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5G & THE FUTURE OF MOBILE DATA

- Future State of the Industry, 5G, Cloud & Edge Ecosystems: 5G is going to be a key accelerator for IT and OT integration
 - 5G- Redefining Communications
- Improve ARPU, Improve Financial Health of Telecom Sector
 - 5G- Indigenous Networks and Ecosystems
 - After 5G Auctions, what next?





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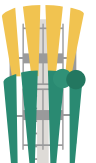


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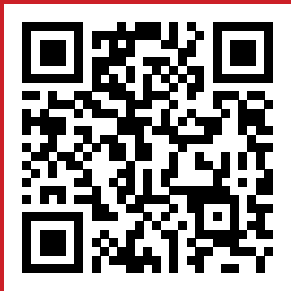
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**GAJENDRA
UPADHYAY**

[OPENING NOTE]

METVERSE IN INDIA

It is the next wave in the Internet universe – a 3D version of the Web. Creating a new paradigm for products, services and immersive experiences online.

According to a report released recently by Nasscom's centre of excellence – IOT & AI, the following are some key developments on the Metaverse front in India:

In a study commissioned by Ciena that surveyed 15,000 business professionals worldwide, including India almost 92% of Indian business professionals agreed to have meetings in the metaverse than use traditional video conferencing.

89% of Indian respondents, compared to 71% globally, said they could envision their company implementing virtual reality space technology in their work processes, Indian respondents (52%) feel that virtual meetings facilitate real-time collaboration on projects.

Mahindra and Mahindra launched TechMVerse banking. This focuses on the following main use cases:

- Meta Bank (a virtual bank and an NFT hub)
- Dealer Verse (virtual car dealership) and
- Middlemist (an NFT marketplace).
- They also released Mahindra Thar NFTs which were auctioned for a value of 26 lakhs.

Accenture is working on Metaverse related research for nearly a decade. They claim to have filed over 600 patents in metaverse-related technologies and have completed over 200 pilots and proof-of-concepts.

Edverse, an educational technology platform, hosts the world's first Metaverse classroom in India. It aims at a customised experience in a simulated, fully immersive 3D setting.

Edverse uses a library of augmented reality (AR) and virtual reality (VR) modules and games for learning.

In April 2022, the jewelry company Tanishq debuted their "Romance of Polki" line in the metaverse. Guests can see and experience jewelry designs as 3D images in a designated area and spin the 3D avatars to study the pieces from different angles and detail. Through the use of QR codes on mobile devices, guests were able to digitally try on the collection using an avatar they had created.

Quick Service Restaurant (QSR) Chain Wow! Momo has released a new F&B metaverse called Festemverse, a platform designed to celebrate India's many festivals throughout the year.

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Improve ARPU, Improve Financial Health of Telecom Sector, says Akhil Gupta, Bharti Enterprises

Over the next two years, 5G will have achieved deep penetration in the country. While 5G is expected to be transformational, it will be a very important tool in the quest for digitization which India is looking for.



BY JOSE JN

Voice&Data recently concluded the fourth edition of its 5G conference under the flagship brand Telecom Leadership Forum. The theme of this year's TLF 5G conference was "5G and the Future of Mobile Data".

Akhil Gupta, Vice Chairman, Bharti Enterprises, spoke at the inaugural session of the conference on the theme New Age, New Needs Demand New Approaches.

"I am really pleased that finally, 5G is here", said Mr. Gupta. He mentioned, a few years ago at Barcelona GSMA (MWC) conference years before the Covid pandemic, when the 5G technology was in its fledgling stages. "It seemed as if 5G not only arrived but was done and dusted. That was very clearly the mood at that time. But like every other new technology, an evolution of new technology like 5G does take time. And it's so good that at least in India, it's going to be a reality." 5G is indeed

It is the duty of all stakeholders that we ensure that the ARPU which is currently the lowest in the world moves to at least 300 rupees over the next one to one to one and a half years.

our new reality with two of the country's main operators having already announced their plans and Indian metros to see 5G in the coming month. Over the next two years, 5G will have achieved deep penetration in the country. While 5G is expected to be transformational, Mr Gupta said that, "it will be a very important tool in the quest for digitization which India is looking for."

5G Use Cases – An Industry Point of View

The telecom industry has clearly supply-led demand. As a result, there are some really good use cases that can bring huge revenue to telecom companies. Mr Gupta went on to list some of them.

- **Mobility:** The first and foremost use case is mobility as apps that require higher speeds appear, or as gaming becomes complicated. Metaverse too, though apprehensions exist if a higher version of 5G may be needed for it. Still, it seems possible to accommodate Metaverse on 5G platforms.
- **Fixed Wireless Broadband:** In a country like India, connecting everyone to fiber is physically and economically impossible. The only way to provide reasonably decent speeds is through 5G. "Not just for India, but for continents like Africa, where we operate in 14 countries. I think we are seriously looking at FWP," said Mr Gupta.
- **Private Networks:** "With the ability to slice the spectrum. I think private networks will become a big business case, in the enterprise segment. And it's my belief that instead of the private companies putting up the network themselves, they will be better served by the operators putting up the network for them," he said.
- **5G Handsets:** According to Mr Gupta, while 5G handsets account for just under 10% of all smartphones, what is heartening is that the current level of shipment of 5G has already reached 22%. And according to projections, within a year 40% of all smartphones shipped will be 5G. It is also expected that 5G handset availability will keep in tandem with the network rollouts.
- **Infrastructure:** The area of infrastructure is a major concern voiced Mr Gupta. "5G being on 3.5 gigahertz and thereafter on millimeter band, the propagation is so bad that it will require a huge number of microsites and small cells. And those have got to be necessarily connected on fiber, because there will be no space. For microwave. This is a very big task, because currently, only 30% of the towers are on fiber. It's a big challenge." Two factors play a vital role here. "Now, it is roughly estimated that within the next two years, we will need anywhere between one lakh to one 150,000 crores, for creating this new infrastructure, which will enable 5G networks. Fortunately, I can confirm on behalf of all the members of the digital infrastructure providers Association, we are absolutely ready and capable of putting in those investments. In fact, our members are very excited about the opportunity to put this investment. The other aspect in this quest is of course, the right of way, and availability of approvals. And I'm very hopeful that the recent steps taken by the government, the DoD in issuing the new RoW rules in consultation with the states and in particular extension of Gati Shakti and establishment of Gati Shakti portal should ease these," Mr Gupta said.
- **Financial Health of Sector:** Mr Gupta pointed out that while the telecom sector appears as if it is booming, especially with 5G rollouts, return on capital employed is at its lowest currently. "So I think it is the duty of all stakeholders that we ensure that the ARPU which is currently the lowest in the world moves to at least 300 rupees over the next one to one to one and a half years. If we are to look for a decent ROC in this industry. I think this piece will be vital. If we want to fulfil the dream of digitization of the country. I have no doubt that together all the stakeholders with the support of TRAI and DoT will overcome all these problems and put up some real robust 5G networks over the next two years, not just in the tier one tier two cities, but deep down into the country because all technological developments need the bedrock of a solid telecom network." 🌟

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The Public Cloud, Perfect for India: Danielle Royston, Founder CEO, TelcoDR, Acting CEO Totogi

Public Cloud can provide the scale India needs at a low price. Because India has one of the largest subscriber bases in the world with over 1 billion subscribers. Any software an Indian telco chooses has to be carrier-grade and has to be able to handle the big scale and provide rock star performance.



BY JOSE JN

Danielle Royston, the public cloud evangelist was a speaker at Voice&Data's recently held TLF 5G conference under the flagship Telecom Leadership Forum. Ms Royston spoke on the theme, Vision 2030: New Age, New Needs- Demand New Approaches.

On a visit to Mumbai to meet one of her largest clients, Vodafone India, Ms Royston, then CEO of a charging company first had the idea to move the telco industry to the public cloud. "As an outsider coming in, I noticed something interesting. Telcos around the world were not using public cloud technology from AWS, Azure, or

Google Cloud. Instead, all of the charging and reading software was being run client server out of Vodafone's own on-premise data centers, the way software used to be managed in the last century," she said. There had to be an easier way to do it, Ms Royston thought. "There's no way this is how telco deploys mission-critical software... To me, it was a no-brainer. The public cloud will come to telco."

Since her last pre-Covid visit to India, Danielle Royston built Cloud City in MWC 21, and delivered two keynotes at MWC Barcelona. She founded her company, Telco DR, and raised a billion dollars fund to invest in software for telco exclusively for the public cloud, by telco software

It's chips, servers, databases, software. And you can use all of the services of AWS, Azure and Google Cloud and pay as you grow. Using more one day and less than next. It's the world's best technology built and supported by the world's best technologists.



companies to pivot their products to the public cloud.

“Our industry is changing right before our eyes, the proof points of the public cloud are everywhere. For the first time at a Voice and Data conference, we’re talking about the public cloud at an event where AWS is a lead sponsor. Seven years ago, there were no AWS, Azure or Google cloud data centers in India. Now there are more than five regions and cities like Mumbai, Pune, Hyderabad, and right here in Delhi, representing billions of dollars of investment by the public cloud vendors.”

Telcos around the world are enthusiastically adopting the public cloud. Vodafone signed a strategic partnership with Google to move all of their on-premise analytical workloads to Google Cloud. In 2021, AT&T sold off its network cloud business to Microsoft, who will refactor it to run natively on Azure. And, the move by US company Dish to go all in on the public cloud, building their entire 5G network on AWS – news that rocked the industry.

Why is Public Cloud Perfect for India?

“The public cloud is perfect for two key reasons. One, It can provide the scale India needs at a low price. Because India has one of the largest subscriber bases in the world with over 1 billion subscribers. Any software an Indian telco chooses has to be carrier-grade and has to be able to handle the big scale and provide rock star performance. But India also has some of the lowest ARPU in the world

at about \$2 per user as compared to more than \$20 in the United States. This creates a unique challenge for telco operators. And the technology that can tackle both is public cloud,” said Ms Royston.

Royston illustrates with an idea of the scale of operation possible with the public cloud. “When Amazon retail business outgrew its expensive Oracle databases, AWS built a new cloud database, Dynamo DB which could scale to more than 100 million requests per second to handle massive online shopping days, like Prime Day or Black Friday. And AWS invested in building their own custom silicon, Intel chips weren’t up to snuff. So AWS created their own custom Graviton chip, which has a 40% price to performance improvement, and is faster.”

“The data centers of the hyper scalers are so much more than infrastructure,” she said. “It’s chips, servers, databases, software. And you can use all of the services of AWS, Azure and Google Cloud and pay as you grow. Using more one day and less than next. It’s the world’s best technology built and supported by the world’s best technologists.” The only catch is that in order to take advantage of this technology and save significantly, tools architected to be truly cloud-native need to be selected. If so, would then amount to it being 80% cheaper and in the public cloud – making it perfect for India. 🍀

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5G - redefining communications

5G is beyond more of the same. We are much beyond adding new spectrum. We will have hyper- connectivity, hyper compute, and hyper storage. We are creating multiple networks for multiple use cases



BY PRADEEP CHAKRABORTY

During the recently held TLF5G Conference by Voice&Data, held in New Delhi in September 2022, Shyam Prabhakar Mardikar, President, Group CTO, Mobility, Reliance Jio, presented on 5G and how it is redefining communications. Spectrum is just one add-on. 5G is going to change everything that we do. Smartphones are now an integral part of the human anatomy. More and more machines will use massive connectivity and compute. Industry 4.0 has become a key buzzword. Industry verticals across all sectors will need digital workflows, robotics, and automated control systems. We will have three Vs – voice, video, and virtuality. We will have connected devices, machines, and industries.

