Karna, MD, CEO, AT&T India and Rohit Chaudhari, Field CTO, Telco Vertical, HPE India



The session moderator was Faisal Kawoosa, Founder & Chief Analyst, TechArc. Open RAN is empowering networks. The key points addressed by panellists were: how will OpenRAN bring cost advantages, improve agility, align with 5G, security and SDN.

Dr. Raj Kumar Upadhyay said, "open networks means open standards and community hardware". Proprietary solutions lead to vendor lock in. With OpenRAN, the options for plug and play increases – different vendors with better components can work together. It allows for disaggregation of hardware and software. This disaggregation is happening in multiple ways. Multiple vendors and interfaces work together to create new solutions. Hardware dependency is reduced. OpenRAN allows you to run the solution on bare metal, containerise and virtualise. New innovations like AI and ML come into play now. Network performance will be better – costs will be lower and new revenue opportunities will be unlocked.

Would Open RAN complement 5G though?

KS Rao of STL felt that technology disruptions and 5G are creating their own space.

These are very interesting times for people who want to move to open source technologies. We have seen how disintegrating hardware and software in the PC

The next level of 5G investments would be huge, and we can expect about 10 to 15 per cent of this to go towards encouragement of new technologies like Open RAN. India can be the 5G open source ecosystem supplier to the global market.

industry broke vendor lock-in and also improved cost-effectiveness. We believe the same thing will happen with Open RAN specially with wireless networks

"OpenRAN is gaining traction because it makes future networks very agile and TCO-efficient," Mr Rao said.

OpenRAN has received attention in the last few years – especially greenfield wireless service providers who adopted it have shown progress – in Japan and the US. At the same time brownfield (existing) operators are also showing interest. They cannot, however, make an overnight shift.

On the role of SDN in OpenRAN solutions, Arun Karna, MD, CEO, AT&T India said: It's all about greater intelligence in networks, maximising performance and reducing costs.

"How do you contain costs as complexity of networks grow. Proliferation of IoT and Cloud environments are creating far-more dispersed enterprises than what we had before. This is where the power of SDN becomes useful. It brings in simplification of networks and agility.

With flexible architectures it enables Enterprises to be more responsive to fast-changing needs of consumers and market opportunities. It removes the complexity in architecture. It enables elasticity which helps to handle high traffic – reducing congestion through intelligent automation.

Intelligent networks can connect to the Cloud and allows payments based on use. The real power lies in virtualisation of networks. How to treat data as separate from physical network – this abstraction helps enterprises a lot. Also allow prioritisation of key applications."

Arun Karna was of the view that Open RAN can help address many challenges including scale of economy, connectivity to rural areas, owing to lower costs. Brownfield operators are contemplating appropriate ways to transition. For a country like India, Open RAN provides a tremendous opportunity for service and manufacturing industries.

Stumbling Blocks Ahead

There are bumps in the road too.

If we look at the legacy brownfield operators they will have reasons for a phased investment. "It requires a lot of ecosystem development- where Telcos and companies have to work together. It requires capable and knowledgeable System Integrators who can integrate these components. The next level of 5G investments would be huge, and we can expect about 10 to 15 per cent of this to go towards encouragement of new technologies like Open RAN. India can be the 5G open source ecosystem supplier to the global market."

The panel also discussed security.

Security is critical for players, customers and regulators said Arun Karna. Network and security are not separate discussions anymore. There is a convergence between NetworkOps and SecOps. Software-centric, cloud-networking and security are the big shifts. Locations outside data centres need to have a unified security and low-latency access. "The modern hyper-distributed enterprise will need a user-centric, dynamic, elastic, multi-access and SASE-powered network, he said."

OpenRAN brings in multiple vendors – that's a challenge. "Standards bodies and ecosystems are working to define interfaces and reduce interoperability problems. I am sure the whole ecosystem will come together and see innovation in this area."

Rohit Chaudhari, Field CTO, Telco Vertical, HPE India had the following views: "We are playing a big role in the Telco space with pre-validated and pre-configured systems with reference architecture. Learning from our experience in 3G and 4G deployments, we started looking at the Open RAN space. With a production level deployment for a tier-1 US operator we had a lot of learnings. Unlike IT, networks are heavily dependent on latency and hardware. Our reference architecture helps to pick and choose various network components – this boosts the disaggregation confidence.

Wi-Fi-6 and IoT: Impact and industry approach & IoT'

As protocols and standards emerge around Wi-Fi6, and as mass-scale deployment of Industrial IoT accelerates, the complexities also increase

At the TLF, a panel of experts – Rakesh Upadhyay, CTO, ONEOTT iNTERTAINMENT LTD; Suryanarayan CS, Country Category Manager at Aruba, a Hewlett Packard Enterprise company; and Vikas Gupta, VP - IOT Strategic & Smart Connectivity – Enterprise, Vodafone India Ltd – discussed and shared views on whether Wi-Fi 6 will be a game-changer.

The panel was moderated by Amitabh Singhal, Co-Founder/Former President-ISPAI & Founder/Former CEO – NIXI.

What next

The main differentiator between Wi-Fi5 and Wi-Fi 6 is its capability and efficiency to connect so many devices. "We have been using Wi-Fi for over 20 years. What began as a convenience, and helped people get rid of wired connections – has, now, become an essential part of our lives," said Rakesh Upadhyay, CTO, ONEOTT iNTERTAINMENT LTD.

"Wifi6 has come at just the right time. The technologies it uses, works well with both downstream and upstream

> We have finally found the reality of what Wi-Fi is during the pandemic and work from home. There were issues of connectivity, signals, battery etc. initially.

> Today, IoT is an ecosystem – hardware, platforms, applications, services- when they all come together, we get a smart IoT solution. Today, there is notable adoption in India. Automotive, BFSI and even solar management, water management etc. show high adoption rates of IoT.

areas – unlike Wi-Fi-5. It is also suitable for low-power and low-bandwidth devices. IoT is one such application where there is a need- for devices that need a small bandwidth to talk to the Internet.

The battery back-up time, removal of unnecessary chatter, spotting and reduction of interference from nearby devices- make Wi-Fi6 much more efficient and faster than Wi-Fi5. Its next successor – Wi-Fi6 E - would be another game-changer. Once approved - it will see so many applications like VR, AR, IoT that will accelerate with its development."

Suryanarayan CS, Country Category Manager at Aruba, a Hewlett Packard Enterprise company said, Wi-Fi is essential today - It's like Roti, Kapda, and Wi-Fi.

"We have finally found the reality of what Wi-Fi is during the pandemic and work from home. There were issues of connectivity, signals, battery etc. initially. But over a period of time, all these got addressed. And Wi-Fi 6 manages these extremely well. Enhancement of performance and speed – was amplified by efficiency, with the advent of Wi-Fi6. Moving forward, we will see a lot of sensors that are low-power and need high efficiency. We will also get good throughput, good battery life, data aspects, system performance and short packets here. This would also be disruptive for gains like low latency, more efficiency for more data rates, compatibility for multiple devices."

The Orthogonal Frequency-Division Multiple Access (OFDMA) and BSS Colouring will drive new use-cases. For example support for IoT. "That's where the next revolution will happen. A lot of outdoor scenarios like smart city, connectivity etc. would be a new realm of use-cases now. All this would be significant because our usage pattern has changed - from emails to video meetings – which is where Wi-Fi needs to understand what application, device type is in action-and how to prioritise them."