5G is beyond more of the same. We are much beyond adding new spectrum. We will have hyper-connectivity, hyper compute, and hyper storage. We are creating multiple networks for multiple use cases.

Next, programmability would be native to 5G. We will have 5G intelligent core, native security, and evolving intelligence. Elasticity of architecture is another major point. We will need to bring assets closer to the customer. We will have embedded compute, and device, user, and control. We will do self-learning through big data, and have hyper performance. The network will start adapting to the customer, to the use case, etc. India will need hyper performance in future. We need to unlearn to learn! We need to have disaggregation, open interfaces, virtualization, augmented intelligence, and modular deployment. India deserves network densification and scale. We need AI/ML to enhance performance. We will also have converging industries. Overlap in processes and skills will be there. We will share digital platforms. We will also have domain automation and AI. We need to understand and collaborate to go digital. 🙌

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5G Opportunities & Challenges for Telecom Sector

New technologies around AI, ML, cloud robotics, and block chain have been executed or implemented for operations in significant ways, in order to make sure that we are ready for that rollout, which will happen in future



BY PRADEEP CHAKRABORTY & JOSE JN

At the recently concluded TLF 5G conference conducted by Voice&Data, P Balaji, Chief Regulatory and Corporate Affairs Officer, Vodafone Idea spoke about the opportunities and challenges for the telecom sector.

“The good news is a lot of progress has happened in the last 12 to 18 months as far as the sector is concerned. I think we hit a low in 2019, when there was a lot of adverse judgment, and a lot of headwinds for the industry as a whole. Since then, the government has really done a stellar job in terms of coming up with the reform package in September 2021, which allowed for the industry to stabilize. They’ve also given a very clear signal about the industry structure. They want to make sure that there is fair operator play in the industry. They’re also

clear that they need to provide adequate time for the industry to repair itself because the last six or seven years have been brutal. All of that is very far-reaching, and one must absolutely congratulate the government for transformation policy,” he said.

Mr Balaji highlighted two points where the government played a vital role. The recent 5G auctions are a very clear reflection; the way they were conducted was to ensure a fair amount of spectrum available for all operators to buy what they needed. Secondly, the government ensured that the payment terms put in place allowed for investments to go into the network rather than ending up in huge upfront contributions to the government exchequer by way of paying for spectrum.

He also concurred with Mr Akhil Gupta of Bharti Enterprises, regarding the financial health of the telecom sector, the need for repair, and the necessity of having an adequate return on capital. "He's absolutely right when he says that the ARPU needs to be between 250 and 300 Rupees at a minimum in the next one to one-and-a-half years' time. I'm sure that with new technologies, new services, and everything else that's being rolled out, that would be a journey that would actually start soon."

The overall digitization plan that the government has, and that the industry has is tremendous, which is driving the need for a lot more investment into robust infrastructure, Mr Balaji said. There are 700,000 base stations installed across the country, all on 4G that over the next few years will start to migrate to 5G. For enhanced coverage, 500,000 more sites would be needed – which will be the microcells needed for 5G to be ubiquitous. "I'm not talking about just the telecom space, or the tower space, but also what AWS does, what the device manufacturers will put in and so on. But that's a significant amount of investment that needs to be made in this industry. Therefore, making sure that every layer of the ecosystem is having enough cash flow and returns is going to be a very critical part," he said.

Speaking from the parent company, Vodafone's experience, Mr Balaji said that a lot would be driven around industry 4.0 – on enterprise solutions, the opportunities of which are expected to be significant. "It requires a lot of collaboration and partnership which has to come in between the telecom players, the infrastructure providers, as well as the intent enterprises. In the space of automotive, manufacturing, we expect a lot of use cases to come up, whether it's in the space of smart factories, or in synchronized planning, smart supply chain networks or smart logistics operations – all of those will be significant drivers for uptake of 5G."

The second area, he said is healthcare. "It's very evident that with the need for primary and secondary health care to tier two and rural India, it's a good opportunity that you have these robust networks coming up and the speeds available to make sure that there is the adequate interplay between the healthcare providers and the telcos to provide services around health care area."

Smart cities are another area that will take off in a pretty big way, said Mr Balaji, "with smart lead management over the smart grids or metering system, whether it's smart traffic management systems, or traffic lights, or video surveillance, and so on. Or even for that

matter, waste management, I think there'll be significant opportunities that are going to come up in this dimension as well. Agriculture is another area that potentially 5G can make a transformational impact."

In order for the expected impact to occur, operators need to prepare the groundwork. "4G needs to go deeper and 5G needs to come in... But I think at the heart of the whole thing, the architecture of networks has been substantially improved in the last 24 to 36 months in preparation."

Taking Vodafone Idea's example, Mr Balaji said, "We've absolutely moved a lot of our applications to the cloud. New technologies around AI, ML, cloud robotics, and blockchain have been executed or implemented for operations in a significant way, in order to make sure that we are ready for that rollout, which will happen in the future. With the virtualization, and with all the cloud players, the ability to turn up capacity on the server side on the data side is, very easily done, as you start to see scale up in the enterprise spaces. So as a company Vodafone Idea, building on the experience of our parent company, as well as our own strong position in the enterprise space, is engaged with our enterprise partners. And looking at the use cases that can be put up in the early rollout of 5G into enterprises, to begin with. And over time, as the devices pick up, as the density of 5G devices and our customers pick up and the competitive intensity picks up that we will also go into more large-scale deployment in tier one cities, and then thereafter the tier two and tier three cities." Talking about government support, Mr Balaji also agreed that Gati Shakti is a great initiative with the state and local administrations collaborating with the center and the industry. "The fact that today we have 35 – 36% of towers fiberized needing to go up to about 80-85% is a real thing. The fact that the government has made E and V Bands available for microwave backhaul, as an interim step is again a very good step. In effect, from planning to execution is where the industry, the government, and the ecosystem players are. But at the core of it is to make sure that financially, things are sorted out sooner than later. 18 months is a good time rather than leaving it for three years. I am quite hopeful that with the maturity that's come into the sector, with the space that is there a structurally good number of operators, strong infrastructure players, and renewed interest in the sector in terms of investment, I think we're looking at a good opportunity in the future, of course, with a few headwinds, which I'm sure will disappear over time." 🍀

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The Public Cloud and Telcos – Reinventing Communications together: Sameer Vuyyuru, Amazon Web Services

The cloud does not exist without the connectivity that telcos provide. Telcos should benefit from revenue growth, better capital structure, and better profitability from the investments that they're making



BY JOSE JN

During the recently concluded Voice&Data Telecom Leadership Forum 5G conference, held in New Delhi on September 13, 2022, Sameer Vuyyuru, Head of WW Business Development for Communication Service Providers, Amazon Web Services (AWS), gave an industry keynote talk on public cloud.

From Telco to Tech-Co

Based on his experience, Mr Vuyyuru shared his observations, trends in telco, how cloud evolved, and

most importantly, how AWS and telcos can work together. “There’s a financial issue we have to solve, which is revenue growth, and capital for investment. That’s where we think we can play a role. There is cost reduction. One of the biggest asks of every board member, every C level, every VP at our telcos is, help us move from a Telco to a Tech-Co,” he said.

“My role, basically, is very simple. I serve the telco customers of Amazon Web Services worldwide. My job

If anyone comes and says we are truly cloud-native, ask them how big their container is. If it's more than a few kilobytes, it's not cloud-native.

is to go sit in front of the thought leaders at the telcos, shut up and listen. Then execute quickly on the needs of our telco customers. The big privilege of my role is I get to see across 1500 telcos worldwide, what's working, what's not working."

Getting into figures, Mr Vuyyuru said that when AWS deploys into an enterprise, the total connectivity value of that enterprise workload is between 5-10%. This is the value that telcos- for all their investment – are capturing from the industry today.

Public Cloud and sustainability

"Our role at AWS is to help telcos capture 20, 30, 40, up to 100%. 5G is happening. But one of the things to consider is, how are telcos going to address these B2B companies? Mr Vuyyuru went onto to emphasise that b2b businesses are already on the cloud. "Your customers are already on the cloud, already using hyper scaler tools. But the procurement process of connectivity, is abysmal, it takes months. Our enterprise customers want to click a button and get connected in seconds."

Why do we need to go through tenders for enterprises or governments? Why isn't the network as consumable as compute has been, as storage has been, as databases have been, as analytics have been? Why aren't we billing the network in one-cent increments to the enterprise customers?, he asked. "There is growing demand from private networks across the world, but that is being led by fixed wireless, and what we recently have observed is that sustainability issues are moving to the top of the agenda. Anecdotally, we were working with an operator in another continent. And they see their electricity bill, their energy bill skyrocket from 50 million to over 300 million in the space of six months. That's just not sustainable."

Cloud Proximity

What has the cloud done? The cloud has gotten close to the business, to the developers and to the end users. If you're watching Netflix or Prime Video on your phone, the end user is using the cloud, the developers are developing on the cloud, the businesses are running their applications on the cloud. "So the constant refrain from our enterprise customers to us is get me to the cloud as



We're frequently asked to do TCO on single use case, single workload, single piece of infrastructure deployments. But that misses the point of the cloud. The point of the cloud is that it's not single use case. It is not a single piece of infrastructure.

quickly, cheaply and programmatically as possible. I want to go on a portal and I want to buy connectivity. Security first. Faster, scalable, and more predictable. That is all cloud," he said.

AWS is now going to market together with telcos with industry-specific bundles. "We go to market now with telcos and I'll show you a few use cases where we bundle the connectivity in. We talked about the carbon intelligent network. I'll show you figures of how much savings in both energy cost, and carbon cost we are able to achieve by moving to the public cloud."

"We are starting to see those truly cloud-native companies start serving through a marketplace where you enter your user ID and password as the enterprise and you start consuming SAS as and when you need it. With that one cent increment that they're talking about."

Cloud Native Challenges

But to be cloud native has its challenges. The network equipment providers' (NEPS) modernization is very slow. Price is another litmus test. "If anyone comes and says we are truly cloud-native, ask them how big their container is. If it's more than a few kilobytes, it's not cloud-native," he said.

"We're frequently asked to do TCO on single use case, single workload, single piece of infrastructure deployments. But that misses the point of the cloud. The point of the cloud is that it's not single use case. It is not a single piece of infrastructure. It is every single use case you have running at different times or concurrently on the same piece of infrastructure. The other one is security control and privacy perceptions are not always understood. We've publicly announced that the National Security Agency of the United States is using AWS cloud. MI5, MI6 are on AWS public cloud. They know what they're doing. So I think there's a little bit of fear of the unknown about the public cloud, but we have gone through the rigmarole of really critical industries, National, Defense Industries, national security industries, moving to the public cloud. And

we've worked with many telcos to do the same. It's a question of understanding what the actual requirements are. Those are the challenges."

So where is AWS investing? "Our number one investment is going to market together with telcos," Mr Vuyyuru said, "The cloud does not really exist without the connectivity that telcos provide. Telcos should benefit from revenue growth, from better capital structure, and better profitability from the investments that they're making. Everything that we do is driven by how we drive revenue for the telcos because if they win, we win. If they are hampered in any way, we do not grow."

"We really double down on AI/ ML capabilities in the telco domain. The kind of data that we're bringing to bear, is very non-traditional. The BSS OSS, enterprise IT innovation, working with visionaries and even the established companies who are starting to really come on board. We believe, fundamentally, that the networks should run and run best on a public cloud, specifically AWS. We are building specific services and specific infrastructure. When we talk about the capital investment needed to build a new network, we invest on your behalf. The question I'd like as take away is, why do you need to invest a single dollar in CAPEX? I know that's a bit of an extreme, but I'm stretching a point to make a point. Why not experiment on the public cloud today? See how it performs. Challenge us. And let us invest. That's our whole business model."

Revenue Growth and Public Cloud

On the revenue growth side, AWS has publicly announced more than \$3 billion worth of investment in partnering with telcos across the board. When talking about the different things AWS has done together with telcos worldwide, Mr Vuyyuru said, "Let's start with the consumer, and what you can do today. A lot of telcos today are monetizing Amazon subscriptions. It is built through the telco. It is an ARPU uplift that you can get today. AWS has become the third largest advertising company in the world after the unnamed ones, Google and META, and growing really fast. And I'll tell you why that's important to the telco

Let's start with the consumer, and what you can do today. A lot of telcos today are monetizing Amazon subscriptions. It is built through the telco. It is an ARPU uplift that you can get today. AWS has become the third largest advertising company in the world after the unnamed ones, Google and META, and growing really fast.



industry. Unified Communications as a service. This has historically been an over-the-top quality of service issue that we believe we've solved with a few telcos, gaming's been talked about on the b2b side; transport services. If you want to expand into a region where you do not have a pop. You create a virtual pop on AWS. You can do it in five minutes. Instead of going to the national carrier in another country, negotiating terms with that business team, and taking six months to do that, Take six minutes, and create a virtual pop. India is the largest contact center market in the world. You should be all over that, partnering with us. And addressing that with an AI-enabled as a service contact center. IoT API platforms, so on and so forth."

When talking about Edge, Mr Vuyyuru said that AWS was heavily investing in it. "We invest for the future, we invest in it with a decade longer or higher time zone. And we're really starting to see a lot of traction in CD ends. In TV modernization, as they move from historical cram-based transmission to over-the-top transmission, smart home platforms, where we are vendor agnostic, our platforms run our competitor's devices as well. So you're not locked into a single ecosystem." He said that Edge, B2B, and private networks rightfully get a lot of press being growth

vectors. "We're starting to see SD-WAN as a service. Getting rid of all of the boxes out there, all the head ends, all of the CPE's and just making it a virtual connection. And the computer vision side is absolutely skyrocketing for us. Wireless-enabled cameras, that you can sprinkle around any city any venue, and they auto provision onto your network and you start billing immediately. These are just a few samples of what we're able to do. And have been doing with telcos worldwide, and would love to do here in India as well," he said. "The underappreciated part of the p&l in a telco when you do the analysis of where the costs are, 30 to 40% of the costs are actually in customer acquisition, retention service. Churn is a big cost at the end of the day. How you actually, intelligently use data to better your cost of customer acquisition and increase customer retention, is low-hanging fruit today. We've been working with companies such as telehealth, T Mobile, and many others that we will announce in the coming months to fundamentally transform that connected customer journey. But that requires data. You have incredible data on your consumers. We've got to figure out how to use it." 🍌

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5G-Indigenous Networks and Ecosystems

The government of India has taken multiple initiatives. Now, we are manufacturing mobile phones in India. We need to bridge the gap between imports and exports. We need to bring atmanirbharta. We need to develop our own R&D. ISM has come in, and now, there are semiconductor fabs and semiconductor packaging



BY PRADEEP CHAKRABORTY

Indigenous 5G networks and ecosystems, were the topic of a panel discussion at the recently held TLF 5G Conference of Voice&Data. PK Roy, the former editor, Dataquest and Voice&Data, was the moderator.

What does atmanirbharta mean for 5G? Y.G.S.C. Kishore Babu, DDG (S.R.I), DoT, noted that companies have been contributing to building the necessary competencies.

Most of them are from global companies. Competencies built into the system are coming from everywhere. We can develop systems, and have technology ownership. We can also develop locally-relevant use cases.

Trusted source is something we are looking at among the available ecosystem. We also need to reduce the dependency on electronic components. In telecom, it is

Most talent is driven by India. We were given the task in 2020 to develop 4G. We have developed indigenous 4G and 5G NSA, along with Tejas. BSNL will launch 5G with 5G NSA. The time for India is now. Our 4G does not depend on any hardware.



probably not possible for everyone to make 100% in India. We need to have the design ownership. That can help us in the value chain. We are already having competencies in design. India can be a value-added partner.

Dr. Rajkumar Upadhyay, ED & Chairman, C-DoT, added atmanirbharta is for all the sectors. Telecom has two aspects – security and economic perspective. Security, lot of software is being developed. Many countries have banned certain vendors owing to security. From the economic side, we need to look at where is it the cheapest available. Most talent is driven by India. We were given the task in 2020 to develop 4G. We have developed indigenous 4G and 5G NSA, along with Tejas. BSNL will launch 5G with 5G NSA. The time for India is now. Our 4G does not depend on any hardware.

The government of India has taken multiple initiatives. Now, we are manufacturing mobile phones in India. We need to bridge the gap between imports and exports. We need to bring atmanirbharta. We need to develop our own R&D. ISM has come in, and now, there are semiconductor fabs and semiconductor packaging. There

is a major opportunity for India. We will close the gap. The government has come out with the PLIs, starting with telecom manufacturing. Chip manufacturing is one part. India has lot of design talent. Once you are declared a trusted source, anybody can buy from you. Rajesh Tuli, MD, Coral Telecom, said this is the right time for India to do it! The ecosystem is very conducive. Ecosystems, such as MSMEs, are being supported. Grants are being given to the private sector. Earlier, it was meant for the public sector. We also need to have a market for the product that we develop. Regarding products, we have now designed domestic chipsets. The IPR belongs to us. My atmanirbharta depends on my privacy. Customers want an end-to-end solution. We need to develop the ecosystem further and create consortiums. The private networks will be one tool to promote local designs. We request that the spectrum for setting up private networks should be for domestically-designed components. We will have to take baby steps. There are concerns about silicon. We need to focus on the software being built around the chip. 🌐

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5G Rollout

There are many use cases, which are non-ICT sectors, but we are putting them a layer of ICT and we call them smart. The moment you use the terminology Smart City, smart citizen, smart mobility, smart energy, what you're doing is actually you're bringing a non-ICT sector into an ICT domain. And that's why 5G Technology has a lot of potential in itself



BY PRADEEP CHAKRABORTY

At TLF 5G Conference by Voice&Data, held in September 2022, a fireside chat session on 5G Rollout was held between Dinesh Chand Sharma, Director, European Project on Standards and Ashwani Khillan, COO & CTO, APAC, American Tower Corp. Some excerpts.

DS Sharma, who moderated the session said, it is no more the time to talk about technologies. We need to

roll out and transform everything. Everything will get connected. Broadband demand has gone up, and the role of latency has really gone up!

We have URLLC and mMTC. We will have a layered architecture. We are having smart cities, mobility, energy, etc. 5G has a lot of potential. 4G will continue to co-exist with 5G for a number of years. The government of India has added a lot of options in place to ensure new

5G will connect everything whether it is a machine, object, or consumer. With massive machine type of communications.

technology gets rolled out. It is also focusing on 6G. There is the existing infrastructure that was rolled out. Rural infrastructure has connectivity. Affordability is the most important factor.

Sharma said, 5G will connect everything whether it is a machine, object, or consumer. With massive machine type of communications. There are predictions that today if we have two devices with us, from the perspective of machine to machine or IoT, these devices will become 10 by 2025. And even this new architecture, which is a network layer, layered architecture. There are many use cases, which are non-ICT sectors, but we are putting them a layer of ICT and we call them smart. The moment you use the terminology Smart City, smart citizen, smart mobility, smart energy, what you're doing is actually you're bringing a non-ICT sector into an ICT domain. And that's why 5G Technology has a lot of potential in itself. But of course, any technology when introduced, it brings its own challenges and that's what I think we're going to debate and discuss from one of the major infrastructure providers in the country. There is also a kind of open question people do ask, why all these use cases cannot be fulfilled by 4G? Yes, it does. But look at the potential of explosion in terms of data. Social networking, for example, the kind of data we are generating and accumulating we call it Big Data analytics. While the use cases can be taken care of by the existing 4G technologies with more spectrum has been auctioned in recent times for 4G as well. So 4G will continue to coexist with 5G and any new technology that comes it gets introduced in a phased manner it can not be rolled out just by the flick of time and with technology like 5G, it will take its own time. So, both technologies will coexist for, maybe five to six years, but yes, the kind of support the Government of India has put in place while introducing or while auctioning the spectrum and on top of it many more initiatives, ease of doing business, amending the IT Act, all these are just to ensure that this new technology is rolled out as quick as possible, and the government can start focusing on the next technology research and innovation, we call it 6G. But of course, before 6G, 5G Beyond will happen.

How has the existing infrastructure supported demand? Ashwani Khillan, COO & CTO, APAC American Tower Corp., said that we need to look at paradigms changing between 4G and 5G. Two clear paradigms are spectrum band, and we need more densification. We have more applications coming in. As we have more apps, we need to touch upon latency. That brings in the third paradigm: the infrastructure needs to be as close to the customer. Form factors are also changing.

Next, we need to keep scale in mind! With the move to 3300MHz, we will probably need to add 75% more PoPs. We need to have 6,000-7,000 towers additionally. 3.3GHz band can provide indoor and outdoor coverage. We need to add nearly half a million more PoPs, especially over the next 4-5 years. It is a big challenge for us.

Sharma said there will be 1 million 5G devices, against 60,000 4G devices in the same area. We will see 5G roll out in 13 cities initially. Khillan said all challenges have been accepted and put in place. New challenges are being put before us. There can be slow proliferation for any service. 4G started getting rolled out in 2014-15. 5G will go through a similar route.

DoT carried out a study regarding the massive rollout of 5G. Now, states have been asked to carry out mapping exercises. Gujarat and UP have almost completed this. How will such steps help? Khillan said the need is to increase the PoPs. They also need to be fiberized as soon as possible. We also used to run de-aggregation over edge data centers. We need to further improve that. We will need PoP every 200m in dense, urban areas. Streetlights may be a good example. They should all get fiberized, and be grid connected. We need to keep them light, with the infrastructure. All the stakeholders now need to get their acts together. Sharma said we are going to have new infrastructure. Government mapping will also be used. Regarding QoS, Khillan said it is a common problem. With a large population, we need to work on QoS. It is difficult to satisfy all consumers. QoS is a continuous improvement in the process. 🍌

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After 5G Auctions, what next?

After the auctions, what next? This is a question frequently asked after the successful completion of India's 5G auctions. During the recently held TLF 5G conference, a fireside chat explored that, and other questions in detail. The session moderator was Pradeep Gupta, Cybermedia Chairman. The panelists were Sameer Vuyyuru, Head of WW Business Development for Communication Service Providers, Amazon Web Services (AWS), Rashim Kapoor, Executive VP & CTO Networks, Bharti Airtel and Lt Gen Dr SP Kocchar, DG- COAI



BY JOSE JN

Cybermedia Chairman, Pradeep Gupta started off the conversation by mentioning the unprecedented collaboration between the government and the industry but noted there were still challenges.