Can all this help us to adopt IoT at a wide scale in India?

Vikas Gupta, VP - IOT Strategic & Smart Connectivity – Enterprise, Vodafone India Ltd stressed that IoT was more than a standalone job of one enterprise. "Today, IoT is an ecosystem – hardware, platforms, applications, services- when they all come together, we get a smart IoT solution. Today, there is notable adoption in India. Automotive, BFSI and even solar management, water management etc. show high adoption rates of IoT. Thanks to the 'New Normal' consumers and enterprises are keen to get a new technology."

Further, in the last one decade, Wi-Fi adoption in India has also increased.

The panel covered industries from healthcare to automotive to manufacturing. And how these would witness adoption of IoT. What could be the impediments.

Support from end devices could affect roll-out time felt Rakesh Upadhyay. "Normally, our intention is to make cheap IoT devices. This can contradict our requirements. If devices are cheap, they will not support the new evolution. As adoption improves, the scale of economy would work out, I hope. Another key factor would be the need to develop applications for these technologies to work." Security concerns would be another big area to watch out for. "We have to be very careful. Security has to be well planned before deployment. Most of the times loopholes, like default states, help hackers to compromise more devices after getting into one device. Network-level security, access controls, firewalls, regular patches, best practices- that's the way to go if we want to keep security intact," he said.

New vectors for cyber attacks are developing on many IoT networks – example IoT devices on CCTV cameras can be used for DDOS attacks. A fish tank can be used to attack a casino, or an open-network printer can be used to get into a bank. These headless devices in IoT need to be secured. Gupta advised to adopt network segmentation, strong testing of devices, visibility, secure password practices, continuous patches in firmware, all-time monitoring of IoT devices. "While the network will follow people – that's what Wi-Fi6 achieves, security has to also follow," said Suryanarayan CS.

Fiber to the Home, Future to the Home

Yugal Kishore Sharma, CEO, ONE Broadband, Hinduja Group spoke at the recently held 21st edition of Voice&Data Telecom Leadership Forum. He spoke on Fiber to the Home

Sharma spoke of the first wave in the telecom industry that gave India its mobility wave, where voice and data became accessible on wireless. "The next wave, coming out of the pandemic and during the pandemic, is the fixed line broadband. The fat pipe coming to your home, bringing internet bandwidth for various applications at your home, which we all have experienced," said Sharma.

Sharma talked of how fixed wireline has brought continuity for business "Except that we can't see each other physically and be in the same hall together, rest all, pretty much we have seen how fixed wireline broadband networks have served the purpose and the need has been felt even more than before," Sharma mused.

One OTT intertainment Limited is a Hinduja Group Enterprise looking into telecom and entertainment. "One OTT is all geared up to take fiber right into the home of every Indian citizen in phases, starting from metros to capital cities, and of course, also participating and working closely with the government to take that fiber right up to every village, to every nook and corner of our country through the ambitious program of BharatNet," Sharma asserted.

"At One OTT, we believe that GPON Access Technology , FTTH - Fiber To The Home, through last mile connectivity, is actually bringing the future to the home, from a consumer perspective," Sharma continued, "In the coming times with 5G coming on the other side, I foresee both these last mile technologies, one trying to serve the purpose wirelessly and other serving the purpose on the wire, both are going to augment and complement the entire reachability for the home of every customer."

Sharma also talked about telcos using last mile connectivity fiber for connecting their micro cell sites. "Last mile fiber, sitting on top of every building and connecting every home, is the fiber that will all also be utilized by telcos for connecting last mile micro cell sites, bringing it more closer, more deeper and nearer to the next door neighbourhood buildings to give a seamless 5G coverage."

Sharma concluded by saying, "the internet has proven the lifeline for civilization across the globe and fiber connectivity gives a big, support ecosystem, like a lifeline for citizens."

5G is about higher capacities, higher throughput, more bandwidth

At the recently held TLF 2022, Digvijay Sharma, Senior Director- Sales, Ciena Communications, India, talked about India's dream of 5G, the challenges thrown to service providers, and how Make in India and Ciena can solves these problems for service providers and overall market

Three Corner Stones of 5G

5G is one of the most promising technology. It provides connectivity anywhere at any time to anyone and to anything. There are three key cornerstones of 5G. One is enhanced mobile broadband, which talks about very large, very high capacities up to 10 gig per subscriber and second aspect, mMTC which is massive machine type communication, which talks about scale and ultra-low latency (U-rLLC), which is about the latency. All these put together gives a wide variety of solutions to the industry. This helps to solve many use cases whether it is telemedicine, high speed trains, driverless cars, agriculture, or many other services. All these put together give a new driving engine to industry 4.0, Edge cloud, as well as industrial IoT.

There is a clear cut case that is coming up of private 5g in which intelligent solutions are coming up. Industry is excited about it, because 5G is such a better technology and has many advantages over existing technologies like 4G and Wi Fi.

Key Trends

What are the key things needed in 5G, their consequences, their impact on technology and service providers, and what kind of different solutions will be needed in order to meet those objectives. Firstly, 5G requires more radio because it needs more bandwidth and lesser latency. This leads to a technological impact from today's D-RAN - distributed radio network architecture to move towards C-RAN. This further leads to a requirement of mid haul, fronthaul and cloud RAN.

Since it the network is scaling to much bigger architecture, much larger number of radios, we need a more simplified network architecture. For that segment routing becomes a key requirement.

Another key aspect is when investors are going to invest in such a large infrastructure they need to monetize

their network. For monetizing, one is the existing wholesale offerings, which would require multi tenant support leading to a technical solution which is FlexE and then differentiated services to different industries. Some industry would require low latency, some industries would require very high capacity, some industries would like many connected devices. For that network slicing becomes a key requirement.

5G use cases drive network impacts, so the bandwidth increases, and the requirement of latency are far more stringent than any other predecessor technology. With high binary increase current 1 gig connectivity in the network would go to 10 gig, 25Gig, all the way up to 100 gig.

The latency will lead to edge compute, which is generating edge cloud infrastructures as well as time sensitive networks. These are the key trends and their technological impacts both on the service provider and a broader technology domain.

Spectrum & Radio Densification Dynamics

5G is about higher capacities, which means higher throughput and more bandwidth, which means we need more higher spectrum to carry more data. When we go higher into spectrum propagation becomes restricted, and

> 5G use cases drive network impacts, so the bandwidth increases, and the requirement of latency are far more stringent than any other predecessor technology.

that leads to a requirement of more cell sites, which means more radios.

As these technologies will be rolled out in phases, the first enablement of 5G will give 5G on the footprint of existing 4G spectrums. We will have 5G coverage but will not have higher bandwidth. In order to further increase bandwidth, we will we will need higher bands of spectrum which will lead to more radios. With more advanced 5G use cases the densification of radio is going to increase. This has a clear cut impact on network loads. In order to simplify those network loads, there are newer technology in the networks that are coming about.

How do we better scale the RAN? How do we reduce cost and complexity?

By moving from distributed RAN to the cloud RAN. We split the radios into a more scalable model, which is more efficient both in terms of CapEx and OpEx, which means space and power. The BBU is moved out from cell site in terms of CU and DU and the RAN becomes centralized rather than a distributed RAN.