Lt Gen SP Kocchar, DG COAI said, “The cooperation between industry and government has been unprecedented and very fast-paced. It is certain to continue in the future.” The areas where a lot more work has to be done can be put in bullet points. The first area is infrastructure. About 65% to 70% of our towers are

not fiberised as of now. With 5G coming in fiberisation is a must. There is a lot of effort by the government to bring in Essential Laws and regulations. For example, the RoW portal, the Gati Shakti portal is of great help. We as an industry are also trying to put in our best to see that fiberisation happens.

Pradeep further noted, RoW has been around now for more than a decade. Government has time and again said, if there is any problem come to us, but still, practically it doesn't work. What can specifically be done now?

The cooperation between industry and government has been unprecedented and very fast-paced. It is certain to continue in the future.

Lt Gen Kocchar continued, “Practically it doesn’t work because one is trying to solve a physical problem by physical means, ie, by the movement of files. This is the first time that we are trying to solve a physical problem with technology. The power of a baboo is to stop a file. With technology that will not happen. That is what we are seeing in the recent drive that the government has undertaken. The cut in the processing time has come down to 21 days. This is the power of technology, to solve non-technical problems. So fiberisation of Towers, as well as RoW related or clearance-related issues. I would put that under ease of doing business. There are many factors, which are regulatory, policy, operational, and even strategic. The recent amendment of the Telegraph Act is a step in that direction. The government has taken a realistic view that outdated rules, regulations and laws have to go. In conjunction and in consultation with the industry. And the third one is cost optimization, which has always been a problem, and revenue generation. That is where a lot of collaboration is happening.”

Rashim Kapoor of Airtel, spoke about Airtel’s readiness and what is happening behind the scenes. “Our backend infrastructure is already with 5G, our core is ready, transport is ready. We have made our data center’s

infrastructure ready. We have also demonstrated lots of use cases during our trials in Hyderabad. During our trials in the key cities, we have demonstrated use cases both on the enterprise side and on the retail side, both on the high-speed broadband and on the enterprise side. As time goes by, we’ll be basically rushing our rollout starting from the metros to the other places. And we’ll be able to leverage our existing fiber assets to give the best customer experience”.

When asked if fiberisation of towers was one of the challenges faced by Airtel, Rashim said, “Fiberisation of towers is good to have, but now there are other options available. E-band has been a very welcome opportunity. E-band will complement fiber. It will give speed as high as one Gbps as the last mile speed, but challenges on fiber remain. Our endeavor is to fiberise our sites as much as possible. But as I mentioned, both RoW issues, the cost of RoW and time to fiberise, those issues still remain”.

Pradeep noted, A big debate that has been going on is, who is going to pay for all these investments that are being made by the telcos in the infrastructure? Is it going to be retail? Is it going to be business?



There is a large belief that the 5G deployments will be enterprise-driven. We share that belief. But I don't think we should ever prognosticate as to which industry vertical is going to be the first one to go.

Sameer Vuyyuru of AWS said, "The cost aspect is going to depend on the revenue generation aspects. Those are tied together. When you can basically align the cost of implementation with the revenue generation and not have that two-to-three-year lag that has historically happened in the industry, that question kind of goes away. The consumer, whether it be an enterprise, or a person, is the one who's actually funding the service that he or she or the corporation needs. So we're a big proponent of experimenting in multiple industries with multiple use cases, and figuring out which of those historically generate revenue, and aligning the investment to that".

Sameer added, "There is a large belief that the 5G deployments will be enterprise-driven. We share that belief. But I don't think we should ever prognosticate as to which industry vertical is going to be the first one to go"

On the broader picture, Enterprise would be perhaps 20%, and 80%, would be coming from retail the moderator noted. Sameer elaborated, "I think there is about a five-year ramp for the enterprise side to actually start becoming profitable and meaningful. Until then the consumer is still going to be the prime driver of adoption" our role as collaborators in the industry is how do you shorten that adoption cycle for the enterprise? Because right now, it's way too long.

Posing the same question to Lt. Gen. Kocchar, the moderator said, "It has always been difficult to get more money out of the consumer. Especially with past experience where competitors have come out with cheaper services and so on, ARPU is something that needs to go up. what do you think can be the methodology for that?"

Kochhar said, "Over a longer period, it will finally be the consumer who will be paying, but in the shorter period, I don't think with the Indian sensitivities' that consumer is going to pay extra for just speed and latency. Initially, revenues will start ramping up on the enterprise side and the indirect effect will be on the consumer. The services which will be rolled out by the

enterprise will be consumed by the consumer only if he/ she subscribes to 5G services and that is how the cycle will proceed. Revenue coming from enterprise should be around 70 to 80% initially, but over a period of maybe four to five years, it'll reverse. It will go back to the consumer but that is because the driving force will be enterprise adaptation.

On the question of what sort of technology solutions is Airtel working on to ensure those revenue streams can be captured, Rashim said, "Mobile broadband will continue to be one of the major use cases and because the speed will increase, the consumption will also increase. We have seen across the globe consumption increasing by 2x to 3x. That should be one of the revenue drivers. Fixed wireless access would be a new service that would get launched wherever fiber visibility is not there. Gaming requires very low latency and some guarantee on QS which can be one of the revenue opportunities on the retail side. On the Enterprise, I would say whenever the ultra low-density use cases become real, there will be many more use cases, but initially, data centers should be one big use case, then private 5G With a complement of slicing, and renting to the enterprise customer would be one of the use cases.

On what industry or enterprise could be the driving factor, Sameer said he gets asked this question all the time by most of the telco executives. Which industry should I invest in? My answer has always been, we don't know. We've seen about 280 different industries being served. Pick the most flexible platform, and experiment in all 280. It costs nothing to experiment.

Sameer went on to share examples of other countries where security, safety, and education are some of use cases, he said, "I'll give you three use cases that we're starting to see really ramp at a broad level. The first one is the computer vision use cases. Really looking at a vertically integrated stack that uses intelligence to pursue where the decisioning on the computer vision takes place. So its security cameras. The telcos, in my opinion, should own that market, the wireless security aspect. The second one we're seeing in the United States, primarily, but also in Europe, is the state local



education departments where the private networks are being asked for and being deployed. And the third one is really public safety.”

Kocchar shared additional views on what could be the verticals, and whether m2m, and industry 4.0 is becoming a reality. “Let me start by making an assertion, he said, nobody in the world knows which is the killer app today, everybody is guessing. He continued, wherever we require artificial intelligence insertions, wherever we require AR VR, augmented reality; those are the areas which we need to focus on. If we are going to look at 5G, wearing the spectacles of 4G, we will go wrong. This is what is happening today. We haven’t yet started looking at 5G as 5G. Whenever we discuss, we talk of healthcare, we talk of education – that can be done with even 4G. So what is so special about 5G? That is where sensors come in. Computer vision comes in, processing comes in, which will not only change the lives of people but will also raise the level of employment to a different scale. Those are the things that affect people. And in a democracy, anything that affects the people is an application. I think anything which touches the lives of people in India will be the first application to work, which includes governance.

On the question of Open RAN, Rashim said, Airtel has a big focus on Open RAN. We started the journey early.

Even with our 4G networks, we invested a lot of time and effort into that. With 5G, we have started doing some testing and even live deployment in some of the clusters. The main intent is to check the performance and the interop with the 4G network, which still remains a bit of a challenge. The second challenge to solve on ORAN is the cost of ORAN and with the new chipsets which are coming up, both from Intel and Qualcomm and building ORANS on those particular chips would definitely reduce the cost.

The last question was on the public cloud and directed to Sameer. What is the reality in India, in terms of the adaption of the public cloud? Sameer said, “specifically for the telco industry, we have engagements with all four and more of the operators here in India. There are multiple aspects to this. There is the application layer, and the data layer, but my sense is you’re asking about the network itself. In the network, it is very early days. What I would encourage the community here to think about is, experiment with us. It costs close to zero and the upside is massive. Let’s experiment and see how it works. Lt Gen Kocchar concurred, “Cost of experimentation is the reason why it will happen. Cost optimization and increasing efficiencies are what telcos want.” 🍀

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Skilling for the 5G Economy

We need to look at the future needs of engineering managers in future. We need to do curriculum reviews all the time. We need to create a future workforce and have a competitive advantage. Startups will have a big role to play. We want to enhance our impact. We would like to work with the industry for future success



BY PRADEEP CHAKRABORTY

Skilling for the 5G economy was one of the key sessions of the recently held Voice & Data TLF5G Conference last month in New Delhi. Sukanta De, Sdela Consulting, was the moderator of the session. He said skilling for 5G is very important. The indigenous test bed for 5G was done at IIT Madras. 5G will be driving all the elements of Industry 4.0. India has adopted all the elements. 5G will be the key driver.

How can the educational value chain be more inclusive? India has many languages. Lav Bhardwaj, Senior Consultant, NCVET, represented NCVET Chairman and said that education has been incorporating the future skilling areas. The national skills qualification framework has been looking at future skills. We have 250+ courses featuring IoT, AI, Industry 4.0 and 5.0, etc. We are now

using technologies heavily across all sectors. We are also incorporating technologies. The government is seized of these problems.

We now need to reduce the skills gap. We are starting from school education. We are working with AICTE on several technology areas. NCVET is a new-age educator. We can have blended learning, and mix of all for the people.

Dr. Arvind Bali, CEO, of TSSC, said that as far as 5G skilling is concerned, most companies are well structured. From the government side, there was a lot of participation. We prepared all the qualifications. 5G will also be a use case for various sectors. Other technologies are also going to work on 5G. All of our qualification packs

We are checking how we can interface with the industry, DRDO, Navy, and Army. We have challenges, such as interfacing with the industry, and also attracting students.



have got a lot of 5G-related stuff. We are well equipped. We are also going to set up 10 Centers of Excellence this financial year.

Last 5-6 years, the private sector has to learn from what has been happening in the government sector. The government has done a lot of work. The responsibility now comes on the private sector. Most of the time, you are skilling on the job. At TSSC, we are trying to bridge the gap between the industry and academia. We are well equipped to provide any kind of skilling.

Prof. Rangan Banerjee, Director, IIT Delhi, added the 5G testbed was initially funded by the Ministry of Telecom. We worked on all aspects of software and hardware with IIT Madras. We have been looking at building up the research capability. We have looked at standards, security, etc. It is now available across the country. At IIT Delhi, we have Bharti School of Telecom. Faculty works on various aspects of telecom.

We are also looking at multiple use cases. We are looking at smart sensors for energy, etc. We are looking at gaming and entertainment, and imaging and healthcare. We have a vision and articulation for looking

at individual projects. We are checking how we can interface with the industry, DRDO, Navy, and Army. We have challenges, such as interfacing with the industry, and also attracting students.

We need to look at the future needs of engineering managers in future. We need to do curriculum reviews all the time. We need to create a future workforce and have a competitive advantage. Startups will have a big role to play. We want to enhance our impact. We would like to work with the industry for future success.

Dr. NK Goyal, President, TEMA, noted that every Indian has the right to connect. We always have a dichotomy. India has given money for test labs. DoT is now looking for test labs. When it comes to research projects, India is capable of doing any kind of research. We want the access to the market. We have wonderful plans for skilling. We need to proliferate this to the education systems. We have been pushed into the digital era due to Covid-19 and government policies. Right to connect is a campaign to connect with the networks. Now, the government also wants to implement some digital fees. 🙌

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The Scope of Satellite, Challenges & Way Forward

There is a lot of long talk about auctioning off spectrum etc. If you start the industry with auctions, I don't think the space industry is going to ever power up in this country



BY PRADEEP CHAKRABORTY

During the recently held TLF 5G Conference by Voice and Data that was held in New Delhi last month, Rahul Vatts, Director of OneWeb in India and Chief Regulatory Officer, Airtel gave a keynote session on the scope of Satellite, Satellite communication and the latest developments in the Space sector.

Rahul mentioned that the world is still unrepresented when it comes to satellites. "I think the biggest problem today is that nearly 52% of the world still does not have internet access. That is one big indicator. In spite of 20-25 years of 2G, 3G, 4G, and even 5G. The fact is the world is still unrepresented. And out of that nearly 20% of the fixed broadband is still at a speed below 10 Mbps,

We are a beam-centric configuration, we are basically ready for 5G type features – a next generation satellite. We are going to have data rates greater than 100 Mbps per user. We are going to support mobility even at speeds greater than 500 kilometers per hour.

so when we talk about 5G, the fact is even ubiquitous coverage of 4G is not available. Even when available, speeds are quite slow. Also, a large part of businesses are now going on the cloud. So we are moving towards enterprises, and enterprises are working on the cloud. So if you are on the cloud, and are going to access your data, you require much more stable broadband connectivity. Everybody talks about industry 4.0, but that is not going to happen if we don't have connectivity ubiquitous across the world.

LEO – Low Earth Orbit basically means that you are trying to place a satellite at around 1200 kilometers above Earth's surface as against a normal geostationary satellite, which used to be around 36,000 kilometers. The advantage is very low latency and higher speeds. LEO satellites are then able to cover the entire globe with a certain number and at very low latency and a very high speed. So wherever 4G or 5G are not reaching, you will always have a satellite reaching completely. It's also a good solution for rural connectivity gaps. Even a country like the US has got huge coverage gaps.

What are these satellites going to do? Basically, there are three basic use cases. One is to go down to the public sector agencies, which largely covered the manufacturing facilities and healthcare facilities, it can cover the traditional buyers, which are maritime and air and then of course, the public utility energy companies,

which are spread across large swaths of land. So, these are the basic areas that are going to get connected.

Rahul talked about OneWeb. He said OneWeb is already built as LTE network. "We are a beam-centric configuration, we are basically ready for 5G type features – a next generation satellite. We are going to have data rates greater than 100 Mbps per user. We are going to support mobility even at speeds greater than 500 kilometers per hour. That is the amount of latency and the stability you will get in the overall context. Of course we come with the advanced pricing features. And we can also differentiate the quality of services each individual user or a b2b enterprise is going to get".

OneWeb is a company which has been promoted by Bharti group. Currently our biggest partner is the UK Government. The Eutelsat merger once it happens hopefully around the first quarter of next year, we are going to have the French government becoming a part of the venture, Bharti being the largest shareholder out of the entire lot.

We are committed in India to covering every single square inch from day one. Whenever we power up, we're going to cover the entire country. We are working with our distribution partner Hughes to split the services in the country. As far as use cases, strategically we are already in touch with the Ministry of Defense for a large





part of our usage. We will also work along with operators for connecting the backhaul.

We have tried to work with the government of India and NSIL in actually sending some of the OneWeb satellites through NSIL. And the first lot of those satellites should hopefully power up into space starting mid-October 2022.

The Prime Minister has announced a new spacecom policy and we are all hoping for major reforms to now get a leg up. The entire ecosystem is now getting ready for something big in the space sector.

Satellites are covering large part of societal applications, we still have satellite coverage for phones in some Defence areas. Of course television, the DTH is part of a satellite journey. So some part of satellite is already being used. Now we have to move to more strategic areas, applications that require low latency like AR VR.

Clearly, we are a very minuscule part of the world economy. India's share in global space economy is just 2.6%. We have got a large opportunity available in space and that is the pie we are looking at. That is why the rush of so many start-ups in the entire space ecosystem. Recently at a conference in Bangalore, surprisingly, there were more than 30 to 40 start-ups all powered up to daily support the space ecosystem.

On the policy front, the NDCP was quite visionary it already visualized that satellite is going to be a way

forward, in addition to the terrestrial. And so it is one of the paths which has been clearly recognized, particularly considering the needs. We may have a need for backhaul, for disaster, for defense needs, but what's important to note is that it is a nascent industry that requires support to be able to grow.

There is a lot of long talk about auctioning off spectrum etc. If you start the industry with auctions, I don't think the space industry is going to ever power up in this country.

As far as challenges in the regulatory space, We require spectrum to grow, we also require that there should be complete privatization of how the satellites work. A satellite comes with a common set of the spectrum and that spectrum is common throughout the world. So you cannot have an India-specific charter for a satellite system, because the same satellite system is supporting the entire world. Much larger coordination is required. If we require the satellite space to grow, we can get a lot of opportunities in education in covering large areas, which are still unconnected.

In terms of the way forward, I think the big item out here is to get 100% FDI in the sector. It allows a lot of investments to flow in the sector. And of course, promotes the ease of doing business. Currently, the procedures for investing in the country, getting approvals, for launching these systems, are multiple processes and quite tedious. I think that needs to basically change. 🙌

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The Role of Satellite in 5G

Startup industry can leverage space communications for deep in-land solutions, enabled by 5G, IoT drones, etc. We are awaiting a space policy. We need to consider 100% FDI to attract investment and technology transfer



BY PRADEEP CHAKRABORTY

The final session of the recently held TLF 5G Conference by Voice&Data was on the role of satellite and 5G. Minu Sirsalewala, Executive Editor (Special Projects), CyberMedia, was the moderator.

Rahul Vatts, CRO, Airtel India, and Director, OneWeb, said 52% of the world still has no Internet access. 20% of fixed broadband connections are <10Mbps. LEO is revolutionizing the communications market. LEO satellites provide high-speed Internet where traditional ground infrastructure is hard to reach. Retail, commercial, and government users can have LEOs promote business digitalization and IoT adoption.

OneWeb is already 5G-band compatible. It has a beam-centric design at mmW (Ka-/Ku-bands) for improved spectral efficiency. OneWeb has a distribution agreement with Hughes. We have a launch arrangement with NSIL.

The model is to partner with telcos for backhaul, remote coverage, IoT, and Industry 4.0, respectively.

The Indian space economy is likely to reach \$12.8 billion by 2025, at CAGR of 6%. Emerging areas include high-speed/low-latency norms, space exploration, navigation solutions, etc. Startup industry can leverage space communications for deep in-land solutions, enabled by 5G, IoT drones, etc. We are awaiting a space policy. We need to consider 100% FDI to attract investment and technology transfer. We need to prioritize spectrum allocation and also reserve 28GHz.

Space has a lot of potential for India. Satellite comes with its own set of challenges. We now need to miniaturize the satellites. OneWeb satellite is hardly 13kg. We have 40 satellites launching at one time. A total of 650 satellites are covering the globe. We need to get the spectrum.

Satellites today provide ubiquitous coverage worldwide. We have been arguing that 28GHz should be shared. We also need to have a single-window clearance. We need to be clear about how the satellite will communicate.



India has to endorse the same spectrum given to the world. India has not yet visualized an operator that has 500 satellites. There is no separate gateway license that is available. InSpace is the right step in the direction. Once you have all this in place, you need to build your entire network. Today, we need multiple approvals before we can start a service. This has to change!

We already have a 5G satellite-ready network. Rel-18 is going to come out soon. Apple launched a new device that allows satellite connectivity. OneWeb will have 2nd generation models prepared by 2026, which will also be 6G ready. Pricing depends on the apps used. OneWeb has tied up with AT&T for coverage in USA. Government has the priority to connect the country. Our market is backhaul, ships, mines, etc.

Lt. Gen. AK Bhatt (Retd), Director General, Indian Space Association (ISPA), said what's available for the world, has to be harmonized by India. India cannot have its own policy. Satellites today provide ubiquitous

coverage worldwide. We have been arguing that 28GHz should be shared. We also need to have a single-window clearance. We need to be clear about how the satellite will communicate.

Satellites have actually come to light since the last decade. It used to be at 36,000km, but that had a challenge. Now, they have come down to 500km and 2,000km. That has lot of effect on latency. There are disruptive technologies that have come in. We can make use of the USO funds to connect the unconnected parts of India. Regarding startups in the space sector, it is the most exciting domain. There will be 36 satellite constellations by end of next year. Pixxel will be launching this next year. They are available for mining, disaster management, etc. Another player from IIT is looking at debris management. They launched on June 30th with the very first solution. We will also have rockets made with 3D technology very soon. 🚀

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Telecom Industry Analysis- Post 5G

13 cities across India have been identified for primary and secondary phase of 5G rollout. Allocation of spectrum and conclusion of trials have been completed by all three major providers. Initial commercial launch is expected, starting Oct. 2022. Between 2023- 2040, 5G technologies will contribute approximately \$450 billion (0.6% of GDP by 2040)



BY PRADEEP CHAKRABORTY

Presenting the opening keynote on the telecom industry analysis, at the recently held TLF %G conference by Voice&Data, Peeyush Vaish, Partner & Telecom Sector Leader, Deloitte India, said the government has been very supportive of the reforms. 5G offers vastly improved network characteristics over previous generations. India will start with the Rel-16 version. Rel-16 made 5G more suitable for deployments in industrial environments, enabling

the potential for private captive networks. Some of the countries where 5G has been rolled out such as Korea and the USA had to invest lot more in 5G.

487 MNOs have invested in 5G so far. 99 MNOs in 50 countries have invested in 5G. 187 MNOs have launched 5G mobile services. 20 operators in 16 countries have launched 5G standalone services. There has been 155% increase of commercial devices in a year (2020 vs. 2021).

Roughly 50% of global subscriptions are going to be around 5G, with about 40% in India. Revenues from B2B segment are going to be far more than what previous generations provided.



Roughly 50% of global subscriptions are going to be around 5G, with about 40% in India. Revenues from B2B segment are going to be far more than what previous generations provided.

We are now fostering innovation with 5G. Countries such as Germany, Finland, UK, USA, Sweden, South Korea, Hong Kong, Malaysia, Australia, Japan, etc., have earmarked spectrum for private networks in the mid-band (3.3-3.67GHz) and 28GHz mmWave band.

13 cities across India have been identified for primary and secondary phase of 5G rollout. Allocation of spectrum and conclusion of trials have been completed by all three major providers. Initial commercial launch is expected, starting Oct. 2022. Between 2023-2040, 5G technologies will contribute approximately

\$450 billion (0.6% of GDP by 2040).

Although current accelerated 5G development investments in mature markets, it will not be sustainable in the long-term. 5G network infrastructure spend will peak by 2023/24. Infrastructure investment in India is expected to be staggered. There will be nearly 7.5 billion smartphones by 2025 globally, with 1.2 billion in India. Mobile global average usage per smartphone will reach 11.4GB. 5G subscriptions are forecast to reach 4.4 billion globally by 2027, and 5G subscription uptake will be faster than 4G. The Indian MNO will generate \$17 billion in incremental revenue. In 2022, 3GPP Rel-17 will roll out. Mass rollout of 5G standalone core network will also take place in Europe. 🍀

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Enterprise & Private Networks

The economic impact is going to be huge. We have embraced technology. The current consumption of data is huge. A lot is going to be offered to enterprises. Healthcare, education, and agriculture will see the massive impact of 5G



BY PRADEEP CHAKRABORTY

During TLF 5G held on September 13, 2022, there was a session on the role 5G will play for enterprises and private networks. The moot question was, what is going to be the impact of 5G? Shubhendu Parth, former editor, Dataquest and Voice&Data, was the moderator.