On each of the towers, we have a BBU down below in centralized RAN. the RH will be separate and DU and CU will be separate. This reduced into a lot of cost reduction, as well and adds to the network simplicity. And this is how the mobile forward the next generation architectures will be as I said, we need more radios and for more radios we need to do move away from DRAN and move to CRAN. These architecture are today's architecture. In all the current deployments, we have a mobile backhaul network in which there are access site and aggregation site and then the core sites.

The network architecture deployment models on site on fiber are going to be more or less the same, the only densification would increase and at network level some simplifications would come like BBU would move from radio sites to a more central site. And this is further divided into DU & CU (distributed unit as well as centralized unit). This would further move ahead and become virtualized in nature, rather than have physical components. It would be done on x86 compute. This will make the network more cloud run and you will see more principles like edge cloud coming into play into the actual RAN networks. This architecture would be done in various variants because technology shifts don't happen overnight.

This is the desired architecture, but most of the service providers would be moving in a phased wise manner, in which multiple different architectures would be there, depending upon the cost, infrastructure availability, and spectrum availability.

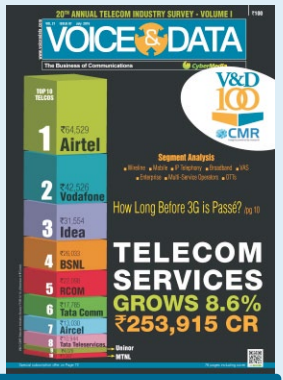
Now since there would be multiple different architecture, there would be different transport requirements. Service provider will have to choose a transport which not only caters to all these different requirements, but also is Futuristic in nature. What they invest today, they should be able to utilize the same network infrastructure when they reach their desired state of completely virtualized distributed RAN architecture.

Ciena's Role

To meet these requirements, Ciena has a wide variety of product portfolio to talk about Xhaul families. These solutions can work in any RAN and are agnostic to various RAN vendors. They support variety of front haul options and have adaptive IP capabilities and support different types of speeds and feeds which help them cover a wide variety of capacity, latency as well as network deployment requirements.

Ciena has 15 years of experience in the country, over 2000 employees, and about 1200 R&D resources. Ciena has a presence in all the tier one service providers like Airtel, JIO, Vodafone and all the key enterprise service providers. This helps us to understand the geography as well as the local India requirements in much better manner. Ciena is going to Make in India. Together with local R&D and geographic expertise and local manufacturing capabilities, we would be able to serve our service providers and help them build 5G networks in more effective manner. Ciena will manufacture select Routing and Switching portfolio products to support 5G use cases in India. This will not only be focused on India, but also some nearby geographies. We have local demo labs which can validate the products that we are going to offer to customers before they are implemented in network. With this, we will be able to help the Indian service providers to realize their 5G dream.

Yes! I want to subscribe to Voice&Data



Subscribe to Digital Edition @ ₹700/-

	Period	Issues	Print Subscription Rate		Digital Subscription Rate
			New	Renewal	
☐	1 year	12	₹900/-	₹810/-	₹700/-
☐	2 years	24	₹1,800/-	₹1,620/-	₹1260/- save 10%
☐	3 years	36	₹2,700/-	₹2,430/-	₹1680/- save 20%

or Subscribe online: subscriptions.cybermedia.co.in/voicendata

Please tick your subscription choice above, fill the form below in CAPITAL LETTERS and mail it to us at rse@cybermedia.co.in

☐ I want to avail premium service of receiving your copy by courier. Tick which ever is applicable.

☐ ₹ 500/- 1 year ☐ ₹ 950/- 2 years ☐ ₹1400/- 3 years

Name [•]: Mr/ Ms _____ **Date of Birth:** M M Y Y Y Y

Organisation: _____ **Designation:** _____

Delivery Addess: _____

_____

City: _____ **State:** _____ **Postal Code:** _____

Mob [•]: _____ **Tel:** _____ **Email [•]:** _____

☐ **I am paying ₹** _____ **by DD/Cheque No.:** _____ **Dated:** M M Y Y Y Y

Payable at (specify bank and city) _____

OR

☐ **Please Remit for ₹** _____ **Through RTGS/NEFT to our A/C details given below:**

Bank Name: ICICI Bank Limited, A/c no. 017705000132, Branch & IFS Code: Gurgaon, ICIC0000177

[•] Essential fields

Signature _____ **Date:** M M Y Y Y Y **Subscription No. (for renewal)** _____

Order form can be mailed with payment (cheque/DD) to:

Sarita Shridhar, Cyber Media (India) Ltd, Cyber House, B-35, Sector 32, Gurgaon - 122001 Tel: 0124 - 4822222, 91+9810499208

Terms & Conditions:

• This offer is valid for a limited period. • Rates and offer valid only in India. • Please allow 4-6 weeks for delivery of your first copy of the magazine by post. • Send crossed Cheques in favour of Cyber Media (India) Ltd. • Please write your name and address on the reverse side of the cheque or DD. All outstation cheques should be payable at par. • Cyber Media (India) Ltd. will not be responsible for postal delays, transit losses or mutilation of subscription form. • Cyber Media (India) Ltd. reserves the right to terminate or extend this offer or any part thereof. The decision to accept or reject any or all forms received is at the absolute discretion of the publishing company without assigning any reason. • Please include pin code for prompt delivery of your copy. • In case payment is through credit card, date of birth must be mentioned. • All disputes shall be subjected to Delhi jurisdiction only.

Encouraging Aatmanirbhar Bharat — Digital Communications Innovation Square (DCIS) set up to provide financial support by the Ministry of Communications

Encourage R&D and transform India into a global manufacturing hub

On 28" March, 2022 the Ministry of Communications has issued guidelines for the setting up and funding of a Digital Communications Innovation Square (DCIS) under a scheme called the Champion Services Sector Scheme (CSSS). This scheme will be for a duration of 4 years i.e. 2022-23 to 2025-26.

A budgetary Outlay of Rs. 124 crore under the Champion Service Sector fund will be earmarked for the scheme.

The scheme will have two components

a) Project Funding - Rs. 112 crore will be given for project funding over a period of 4 years. For this the applicant showing capability, intent, and promise to be able to produce functional prototypes or to productize existing technologies will be awarded grants of up to Rs 10 crore strictly based on a milestone basis.

b) Setting up one Incubation Centre each in C-DOT Delhi and Bengaluru and strengthening them with total budget of Rs.10 crores.

Milestone based Fund releases

Successful applicants will be offered funding support in the form of a grant of up to Rs. 50 lakhs for Startup and Rs. 2 Cr. for MSME. However, the grant up to Rs. 10 Cr. may be considered for technology products requiring higher funding on the recommendation by TEC and approval by Apex Committee. The fund disbursement will be milestone-based and will be released in 4 installments:

The main Objectives of the Scheme are:

a) To promote the ecosystem for research, design, development, proof of concept testing, IPR creation, pilot project and manufacturing i.e. complete value chain to make India a global hub for production of telecommunication equipment and a centre for digital communication services.

b) To develop and establish standards to meet national requirements and participate in international standardization bodies to contribute in formulation of global standards, thereby making India a leading nation in the area of international telecom standardization.

c) To promote India specific application development that matches with behavioral pattern of the masses and adds value to their day-to-day activities both economic and social.

d) To create synergies among the Academia, Research Institutes, Start-ups and Industry for capacity

Installment	Milestone	Release
1st Installment	Signing of Contract	40% of Total Grant
2nd Installment	Completion of 1st Milestone	20% of Total Grant
3rd Installment	Completion of 2nd Milestone	20% of Total Grant
4th Installment	"Completion of project & submission of final report with prototype/product (focusing on Technology Completion of the project and outcome could be Technical Success or Failure)"	20% of Total Grant

building and development of a balanced telecom ecosystem by organizing workshops/seminars/ webinars

e) To bridge the gap between R&D and commercialization

Communication services in India are mainly provided by imported equipment and technologies. The scheme will promote indigenous innovation and incubation of future technologies and their deployment/ manufacturing thereof, resulting value addition for the Indian Telecom Sector.