Tilak Raj Dua, Director General, DIPA, said we need to look at NTPC 2018, where we need to take a holistic view. We look at Industry 4.0 and see whether the Indian industry is ready for it. 5G auctions have now been done. We have the infrastructure side for network equipment. We have to provide coverage and capacity. We need to



“We need to have more towers fiberized. We are at 35%. We need to move that to at least 70% by the end of next year.”

TR Dua, DG, DIPA



“There were over 750 private networks deployed globally, as of Jan. 2022. As the ecosystem matures, challenges will be taken care of. From an Indian perspective, manufacturing, automation, education, etc., are the areas that will benefit.”

Aditya Khaitan, Partner, Consulting, Deloitte India.



“We also need to have IT governance and security. There will be a transition, along with the new ecosystem. We need to have the inter-working of everything together.”

Himanshu Gupta, Country Manager, Telecom, Media & Entertainment, HPE India

get a return on investment (RoI). New amendment to the guidelines has come in. For densification, we need to have more base stations. Enterprises and private networks have to address all of this.

There are currently some infrastructure challenges that will be taken care of over time. We need to have more towers fiberized. We are at 35%. We need to move that to at least 70% by the end of next year. We can also do fiber sharing to reduce the capex. Some models are already available for study and use. We will meet all those challenges.

Aditya Khaitan, Partner, Consulting, Deloitte India, said the use cases across industries are across supply chains. They are enabling all aspects. Telcos are now putting up more roadshows with enterprises, and use cases are getting developed. There were over 750 private networks deployed globally, as of Jan. 2022. As the ecosystem matures, challenges will be taken care of. From an Indian perspective, manufacturing, automation, education, etc., are the areas that will benefit.

In terms of core challenges, we will see a plethora of use cases right now. Every use case may lead to different



[COVER STORY]

5G & THE FUTURE OF MOBILE DATA



“We have already seen the benefits of 4G. How this will evolve is going to be massive. There will be a very efficient and targeted way of deploying 5G. Use cases are going to be developed here in India.”

Kapil Ahuja, CEO (North), Reliance Jio.



deployment options. We need to have the evolution of use cases. From a CIO perspective, we will see integration with the existing platforms. One size does not fit all! Planning is critical.

Himanshu Gupta, Country Manager Telecom, Media & Entertainment, HPE India, said there are focus areas for 5G. Broadband connectivity can be prime. China has already put over 7,000 5G towers. They have a plan to build 5 million towers by 2025. The way they are developing should be looked at very seriously. The pace of growth for private 5G has been slow. Rel-17 was only frozen in 2022. There is a lot at stake for our country. Private 5G can be a game changer for India over the next 5-7 years. The economic impact will be much higher. We are ready!

We will have eMBB and URLLC that will come up fast. These will propel the motion forward. We also need to do ecosystem development. We also need to have IT governance and security. There will be a transition, along with the new ecosystem. We need to have the inter-working of everything together. We need to decide

on the RoI. We can start with introspection first. We can then map that with apps, etc., and do experimentation, along with strategies. We need to have investments that can help evolve organizations to a huge digital platform. We need to have partnerships. HP has a solution called 5G-in-a-box.

Kapil Ahuja, CEO (North), Reliance Jio, said there are five things offered by 5G. These are data, 10x speed, low latency, the true sense of fixed-mobile convergence, and cloud, mobile, and IoT. The economic impact is going to be huge. We have embraced technology. The current consumption of data is huge. A lot is going to be offered to enterprises. Healthcare, education, and agriculture will see the massive impact of 5G. We have already seen the benefits of 4G. How this will evolve is going to be massive. There will be a very efficient and targeted way of deploying 5G. Use cases are going to be developed here in India. Challenges include access networks. Model two is a mix. Last is the standalone network. 5G is going to bridge the digital divide between large and small enterprises. 🌟

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The Future State of the Industry - 5G, Cloud & Edge Ecosystems

At the recently held Voice&Data's Telecom Leadership Forum's 5G Conference, there was a panel discussion on The Future State of the Industry- 5G, Cloud and Edge Ecosystems. The panelists included Saurabh Mittal, Head- Product Management Solutions & Integration, Network R&D, Bharti Airtel; Sivakumar Selva Ganapathy, VP, Johnson Controls; and Sameer Vuyyuru, Head of WW Business Development for Communication Service Providers, Amazon Web Services (AWS). The session was moderated by Anil Chopra, VP, Research and Consulting, Cybermedia Research and Services Ltd.



BY JOSE JN

Cybermedia's Anil Chopra introduced the 5G, Edge and Cloud Ecosystems session by looking at some of the market data, growth predictions, key technologies that are going to enable and enhance 5G rollouts. "If I were to look at some of the numbers, I think there's a massive amount of growth expected in all three areas. I think 40% of subscribers predicted in the next five years are going to be on 5G.

That's the kind of growth we're talking about. Cloud has already seen about 30% growth over the past year itself. For Edge, around 40%, growth is expected in the next five to seven years. So it's important, to talk about the role of all these technologies in enabling 5G rollout.

The first question was posed to Sameer Vuyyuru of AWS. 5G standard has been written to be cloud native.

If you build your network on AWS, it is a pay-as-you-go model where you align the revenue streams with your costs, which is ideally what you want to do, and not overbuild.

Now, what's the best way to use the cloud when we talk about using 5G? Is it hybrid? Is it private? Or is it using one of the hyperscalers like Amazon? What is your suggestion?

Sameer said, "We've all talked about the return on capital. There's two ways to inflect return on capital. One is grow the top line. But equally important is to reduce the amount of capital expenditure. So pick the best combination of technologies that enables you to do both. Call me biased, but I think the public cloud allows you to inflect both sides. We've talked about how much money and where our telco partners are making with us in my session earlier. On the flip side, take it to an extreme again, there is no capital expenditure. If you build your network on AWS, it is a pay-as-you-go model where you align the revenue streams with your costs, which is ideally what you want to do, and not overbuild. Take advantage of the elasticity, take advantage of the geographic reach, if the infrastructure is already there, why not use it?"

Sivakumar Selva Ganapathy of Johnson Controls added, "Johnson Controls has been into, a lot of automation and building automation. So obviously, the edge becomes really important. How is edge becoming a viable choice now? Is it going to really enable 5G scaling as the need arises? Are we seeing edge computing and 5G as the next level of digital transformation? We're going to look at how 5G can really accelerate in terms of edge and cloud-based offerings to our customers if we start from the customer-centric perspective. In order to do that, the fleet and the diversity of devices and assets we have from an enterprise context are pretty huge. It is local to a particular country, and then to regions and across the globe as well. So here, we are looking at both cloud and the edge. 5G is going to be a key accelerator for this kind of IT and OT integration, particularly the scale. Also from a Cloud Native perspective, it's going to be very important to provide a tailored, bundle-based offering to our customers, because particularly in the Indian context, the customers are very diverse. From a commercial standpoint, we have large, ambitious enterprise customers who can afford it, and then we also have a set of customers who are very price sensitive. So

that is where I think both cloud native and Edge are going to play a key role in terms of handling this monsoon of data to provide a rich experience to the end customers, that could be businesses, enterprises, and consumers across verticals.

Anil Chopra said, if we look at 5G, it offers a massive and ultra-reliable machine-type communication. And then we've got cloud, working along with that. Do you really see this as a game changer in terms of delivering 5G services, and establishing some of the really good use cases?

Saurabh Mittal of Bharti Airtel said, 5G is associated with speed. I'm going to give an acronym, which is PACE for Speed Plus. Let's look at how 5G through PACE is going to be a game changer.

P – stands for programmability. 5G inherently makes the network programmable to the needs of the application, user or enterprise. That's the fundamental part of it. We have seen technologies like network slicing. There are components in the network, which essentially make the network more programable.

A – stands for automation. Whether you take AI/ML, or the way the network analytics actually are made available. And if you look at the self-organizing networks, this is something which was talked about a lot in the 4G space as well, but inherently the way the fundamental technologies are built up in the 5G, this is far more automated and self-learning, which is lending itself to the AI/ML part of it. This is one of the fundamental beauties of 5G. You can essentially use it in the manner you want it.

C – is for the capability of 5G. Whether it is machine type, massive machine communications, whether there is URLLC (Ultra Reliable Low Latency Communications) type of use cases or the Enhanced Mobile Broadband (eMBB) itself. These are the fundamental different capabilities, which have been added by 5G. For example, coming to a manufacturing facility or large warehouses which have multiple sensors, if the technology used was Wi-Fi, Wi-Fi6, Wi-Fi7, 5G it essentially gives a much more predictable environment. These are the inherent

If you make 5G a simple bolt-on, and trivialize deployment of it, the economic structure is that connectivity is only 10% of the total consumption of an enterprise.

capabilities in 5G, which actually make it stand out as an access technology to be used for a plethora of use cases.

E – is for the exposure capabilities in 5G. Now, there are standardized APIs which are getting exposed through the functions called NEF (Network Exposure Function), which 3GPP has defined, making it possible to be used and consumed by the applications of the use cases.

This is something that was put up by 3GPP or the standardization bodies in 4G. People tried to build a lot of API gateways. But these were not standard-based, and hence, were not fully exploited. The last E essentially makes 5G an innovation platform for all different kinds of use cases. This is how 5G is enabling pace, and pace is speed plus. So it is not just speed. The pace of 5G, is what makes it a differentiator, and a game changer.

Anil Chopra extended the question further by asking AWS' Sameer Vuyyuru about using the infrastructure as Sameer has been handling the telco business in the US. If I were to look at using the public cloud for telcos, how do

you look at the data security and regulatory requirements of some of the telecom workloads?

Sameer said, "Fundamentally, security is job number one for us at AWS. You will hear that over and over again. All data is encrypted all the time – at rest or in transit. We use quantum key encryption and all of that. We've been selected by national security agencies, financial exchanges, health care, and real-time applications. It's something that we deeply understand." He continued, but I want to pivot to the edge for a minute. We tend to associate edge with low latency. But our view is that the edge serves three laws. One is the law of the land, when you need the data to be within a certain geography, or in a certain enterprise. That's when you bring the AWS cloud into that environment, whether it's a county, whether it's a State, whether it's a single enterprise. So that's the law of the land. The second biggest driver is the law of economics because it is going to be impossible to transport all of the data generated to a central processing facility or a central cloud location for it to be acted upon intelligently. So the ability to intelligently distribute processing, storage, algorithmic execution for AI/ ML,



where the data resides, takes your cost down 80 to 90%, as we've seen in the computer vision use case. Otherwise, you're paying for petabytes of transport to a central cloud. And then comes the law of physics, which is latency. And what you will find is that in a lot of places where we have the infrastructure, just do a ping to the AWS cloud, and you will see in 20 to 30 to 40 milliseconds today, without an additional edge and where we need that additional law of physics constraint. We have multiple engagements with telcos. We have partnered with a service called Wavelength, with Verizon with KDDI, with Vodafone, and so on. We have outposts, which is a private Mac. We have IoT Core, which sits on the devices themselves and provides decisioning there. So the edge is really wherever the data is. That's the mental model you should be looking at through those three laws.