The scheme will be focused mainly in the following areas:

i) LTE Advanced, 5G and future generation access technologies, Software Defined Networks (SDNs) and Network Function Virtualization (NFV), IOT/ M2M, the cloud and data analytics.

ii) Backhaul radio and communication technologies,

iii) Core and edge routers, Soft switches, Ethernet Switches, xDSL, modems, routers, dongles, data cards, mobile handsets, wireless access points, mobile handsets etc.,

iv) Security and surveillance equipment, sensors,

v) Convergence of telecom, IT and broadcasting technologies,

vi) Over-the-top (OTT) services as drivers for penetration of broadband services

vii) Green and energy efficient technologies / solutions for the telecom sector and

viii) Any other area considered commercially relevant in future.

The main idea of the scheme is translation of research into technology (product/process) but not to carry out open ended fundamental research. Investigations must lead to innovation or new product/process ready for demonstration or pilot scale deployment (not only publication/ patent).

The Implementing Agency will be any of the Telecom Centres of Excellence (TCOE) in India. TCOE India will implement the Scheme on behalf of the Department of Telecom. The Implementing Agency will work under the overall supervision of the Apex Committee and guidelines issued by the DoT.

Deliverables - Impact of this Scheme will be measured in terms of:

i) Pilots of innovative ideas converted into full scale operation.

ii) Number of Start-ups, MSMEs being provided educational order, culminating in getting full fledged orders.

The year wise/ component wise budget estimate are:

Year	Component			Total (in Rs. Cr)
	Project Funding (Rs. Cr.)	Setting up one Incubation Centre each in C-DOT Delhi and Bengaluru and strengthening them (Rs. Cr)	Administrative expenses of Implementing Agency (Rs. Cr.)	
2022-23	28	10	0.5	31
2023-24	28	(Entire amount may be granted to C-DOT during the period 2022-23 to 2025-26 based on the progress)	0.5	31
2024-25	28		0.5	31
2025-26	28		0.5	31
Total	112	10	2	124

Neeraj Vyas
Head of Digital Business Solutions,
South east Asia, Oceania and India, Ericsson

"5G networks anticipated to deliver transformational customer experience"

Many telecom operators are aware that 5G success depends on their digital Business Support Systems (BSS), and bringing innovation to their own business models. BSS is critical to drive agility and operational efficiency, and to support emerging business models to capitalize on 5G opportunities as networks, applications, services, and customer behavior evolve. 5G networks are anticipated to deliver a transformational customer experience with improved speed, connectivity, network coverage, interoperability, and more.

Here, ***Neeraj Vyas, Head of Digital Business Solutions for South east Asia, Oceania and India, Ericsson,*** *tells us more. Excerpts from an interview:*

How will 5G transform BSS for telecom operators?
Business support systems (BSS) play a crucial role in managing CSP's relationships with its customers, partners, and other stakeholders by handling orders, producing reports, sending invoices, etc. Since the inception of telecommunication services, BSS continues

to be the backbone for manual and phone-first business processes, particularly in B2B settings. In a Traditional BSS ecosystem, the CSP in a network developer role, used to charge for voice, text and data services based on consumption or subscription level.

With 5G-fueled innovation in consumer services, CSPs will be in a better position to drive revenue potential with new capabilities going beyond connectivity into new applications and services. In the enterprise segment, with 5G enabled BSS solutions, CSPs will be able to create new revenue streams beyond telecom related services. In the age of 5G/IoT business, there will be new stakeholders that include:

- Enterprises and industry verticals that require solutions beyond telecoms.
- IoT device providers and suppliers of eSIM (embedded SIM) and related technologies.
- Platform providers that specialize in specific IoT or edge clusters or groups of use cases such as massive and broadband IoT platforms, industrial IoT platforms and content data networks.
- Integrators that specialize in specific verticals such as asset management, mission-critical services or automotive that combine capabilities from multiple stakeholders to address consumer needs.

With this, the CSPs must make significant changes across different business operations such as sales and marketing, IT, network management, pricing, and billing. To drive this transformation, a 5G-evolved BSS will be key – supporting service providers in the transition from traditional networking developers to 5G and IoT enablers, and ultimately to service creators who can collaborate beyond telecoms.

How can 5G-enabled BSS enable CSPs to diversify business models and monetize on improved customer experience?

With 5G bringing in new services in the enterprise segment including network slicing, private networks, internet of things (IoT), etc., the redefined BSS will enable CSPs to monetize services for IoT/5G platforms and edge deployments.

With 5G-enabled BSS, CSPs will be able to develop new business models by extending support in the areas of mass-device management, device and resource life-cycle management, subscription management, charging models for non-telco services and multiparty charging.

- **IoT-scale mass-device management**
  While current BSS architectures are scalable, they will be too costly for IoT use cases due to the large data footprint and processing need of each device. 5G-evolved BSS architecture with persistence and management model will allow many devices to use the same footprint as one traditional device.

  This can be addressed using concepts such as herding, where each individual device only requires a minimal data footprint. The behavior of each individual device is determined by the herd configuration, which is a single specification per herd.

- **Life-cycle management of IoT devices and resources**
  Managing the life cycles of IoT devices and resources is another significant challenge for BSS. In many emerging IoT applications, the ability to monitor the state of the device throughout its life cycle is not sufficient. Overcoming such challenges will requires a BSS architecture that can provide up-to date state information per individual device or resource as well as aggregated information to the rating, charging and billing functions.

- **Subscription management for IoT devices**
  Subscription management is another opportunity for CSPs in the 5G/IoT context. Traditional BSS are built to manage consumer subscriptions. They are not capable of handling the massive number of devices in IoT use cases in a cost-efficient manner. Subscription management in 5G-evolved BSS requires a high level of automation and solutions that reduce the processing footprint to onboard and manage devices, services and products.

- **Charging models for non-telco services**
  5G-evolved BSS will be able to support the management and monetization of services that are not traditional telco services, such as those for the IoT platform or application hosting at the edge. The usage of a non-telco service can be monetized using something as simple as a network slice identifier to determine how to aggregate and charge for a service.

- **Multiparty charging**
  In 5G-evolved BSS, different events for the same service can have different charge or revenue share distribution. One-time fees, recurring charges or usage fees can all have different distribution rules and include one or more partners.

As per Ericsson's 5G for Business: a market compass study, by 2030 up to USD 700 billion of 5G-enabled, business-to-business value could be addressed by service providers, with the projected value of the 5G-enabled digitalization revenues in India being approximately USD 17 billion.

How are other countries leveraging 5G to monetize on various services/use cases?

With a global leadership of over 170 commercial agreements and 109 live networks, we are a global technology leader and the most preferred partner for CSPs worldwide. It is worth highlighting that in collaboration with the industry's frontrunners, we have created some world's first. We have partnered with the CSPs to generate new revenue streams. For instance:

- Recently, by implementing Ericsson Digital Experience Platform (DXP) and Ericsson Charging, Telstra was able to digitize, automate, simplify, and transform its prepaid customer experience and operations with a new digital BSS stack.

- Ericsson and Vivo collaborated to deploy the next-generation cloud solution, combining B2C and B2B operations, automating processes ranging from ordering and billing to catalogs and customer relationship management (CRM). With the newly transformed BSS platform, Vivo Brazil is able to market new services, automate critical functions and monetize new business opportunities more quickly.

- Ericsson's 5G Business Compass report estimates the total 5G-enabled B2B opportunity for service providers across 10 industries, would be $700 billion USD by 2030.

What are the early 5G use cases for Indian consumer and the associated business models and implications of these for operators?

With 5G expected to redefine the digital experiences for both consumers and enterprises, there are several use-cases that are expected to drive new revenue streams for the CSPs:

Consumer use cases:

- **Cloud Gaming:** Globally, 5G ready users are already spending more time on video content and multiplayer mobile gaming, spending 1.5 hours more per week on enhanced video (4K, 360-degree, live streaming) and 1 hour more per week on playing multiplayer online games as compared to 4G users. From an India perspective, 60 percent of the smartphone users plan to use XR applications over 5G network daily in 5 years' time and will spend 7.5-8 hours per week.

- **Live Sports:** 5G enabled sports is amongst the top predicted revenue drivers. A spectator will be able to get an even more immersive experience using 5G-enabled stadiums, 5G network slicing, 5G enabled cameras and Virtual transmission centres.

- **Enhanced Video:** In this era of binge-watching, video content is the most significant traffic type generated by smartphone users. The rapid increase in data traffic for video is a result of increasing video formats/content and high viewing time. The need for low latency will be even more crucial with AR/VR entering the market for consumers to have a captivating experience. 5G will be able to address this easily.

Enterprise use cases:

- **Healthcare:** In the healthcare sector, wearable devices, secure online consultations, and remote procedures like robotic surgery will improve resource efficiency and meet consumer demands for greater convenience and freedom of choice.

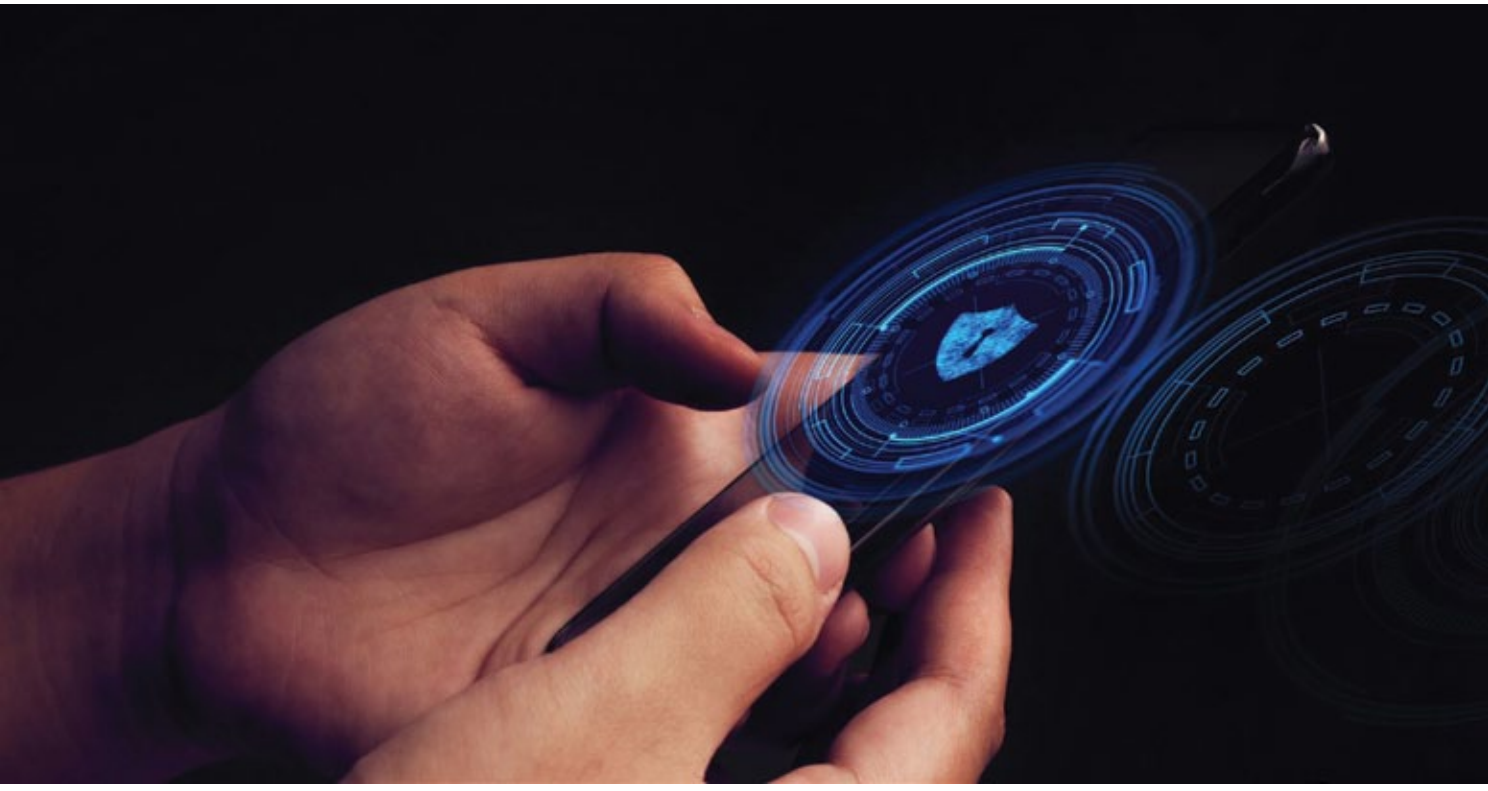
- **Manufacturing:** In the manufacturing sector, private cellular networks – and 5G in particular – will play a critical role in enabling smart manufacturing and allowing the industry to overcome key challenges. Use cases will include Autonomous mobile robots (AMRs) which can manoeuvre around the factory floor, carrying, tracing and inspecting products and parts, Collaborative robots that will help operators to perform tasks like drilling, assembly and inspection and even Asset condition monitoring that collects data from machinery and alerts operators when maintenance is needed, resulting in less unplanned downtime and costly replacement parts.

- **Education:** In the education sector, 5G technology can help educators manage remote learning and discover new educational digital experiences for both teachers and students.

feedbackvnd@cybermedia.co.in

SD-WAN and SASE: Two sides of the same coin?

Both SD-WAN and SASE are network architectural approaches designed to help administrators better manage distributed computing environments



BY ARUN KARNA

As organizations have accelerated their plans to better enable dispersed workforces in a post-pandemic reality, many technology decision-makers are broadly rethinking their network architectures.

Inevitably their discussions lead to comparisons and debates over both Software-Defined Wide Area Network (SD-WAN) and Secure Access Service Edge (SASE) technologies.

There are quite a few similarities between SD-WAN and SASE technology categories. Both SD-WAN and SASE are network architectural approaches designed to help administrators better manage distributed computing environments. Both enable branch and remote workers to securely connect to enterprise assets with improved performance over legacy MPLS and VPN connections. And both use software-based virtualization to deliver bandwidth optimization and traffic prioritization, as opposed to leaning on traditional on-premises hardware like network routers.