A question from the audience was "5G has spawned a number of MVNOs in the US. Do you think there is an opportunity for that to happen here, if so why? If not, why not? Sameer answered saying, "We've deployed quite a few MVNOs and I was running natively on AWS today. So I've been privy to why they have done it. And the reason actually has nothing to do with 5G. It is about the industry expertise that they bring. If you make 5G a simple bolt-on, and trivialize deployment of it, the economic structure is that connectivity is only 10% of the total consumption of an enterprise. The people who are serving the other 90% are the industry-specific SI's, and industry-specific IP owners like Johnson Controls, for them, it's a simple add-on at this point. 5G is cloud-native, which means you can

click a button and turn it on. And so you're going to start seeing competition in that private network space, from people who are deeply embedded and know the industry. And that's why these enterprise-specific mobile virtual network operators are easy to deploy now.

I think it also presents an opportunity for the established telcos to really create those specific industry vertical spinouts quickly. If you look at the S curve, just create a bunch of start-ups, you need two people, three people who are really familiar with the industry, and the tools that are available out there. Go launch an MVNO, I can launch an MVNO spectrum V-link, in two or three days. Siva of Johnson Controls also responded to the question saying, "it also depends upon the India market, particularly which vertical we are targeting. And definitely, we'll have to pick and choose which vertical an MVNO is really required and then deploy, instead of a one size fits all. So it really depends upon what market segment we are looking at, and deploying it. We should be able to experiment and then take it forward.

Airtel's Saurabh Mittal added, "being from a service provider it is a very tricky question to answer. The only thing I will add is that on the telco side, we are investing a lot in the industry verticals. Whether this is an MVNO or whether this is within the larger telco umbrella, I think that's immaterial. What is important is to experiment. At the end, the service experience has to be predictable for these use cases to succeed. Everybody brings their own expertise. Telcos bring the expertise of running the network and



Whatever is needed at the edge, having security reliability, low latency and advanced analytics. At the same time, whatever we need, let's say real-time, less payload, less transport cost, etc, we move it to the cloud, and then interplay with it. So that co-mingling is going to stay. And that's the pattern we are looking at.

ensuring the KPI – SLAs, which are required for these industry verticals to succeed. If it is just connectivity, there are technologies like 4G, Wi-Fi 6 or 7, which exist. Where 5G becomes different is the predictability and ensuring the KPI SLAs, which are needed to make these new use cases succeed. And this is what the telcos are great at. So my sense is that Telcos have been investing a lot, working with the right set of partners. I don't mean to say that telcos know everything. No! We are working with a SI's, and many partners to see how to actually build these capabilities in India. There are multiple models. Some models have succeeded in Western countries. I'm sure there are new models which can emerge at other locations, and the telcos are very well positioned to take this forward with the enterprises ensuring whatever is needed gets done to make this happen.

Anil posed a question to Siva of Johnson Controls, "we talked about how 5G and edge can be the next level of digital transformation, but you didn't bring in the cloud. So if I were to look at cloud edge and 5G, do you really see that as game-changing for some of the things that you do? You've been doing a lot of IoT, being in the IoT space.

Siva said, "Definitely, I think there are two patterns emerging. One is how do we cloudify and at the same time, how do we edgify. It is going to be a mix, it's not going to be one versus the other. A few years ago, there used to be a term called lift and shift – from on-prem to cloud or cloudify. Those days are gone. It'll still happen, but that's not the real transformation the market and our customers are looking at. Then we will say, Okay, let's refactor the architecture and make sure it is cloud-enabled. Now, with the volume of data, we are at a point in time where we have to really look at how to start a Greenfield and by design make sure it is cloud-native, and leverage concepts like containerization, so that we give our end customers an ala carte menu to pick and choose what they need. Remember, we are also talking about return on investment, and how to grow the top line and the bottom line. It is very important to cater to customer needs. If you're going to give a grand buffet when appetite is really low, nobody's going to take it. So it's very important to really look at that cloud-native

approach, leveraging microservices, architecture, and also monetize those through API's, and of course, being very secure about it, particularly on the edge side of it where we are looking at edge cloud, particularly in the telco sector. Really looking at concepts like MEG etc, to have closer-to-the-device, how to do advanced analytics for the telco operators themselves to look at, monitor, self-heal using advanced analytics concepts and make those cognitive impacts to maintain it well, and run and also provide value-added services to the end consumers. That's how I see how cloud and Edge are going to interplay with each other. Whatever is needed at the edge, having security reliability, low latency and advanced analytics. At the same time, whatever we need, let's say real-time, less payload, less transport cost, etc, we move it to the cloud, and then interplay with it. So that co-mingling is going to stay. And that's the pattern we are looking at.

Sameer Vuyyuru added to that saying, "The mental model of the edge has got to change. The edge is wherever the data is. Speaking for AWS, if you're in Metro, Bombay, all of Metro Bombay is the edge, because, we have a region there. Whereas if you're accessing it out of Thiruvananthapuram, you will need an edge cloud deployed there to get the same benefits. So in our view, there is no discrete edge, no discrete cloud. The cloud extends and stretches to wherever the data is including on the smallest chipsets available that run sensors. That is also the edge. That is also the cloud. There is no difference.

The moderator's last question for the session was on the importance of partnerships between Cloud, Edge, 5G and Telcos. He asked the panelists to mention the advantages of partnerships, and how that would scale up 5G deployment going forward. All three panelists emphasized on the importance of partnerships between all ecosystem players. Sameer Vuyyuru illustrated his point using real-life examples. In 2021, AWS announced that Dish networks in the United States was building a cloud-native network on AWS. In 15 months, without any infrastructure investment, it is serving roughly 100 million population today. It could not have happened without all of the ecosystem players, the BSS players like Amdocs, TelcoDR, the Core and RAN manufacturers, the



Samsungs, the NECs, and Nokias, all of them committing to becoming cloud-native to build that. So there are literally more than 50 partners that ran on AWS to help to make it enable that network to be built at that speed. The key is a uniform development environment. Everyone's operating on the same environment. One of them doesn't have their own private stack and the other one doesn't have their own private stack. The tools that you see out there are what the IT guys use. The AWS console is the orchestration engine. So speed, very low cost of capital and many, many use cases that they've deployed to b2b.

Johnson Controls' Siva said, we are in a world of interconnected relationships, or 360 degree relationships, if you will. So, it's very important to have partnerships, customer relationships, suppliers relationships, etc. We wear different hats depending upon the context in which we are. Particularly with telcos and hyperscalers and 5G, etc., we also have another set of stakeholders to cater to. When we talk about transformation, it's our collective responsibility to really make sure that we responsibly transform. We are also looking at other kinds of partnerships to look at how we make sure this kind of, not specific to 5G, but any kind of technology transformation, we are looking at being environment and eco friendly, we are also sourcing material that is sustainable. Partnerships are very critical for any transformation. Particularly for this 5G In telco where there are different points of view. With all these microcells and Antennas, there is an impact of bird migration pattern, and some of the colonial bees and their fertility. etc. So it's very important that partnership is key and both outside in and inside out. And also another critical aspect is digital literacy. So we are talking about in Indian context of urban and semi-urban and rural. So what kind of partnerships we need to really leverage to improve literacy and the kind of offerings we give, how they adopted and

adapted as well. So partnership is key, it's very complex, and it's intermingled.

Airtel's Saurabh Mittal said, From a telco perspective, telcos have been used to working with a model called single-neck-to-choke. You have a partner and you work with them on certain KPI SLA, this has been the strength of most telcos. But the world is definitely changing. Telcos understand that this is now an ecosystem, which has to be supported by each other. There is this term 'frenemies' – friends and enemies have to work together to solve the customer issues at the end of day. The second important part is a bit overlooked. For a great experience for the consumer, and to the enterprise, there are various domains, which essentially have to come together. If you look at it just from a network perspective, and especially with the cloudification, and virtualization, many things come together. There is a core network, then you have a radio network, and then you have the devices, and of course, all the automation and the orchestration which goes along with it. The person having expertise in devices probably doesn't understand ABC of the core networks or the automation, the person understanding the radio network, he doesn't probably care about the automation. The partnership is a model to actually overcome, these kinds of challenges. These are not intersecting circles, but a union of these circles. So partnership is a model, which actually has to be there to deliver to the business outcomes. From an Airtel perspective, we have been working with, hyper scalers, whether it is private clouds, whether it is infrastructure providers on the compute side, storage side, down to the chipset levels, when it comes to the SI parts. There are a whole bunch of ecosystem players that we work with, to deliver on most of these use cases. 🍀

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Corning Opens Wireless Development Center in India to develop core skillsets & people

We recognize the need for growing the capacity and the capability. We understand that India is now the main hub for this kind of talent. That has been the driver for us to develop systems and software capability here in India



BY PRADEEP CHAKRABORTY

Corning India announced the opening of its Wireless Software Development Center of Excellence in Gurugram, India. The Center will help advance the adoption of 5G wireless networks across India by making it easier for service providers, system integrators, academic institutions, and enterprises to test their

services and solutions, acquire new capabilities, and achieve operational efficiencies.

“Corning India’s Wireless Software Development Center of Excellence will enable Corning India’s wireless teams to develop innovative software solutions for

The Center will be a mirror of most of the work that we do in California. We will focus on systems engineering, the front-end work of designing the systems. We are also doing software development focusing on cloud, virtualization, etc., and wireless software or the protocol stacks.

public and private 5G-enterprise networks, work on wireless product concepts, and focus on system engineering,” said Dr. Shirish Nagaraj, Chief Technologist, Wireless, and Director, Wireless R&D, Corning Optical Communications.

Elaborating on the Wireless Software Center of Excellence, Dr. Shirish Nagaraj said that Corning has been in wireless for about 10-odd years developing small cells and distributed antenna systems. Software has become a core competency for us. We are based in California, USA. We recognize the need for growing the capacity and the capability. We understand that India is now the main hub for this kind of talent. That has been the driver for us to develop systems and software capability here in India.

The Center will be a mirror of most of the work that we do in California. We will focus on systems engineering, the front-end work of designing the systems. We are also doing software development focusing on cloud, virtualization, etc., and wireless software or the protocol stacks. We are investing in a new capability, especially, for system performance characterization. We are building 5G wireless inbuilding systems. We are building a team here that will work closely with the research team in Pune. We will develop capabilities for characterizing the system. It can be where the throughput is, thermal performance, modelling, etc. The work is already ongoing here, in Gurgaon.

Foray into wireless

Corning covers the entire range of radio access capability, but they are tailored to inbuilding systems. Dr. Nagaraj said that we cover the whole range of RAN. For O-RAN, we will see how the things evolve. The fact that a majority of interfaces are going to open up allows you to have vendor diversity. The operators are interested in that to reduce the total cost of ownership (TCO). Even as a RAN vendor, we are seeing the potential to work with other ecosystem players, to put submissions together, and integrate the system.

We have had a tradition to be fairly open in our working even before O-RAN came in. For example, on the

X2 interface, working with another eNodeB partner or supplier, our system 5G system can work with any other 4G vendor system. We are being very open in that matter. X2 interface is a point-to-point logical interface between two eNodeBs with the E-UTRAN.

The foray into wireless has been quite organic for Corning. For wireless, we need to have the entire ecosystem participate to build a new solution, such as access points, small cells, etc., and especially to drive fiber in the horizontal. We have also done a series of strategic acquisitions.

For an enterprise and inbuilding solution, we have all the components and the entire range of fiber and radio. We have the remote powering solutions, as well as the composite cable that delivers both fiber and power. We have access points, switches, radios, and controllers. We are now virtualizing. We are running it as a software that can be cloud managed.