SASE offers native security and performance features that extend the value proposition of SD-WAN management. The two technologies handle cloud connections differently and they also tend to support different network topologies. This point is why it is crucial

SD-WAN is not designed to inspect traffic or apply robust security policies. Security teams still need to layer in a mix of secure web gateways, application firewalls, and cloud controls.

for organizations to understand the differences and the relationship between SASE and SD-WAN.

The following are three big factors that should inform how leaders chart a path for future-proofed connectivity.

SASE enco mpasses (and extends) SD-WAN principles

Comparing SASE with SD-WAN is no apples-to-apples affair, because in truth SD-WAN functionality is a subset of the broader SASE feature set.

Since SD-WAN first started to gain steam in the mid-2010s, the draw has been its ability to optimize traffic across widely dispersed geographic locations, securely terminate traffic, and do it all with the required remediation to different destinations. It does this using a virtualized network control plane that has the flexibility to use a range of transport services, whether broadband internet, MPLS, or LTE, to connect sites and services. That control plane centralizes management and makes it much easier and more affordable for large organizations to unify the connection of branch offices to corporate networks.

The connections are secure, but the sticking point is that SD-WAN is not designed to inspect traffic or apply robust security policies. Security teams still need to layer in a mix of secure web gateways, application firewalls, and cloud controls to achieve their risk management goals. This means that SD-WAN traffic must traverse across a central inspection point for appropriate security controls to preside over it. This greatly limits the secure flexibility of SD-WAN in cloud environments or when connecting remote users or IoT devices to anything other than the main corporate network. This is because all traffic must be backhauled to the corporate network in order for it to be managed from a security perspective, incurring latency and performance problems in the process.

The big difference with SASE is it takes that centralized management principle of SD-WAN and bolsters it with a full slate of security controls that are administered through a cloud-based service that pushes traffic inspection out to the edge.

SASE is designed with key security controls baked in

When Gartner first defined the SASE category back in 2019, it laid out the bare minimum five ingredients that create the category. SASE technology combines SD-WAN network controls with four other security control functions directly baked into the architectural framework:

- Secure Web Gateway (SWG),
- Cloud access security brokers (CASB),
- Zero trust network architecture (ZTNA), and
- Firewall as a service (FWaaS)

As SASE technology evolves, other functionality like next generation anti-malware (NGAV) and managed detection and response (MDR) has been added to that mix to create a more complete package of security management capabilities.

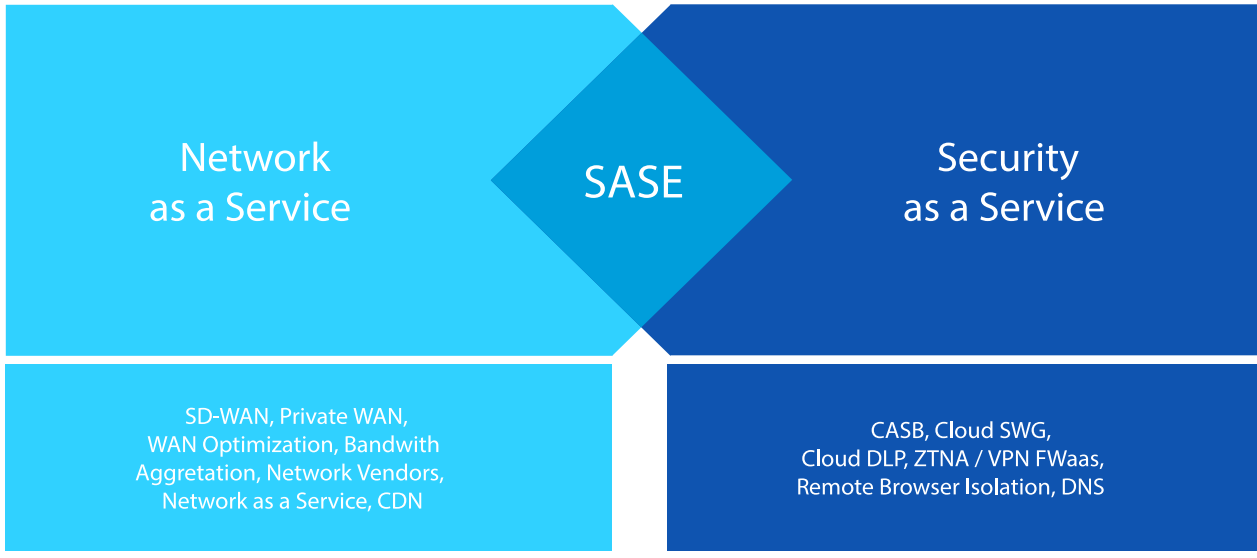
SASE topology looks more like a mesh than secured SD-WAN's hub and spoke

That built-in security functionality is bundled up into a single SASE cloud service that applies the security controls and inspection from a distributed set of SASE points of presence (POPs) located close to the connecting device. In this way, SASE topology looks much more like a mesh than the hub-and-spoke model necessary for secure management of SD-WAN traffic.

This cloud-native model concurrently enables a higher level of security assurance while maximizing performance and operational efficiency in an era of cloud-first, IoT-heavy environments.

SASE unifies management of hybrid environments while dispersing network inspection, and when that's paired with Artificial Intelligence for IT operations (AIOps) technology, IT teams are able to scale up visibility and management of edge devices. SASE and AIOps together can help organizations automate more management functionality and keep tabs on a diverse portfolio of

Many organizations have delayed their SD-WAN implementation for fear of transitional bumps or shocks. Adding SASE options can sometimes compound that fear and elicit analysis paralysis.



network devices that keeps getting bigger as IoT devices rapidly proliferate.

Many organizations have delayed their SD-WAN implementation for fear of transitional bumps or shocks. Adding SASE options can sometimes compound that fear and elicit analysis paralysis.

Technology and business leaders should rest easy with the understanding that while SASE does extend SD-WAN principles, there's no SD-WAN prerequisite for embarking on a SASE journey.

Can we apply learnings from SD-WAN implementations to SASE?

Lessons learned from the early days of SD-WAN can help ease the adoption of SASE. Many enterprises start with a proof-of-concept (PoC). This allows them to realize the benefits of SD-WAN and the security it can deliver, allowing them to map their deployment and scale it for network transformation goals. As enterprises continue to move through their modernization, they should look to a PoC to help them identify and define their desired business outcomes and experience how a single stack SASE solution can solve this.

Another key lesson is the importance of the right service provider to minimize the challenges faced when choosing and deploying SASE solutions. To overcome operational challenges that can otherwise become overwhelming, businesses should partner with an experienced managed service provider, one that offers a consultative approach, and considers the future needs of the business, existing IT resources and the current state of the network.

SASE deployments can be greenfield and incremental

Companies with no SD-WAN infrastructure can go for greenfield SASE deployments quickly. Getting started with SASE is not difficult. SASE can be rolled out incrementally. There is a simple step-by step process to achieve gains in network and application performance.

There are options, AT&T can help you systematically move in that direction based on your existing implementations and your goals for security, network performance, and business enablement. Download the SASE e-book from here Edging Towards SASE: Next generation networking, cloud and security (att.com)

Arun Karna, MD & CEO, AT&T Global Network Services India Pvt. Ltd.
feedbackvnd@cybermedia.co.in

[INTERVIEW]

YOTTA INFRASTRUCTURE

Nitin M. Jadhav

Executive Vice President & Head – Solution Engineering & Network Services, Yotta Infrastructure

"The latest infrastructure status will incentivise clean energy storage"

Nitin M. Jadhav, Executive Vice President & Head – Solution Engineering & Network Services, Yotta Infrastructure *explains the reasons behind, and expectations from, the coming together of Yotta Infrastructure and DE-CIX for internet peering.*

Tell us about the implications of this announcement for Yotta's India footprint, customer segments, new services in the portfolio etc.

DE-CIX India is the largest carrier and data center neutral Internet Exchange (IX) operator in India. And has now set up a point-of-presence (PoP) at Yotta's NM1 facility in Panvel. The NM1 data center is India's largest Tier IV colocation facility. We offer a comprehensive suite of peering solutions, interconnection and cloud connect offerings.

It has four dedicated fiber paths, with all major telecom operators and leading Internet Exchanges like ExtremeIX, NIXI and now DE-CIX.

With DE-CIX's point of presence at Yotta, our customers can now connect to over 550 networks globally. Customers in the western region can access a larger base of content providers, cloud providers and ISPs, and benefit from the expanded high-speed interconnection capabilities to the rest of the world.

Some of the major advantages of DE-CIX's presence at our centre is enhanced network performance, low latency, one-hop hyperscale cloud connectivity, and internet peering services to a majority of ISPs across India and globally. We also address low-latency edge requirements and seamless content delivery through a vast footprint of network nodes across the country.

DE-CIX nodes are now locally available for our customers at Yotta NM1, along with direct fiber connectivity. This provides unlimited capacity to connect to any service provider from a single point.

By using DE-CIX DirectCLOUD, customers can reach global cloud providers including Microsoft Azure, AWS, Google Cloud, and others through a single point, thereby eliminating direct connection costs. Additionally, Microsoft Azure Peering Service via DE-CIX enables enterprises to reduce latency to the Microsoft cloud and enhances connectivity to Microsoft 365 services.

What is the impact of edge and colocation data centers in the Indian Tech industry?

Growing internet penetration, smartphone userbase and cheaper access to mobile data are three major drivers of tremendous consumption and generation of content over the internet by masses. The resultant data infrastructure

> The government has emphasised its plans to expand broadband connectivity to village levels under the BharatNet project on a PPP model. This will further catalyse data center development in these regions.

and cloud needs have brought major hyperscaler's to the Indian market.

This has given an immense boost to large colocation data center parks and Edge data centers alike due to the need for a robust data center infrastructure network and ensuring content delivery to the last mile.

How is the regulatory policy evolving on data sovereignty, the recent infrastructure-status and other aspects that affect data centers?

The most recent development in the data sovereignty space is the talk of India drafting a completely new privacy bill, replacing the current version of the Data Protection Bill. The idea behind a new bill is to alleviate concerns that current provisions may hurt India's fledgling technology and start-up ecosystem.

Granting infrastructure status to data centers is a noteworthy step in transforming India into a global data center hub. It will foster a conducive environment for data centers, which will catalyse infrastructure development and data centers will find their place in the larger domestic infrastructure story as a major contributor to India's economic growth.

Even from an energy storage perspective, as data centers consume a lot of power, granting energy storage and grid scale battery systems - infrastructure status will incentivise data center players to focus on clean energy storage.

How have you addressed better uptime, lower jitter and outage prevention at NM1?

Being India's largest Uptime Institute TCCF certified Tier IV facility, Yotta NM1 offers the best uptime and fault-tolerance. Our state-of-the-art systems and equipment ensure that our customer operations run with 99.99% uptime under any circumstances. We offer multiple path connectivity to DE-CIX nodes via our Panvel, Chandivali and Thane-Belapur sites.

Are new forces like Blockchain and AI going to be good news for your industry?

Data centers form the infrastructure foundation upon which these technologies thrive. Workloads around AI/ML and IoT also require High-Performance Computing (HPC) capabilities, which often come at huge costs and complex setups. We offer world-class infrastructure and HPC environments to support our customers' new-age workloads. Moreover, the emergence of 5G will significantly strengthen the IoT ecosystem and Edge workloads that require low-latency Edge infrastructure and connectivity solutions.

What are the key factors that have catalysed the growth of data centers in India? Is there a trend towards in-house DCs?

There have been multiple factors driving the growth of the data center industry in India. In this year's Union Budget, the government announced several progressive steps that can take its Digital India vision to new heights – be it building digital universities, pushing for digital payments, integrating post offices with core banking systems, the launch of the Digital Rupee using blockchain, among others.

This resonates with our focus on expanding our hyperscale data center footprint, complemented by last-mile access via Edge data centers.

While there has been migration from on-premises data centers to third party colocation facilities, a large percentage of enterprise workloads still run in captive environments. This underlines the huge, existing opportunity for us. Yotta will continue to invest heavily in developing high-quality data center parks across the country.

We have charted a roadmap to deliver 1030 MW capacity across Maharashtra, Gujarat, Tamil Nadu, West Bengal, and Delhi-NCR in the next 5-7 years.

Is there a movement towards setting up Data Centers in Tier 2-3 cities?

As a pioneer of mass-scale self-sufficient data center parks in India, Yotta is highly bullish on its expansion plans. Tier 2 and Tier 3 cities, which have been underserved with reliable data center infrastructure, will increasingly witness and benefit from the development of more data centers, as the need for Edge data centers rises.

The government has emphasised its plans to expand broadband connectivity to village levels under the BharatNet project on a PPP model. This will further catalyse data center development in these regions.

This will bring digital solutions and cutting-edge technologies to regional businesses and help large enterprises strengthen their reach in newer geographies.

feedbackvnd@cybermedia.co.in

5G Policy & Standardisation - EU & INDIA Collaboration

This article gives a glimpse into the background and latest status of 5G standardisation and related policy work carried out by EU and India.

BY DINESH CHAND SHARMA

As part of the growing strategic partnership between EU and India through Joint Communication "Elements for an EU strategy on India, endorsement of EU-India Strategic Partnership: A Roadmap to 2025, India and European Union (EU+27) joint declaration and India-EU Connectivity Partnership, both the regions have agreed to work together for a stronger digital cooperation, pursue digital transformation to create quality jobs and improve the lives of citizens, digital connectivity while promoting the fast and effective roll-out of 5G in line with 3GPP based standards.

Digital technologies have played a significant role in making our lives normal during the last two years of unprecedented crisis. New and emerging technologies such as 5G, 6G, IoT, AI, Blockchain will continue to make a deep impact on the way we work, entertain and live in the future.

In fact, the digital inclusion has already become an intrinsic part of all our lives and we are dependent on smart, intelligent devices and applications. New and emerging technologies have become an important tool for governments to drive national economies. Workable technologies, viable applications, marketable products are a priority for governments all over the world.

Technology Standards

Towards this there is an increasing interest in understanding the effects of technology standards on these emerging areas. And the role that governments can play to encourage innovation and provide support for standardisation.

Mobile data traffic is rising fast – primarily on account of billions of devices using Internet of Things (IoT) platforms and machine to machine (M2M) communications, interacting and communicating with each other on networks.

5G or the 5th generation enables a new kind of network designed to connect virtually everyone and everything together including machines, objects, and devices. With enhanced mobile broadband, massive machine-type connectivity and ultra-reliable low latency communications, the impact of 5G will extend far beyond conventional cellular applications. It will enable new use cases (e.g. for ultra-low latency or high reliability cases) and new applications be it for Industry 4.0 or for end customers to use like medical applications.

EU

The European Commission identified 5G opportunities quite early and established a public-private partnership on 5G (5G-PPP) back in 2013, to accelerate research and innovation in 5G technology. A 5G action plan was adopted in 2016 to ensure the early deployment of 5G infrastructure and start launching 5G services in all EU Member States by end of 2020. 5th generation networks are live right now in some European countries, and this will accelerate in other countries during 2022. At the

> New and emerging technologies such as 5G, 6G, IoT, AI, Blockchain will continue to make a deep impact on the way we work, entertain and live in the future.

end of March 2021, 5G commercial services had been deployed in 24 of the EU-27 countries.

5G Standardisation started in early 2016 under the umbrella of the 3rd Generation Partnership Project (3GPP), the key standardisation body for global mobile communication systems. Several ETSI's Technical Bodies (TBs) and Industry Specific Group (ISG) are providing input to 3GPP and/or collaborating with 3GPP.

To support and compliment Europe's vision and goal of 5G deployment, 3GPP kick started the standardisation efforts. Defining an entire new standard for 5G was a large undertaking hence 3GPP divided the 5G standard into it two releases: Release 15, which corresponds to New Radio (NR) Phase 1, and Release 16, which corresponds to NR Phase 2. In NR Phase 1, there are common elements between LTE and NR, such as both using orthogonal frequency division multiplexing (OFDM). Many commercial rollouts have already happened on Release 15.

After 3GPP meeting in Dec 2020, the planned dates for Release 17's physical layer, functionalities and protocol work freezes have been agreed for December 2021, March 2022 and June 2022, respectively. As Release 17 reaches maturity with Rel-17 functional freeze set for March, the focus is now shifting on the Release 18 in which emphasis will be on 5G Advance.

ETSI itself has several activities that are developing requirements and potential enablers/building blocks such as Network Functions Virtualization (NFV), Multi-access Edge Computing (MEC), Millimetre Wave Transmission (mWT) and Next Generation Protocols (NGP) which will be integrated into future 5G systems. These groups have released specifications on key building block technologies for next-generation networks, feeding them to 3GPP 5G specifications.

Networks are also going to become software-defined, running primarily on homogeneous, highly distributed cloud-like infrastructures.

These characteristics will allow network providers to address the heterogeneous and diverse needs of 5G applications and to guarantee that overall network services can be properly managed. But the issue of management is perhaps the most critical challenge, as we move into future networking.

Given the scale, heterogeneity and complexity of emerging networks, management solutions need to be highly automated and extremely "intelligent", in the sense of a "machine intelligence", able to collect large amounts of relevant data, process it and act on it in an automated fashion. As the network undergoes a significant transformation, it requires the best open standards to ensure interoperability and faster time to market. Driven by the needs of 5G networks and applications, and enabled by transformative technologies, such as NFV and cloud-based deployment practices, this change is likely to be the single biggest technological and business transformation of the industry since the consolidation of mobile communication infrastructures.

TSDSI INDIA

In India Telecom Standards Development Society of India (TSDSI) is an Organizational Partner (OP) of 3GPP, which entitles its members to become individual members of 3GPP through TSDSI and to take their work into the global arena. Recently, Telecom engineering Centre (TEC) under Department of Telecom, Ministry of Communication has adopted TSDSI transposed 3GPP technical specifications as national standard and has initiated the process of adoption of TSDSI transposed 3GPP Rel. 16 standard into National Standards.

In yet another milestone for India, the indigenously developed 5Gi standards by the TSDSI are being considered to merge with the 5G standards for enhanced coverage to benefit rural and remote settings globally. The key requirements and the next steps that will culminate in the merger of 5Gi into 5G, was endorsed as part of the 3GPP 5G standards in the deliberations of 5G Release 17.

The merger of the 5Gi requirements into 3GPP 5G standards, enables a single common specification going forward, as well as creating a single radio access solution for 5G deployments in India and globally.

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

feedbackvnd@cybermedia.co.in

CyberMedia

DATAQUEST DIGITAL LEADERSHIP CONCLAVE

29th ICT BUSINESS AWARDS

Let's Transform with NeXtGen Tech

COMING SOON

#DQConclave #ICTAwards

Follow us: @Dataquest_India

Dataquest is organising a conference on Next Gen Enterprise, that will highlight the CXO's challenges in making the enterprises more resilient. It will focus on Intelligent Enterprises, Hybrid Workspace, cloud adoption for business growth, enhancing customer experience, enabling modern infrastructure and The Future of Work.

NOMINATIONS HAVE BEGUN FOR THE 29TH EDITION ICT BUSINESS AWARDS

IT PERSON OF THE YEAR

LIFETIME ACHIEVEMENT AWARD

PATHBREAKER OF THE YEAR

NOMINATE NOW:
https://dqconclave.com/

WINNERS OF THE 28TH ICT JURY BUSINESS AWARDS

IT PERSON OF THE YEAR

Rajesh Gopinathan
CEO & MD, Tata Consultancy Services

LIFETIME ACHIEVEMENT AWARD

Som Mittal
Former, President & Chairman, NASSCOM

AATMA NIRBHAR BHARAT CHAMPION

Sunil Vachani
Chairman, Dixon Technologies

WRITE TO US

Marketing & Alliances:
Rajiv Pathak I Manager, Marketing
rajivp@cybermedia.co.in I +91 8010757100

Registrations & RSVP:
Ravi Kant I Sr. Manager, Operations
ravik@cybermedia.co.in I +91 98104 81484

RNI No. 59233/94. Published on 1st of every month. DL(S)17/3114/2021-23. Licensed to Post WPP. U(SE)62/2020.
Posting Date: 13&14 of every month. Posted at Lodi Road HPO.

APEEJAY EDUCATION

SOARING HIGH IS MY NATURE

Apeejay Stya Advantage (50+ Years of excellence in education)

Quality Education
from pre–nursery to doctoral level

2,500
Faculty

65,000
Strong alumni network

85+
Programmes to choose from

40,000
Students

24
Educational institutions across the country

Some of our Awards and Accolades

'Top Education Brands Award' (Academic Excellence in K–12) by Business World Education in 2020

Awarded as **'Best Education Society for promoting Social Cause in 2019'** by Centre for Education Growth and Research

Apeejay Schools

- Apeejay School, Mahavir Marg, Jalandhar, Punjab
- Apeejay School, Hoshiarpur Road, Jalandhar, Punjab
- Apeejay School, Tanda Road, Jalandhar, Punjab
- Apeejay School, Model Town, Jalandhar, Punjab
- Apeejay School, Panchsheel Park, New Delhi
- Apeejay School International (IB), Panchsheel Park, New Delhi
- Apeejay School, Saket, New Delhi
- Apeejay School, Pitampura, Delhi
- Apeejay School, Noida, U.P., Near Delhi
- Apeejay International School, Greater Noida, U.P.
- Apeejay School, Faridabad, Haryana
- Apeejay Svrán Global School, Faridabad
- Apeejay School, Charkhi Dadri, Haryana
- Apeejay School, Kharghar, Navi Mumbai
- Apeejay School, Nerul, Navi Mumbai
- Apeejay Rhythms Kinderworld, GK–2, New Delhi
- Apeejay Rhythms, Sector–15, Faridabad
- Apeejay Rhythms Kinderworld, Model Town, Jalandhar

W: www.apeejay.edu | E: aes@apeejay.edu