All of the software actually runs the RAN. It is right from the protocol stack to the platform layer, to virtualizing the RAN. There are different aspects of software, real-time embedded software, and our virtualization work. The core skill is really the wireless protocol stack, such as 5G NR, etc. We are developing the whole protocol stack and making the end-to-end solution work. There is also the management system that controls them all. Our systems are commercially deployed. We already have our mmWave systems seeing many deployments, especially, in the USA.

Looking at talent

In India, first and foremost, we are looking to contribute by developing the talent, he added. We are now hiring people for the India Wireless Center. This is another Center, along with our California, US, and Israel Centers. We develop core skillsets, and people. We are going to get the top talent from the leading universities.

Another aspect is that, we are now developing 5G testbeds, etc., and lab infrastructure, including here in India. We are developing the cloud RAN infrastructure. Now, we can have a full, end-to-end 5G call capability. You

The Center will be a mirror of most of the work that we do in California. We will focus on systems engineering, the front-end work of designing the systems. We are also doing software development focusing on cloud, virtualization, etc., and wireless software or the protocol stacks.

can now do throughput test, coverage, etc. Infrastructure development is also happening here.

All of our baseband software is running here over COTS servers. We are having switches, routers, powering solutions, etc. We are making this as a mini data center. A developer sitting remotely can actually rent a setup to test a network. It is like a shared resource. Think of the whole wireless infrastructure as a shared resource.

We already have an optical fiber plant in India. In wireless, we are just foraying into India. We are starting the development center first. Then, we have to look at the opportunities that unfold in India with 5G. To expand our outreach for acquiring talent, we are also looking to engage with universities in India. It is going to be mix of talent from tier 1, and tier 2 and 3 cities.

Software innovative solutions

How would Corning India teams develop software innovative solutions for public and private 5G enterprise networks? Dr. Nagaraj said that Corning has been inbuilding specialists. We think about inbuilding wireless and networks. There is also the public network piece. There are also private networks that are coming up. Lot of the use case definitions are happening right now. We are ideally suited for engaging with enterprise networks. Our solutions are clearly working for public networks also. With private core, we can also enable private networks. The architectures that we define are very much tailored with that.

And, what about 5G use cases? He said that if you look at the enterprises, being able to get an operator signal inside a building is very critical. That can be the simplest use case. On top of that, if the enterprises run their apps, that's a different scenario. There are lots of airports, ports, mining, manufacturing, etc., where the use cases are still being developed. It will take some time. Enterprises should have the architecture that is ready. Then comes the speed and ease of use. At the end of the day, an IT person deployment can be different from the CSP deployment. Also, the network management should be really very simple to manage.



For the enterprises, managing this will be critical. You have to make your solution as simple to deploy. We are making our solutions very simple. Speed and ease of deployment is critical.

What is the work going on regarding wireless product concepts and focus on system engineering? Dr. Nagaraj added that we are focusing on wireless software development and front-end systems engineering. They come up with the architecture. It is done by the systems engineering team that requires a different skillset. We see a lot of talent here in India. We are augmenting our teams in California and Israel. We are also having systems engineers here. We are looking at product architecture that can support fiber and wireless. We are actively working on these.

Finally, how is Corning a preferred indoor 5G RAN vendor for tier 1 operators? He said that we have been through the DAS product portfolio that are deployed across large venues and stadiums, etc. On the RAN side, we are using Spider Cloud product family, making it easy to deploy 4G indoor small cell. We have now upgraded that to 5G for inbuilding wireless. We have some extensive deployments. Through the small cells that we have, we continue to evolve them, along with the introduction of mmWave small cells that are now commercially deployed. Sub6GHz band solutions are suitable too. 🍌

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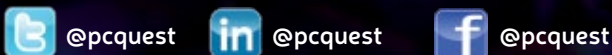
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My Five major takeaways from the four day India Mobile Congress 2022 (IMC 2022)

From remote health and robotic surgeries to agro-tech solutions and pollution control, and cloud gaming to the use of AR (Augmented Reality) and VR (Virtual Reality) for training and education, the range was overwhelming



BY RAJ SETHIA

Between the 1st and 4th of October 2022, the Department of Telecommunications (DOT) and the Cellular Operators Association of India (COAI) hosted the much-anticipated flagship event of India's mobile industry at Pragati Maidan in New Delhi. After a three-year hiatus, IMC held its first in-person event.

The event provided an excellent forum for industry, academia, and policymakers to discuss the present status of the industry as well as the emerging trends, and developments in the world of digital communications. This was accomplished through some well-curated panel discussions, keynote addresses, and interactive sessions, which were ably supplemented by impressive demos and experiential exhibits across all booths.

From remote health and robotic surgeries to agro-tech solutions and pollution control, and cloud gaming to the

use of AR (Augmented Reality) and VR (Virtual Reality) for training and education, the range was overwhelming. As a breath of fresh air, most of the industry players, including the young start-ups, were attempting to solve India's problems rather than selling globally available solutions.

Here are my top 5 takeaways from the event:

1. The Big Shift

The level of engagement, support, participation, and visibility provided by the government, industry, and administration was impressive, demonstrating their collective commitment to and enthusiasm for the Digital India Vision. Themes such as Make in India, Aatmanirbhar Bharat, and Start-Up India, which many saw as too bold and audacious a few years ago, have permeated deeply into the consciousness of every link in the industry value chain. This in itself marks a

watershed moment in our history and the government, and every citizen of India should be immensely proud of it. However, one notable (and unexpected) feature of the event was the conspicuous absence of hyper-scalers, handset behemoths, and large passive infrastructure providers, all of whom are integral, and equally committed to the next phase of India's networks and the digital revolution.

2. No Tech-Babble, all applications, mostly 5G and Enterprise Centric

The focus of this IMC 2022 was on use cases and applications, rather than technical jargon, feature enhancements, and capability upgrades. Unsurprisingly, 5G and 5G-led industrial applications dominated the conference sessions, demos, and exhibits.

Fixed Wireless Access is likely to be the most important 5G use case in the short term, while business applications will receive most of the attention in the medium and long term.

3. The barely visible elephant in the room – Viable Indoor Connectivity

While there was a lot of emphasis on use cases and adequate focus on coverage and access, the big elephant in the room that did not get much attention during the event is the delivery of commercially viable indoor connectivity. There could have been critical discussions and sharing of international best practices on how the industry and the government together could create commercial models that made sharable and 5G-ready indoor and dense outdoor infrastructure possible through a mix of Small Cells, DAS (Distributed Antenna System) and Wi-Fi 6/6E/7 technologies to serve emerging use cases.

This, in my view, is an area that will necessitate significant innovation and lateral thinking, and I hope it occurs sooner rather than later.

4. The Emerging Star – Network as a Service

Given the nature and complexity of delivering new use cases to customers, the Network-as-a-Service model will be one of the fastest-growing business streams over the next 3-5 years, taking various shapes and forms.

All customer-facing solution providers, such as MNOs (Mobile Network Operators) and SIs (System Integrators), will require skilled, professional, and dependable intermediary partners for bundled, segment-specific NAAS infrastructure and solutions delivery. They must

now rapidly develop and mature the capabilities and expertise required to nurture and manage through multiple partners across key customer verticals such as healthcare and aviation.

All their upstream and downstream channel or service partners, infrastructure service providers, and OEMs (Original Equipment Manufacturers) must thus align with this emerging reality and prepare for a more verticalized approach with distinct and often customizable offerings for different business verticals.

This will demand non-linear innovation in the form of new operating and commercial models across the value chain.

5. Mainstreaming of Open-Source Solutions

"Open source," whether it is software, Open RAN (Radio Access Network), or Open Wi-Fi, is now clearly mainstreamed even in the industry's most strict proprietary domains and is universally recognized as a key driver of innovation and cost competitiveness. Advancement of Open Wi-Fi, thanks to the excellent work of TIP (The Infrastructure Project), was a revelation for many, including myself.

Aside from the specific event, the IMC 2022 in general demonstrated India's noteworthy progress in organizing large-scale, large-scale, and global-quality events. With the ongoing redevelopment of Pragati Maidan as a world-class convention location, one should not be surprised to see India emerge as a major hub for Asia to host industry fairs and exhibitions over next 2-3 years. Specifically, for tech and digital space.

In this regard too, IMC 2022 was an excellent starting point for this techade!

Raj Sethia founded and currently leads FireFly Networks Limited, a joint venture between Bharti Airtel and Vodafone Idea. He has over 18 years of experience in the telecommunications industry, holding positions in Finance, Corporate Planning, Strategy, New Business Development, and General Management. A digital enthusiast who enjoys reading, dreaming, traveling, meeting interesting people, and watching random YouTube videos in his spare time. The opinions expressed here are entirely his own. 🍌



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C-DOT in the Broadcast & Converged Services (BCS)

CDOT is playing a pivotal role in this era of natural seamless convergence of broadcast and broadband technologies



BY PALLAB DATTA

Television (and later mobile phones) are probably the most extensively used electronic gadgets over the the last half a century. It is content which is ultimately driving the march of technology in every vertical.

The proliferation of mobile technology is in many ways, an enabler for broadcast/converged ecosystems. Thus, propelling the growth in Linear (Cable & DTH) & non-linear (OTT) TV space. There are around 298 million households in India, out of which 197 million households have TV sets (Source: BARC, CII, FICCI reports).

Of this, around 90% have set top boxes, STBs (either cable or DTH or OTT). Majority of the STBs in India are still imported from countries like China, Taiwan etc. There is a huge annual import of finished/semi-finished products in this segment. There are no repair centres for such STBs in India.

STBs that are manufactured in India hardly have any value addition / design / intellectual Property from inside the country. All these results in huge imports and generation of huge amounts of e-waste due to electronic dumping of low quality/one time useable STBs. Industry

The convergence of Broadcast and Broadband technologies is driving the choice of both consumers and service providers; thus synergy of different technology verticals is apparent.

estimates show that there is a requirement for around 100 million (10 Cr) STBs over the next 2-3 years to.

It is pertinent to mention that in June 2014, STB has been notified as Telecom Equipment by Govt. of India. The sector regulator is TRAI and in the recent past the standardization activities in the broadcasting segment has been entrusted to TEC. The convergence of Broadcast and Broadband technologies is driving the choice of both consumers and the service providers; thus synergy of different technology verticals is very much apparent.

Encouraging indigenously designed, developed and manufactured products and solutions in Broadcast and Converged technology domain will:

- Meaningfully contribute towards making the country Technologically "AatmaNirbhar (Self-reliant)"
- Provide true impetus to flagship programs of Govt of India: "Make In India", "Digital India, "StartUp India" and " Skill India".
- Benefit to the masses / the wider reach to the bottom of the pyramid

The most important entity in the linear TV (Digital Broadcast Networks – Cable & DTH) is the Conditional Access System (CAS)

CAS: The Security Module consists of

- A Conditional Access System is a subsystem that is used to limit the access of TV signals to only authorized viewers
- At an industry level, it tackles the issue of addressability that has been a problem in India with gross underreporting of cable homes by operators. This also opens up a whole new paradigm.
- At the core of CAS, is the encryption/decryption engines based on cryptographic algorithms.
- CAS is implemented as a combination of Hardware and Software.

CAS has two parts:

- One Part is the Headend (Content Scrambling & Key Encryption)
- The other is (Complementary Part – Descrambler & Decryptor) resides in the Receiver (STB & Smart Cards)

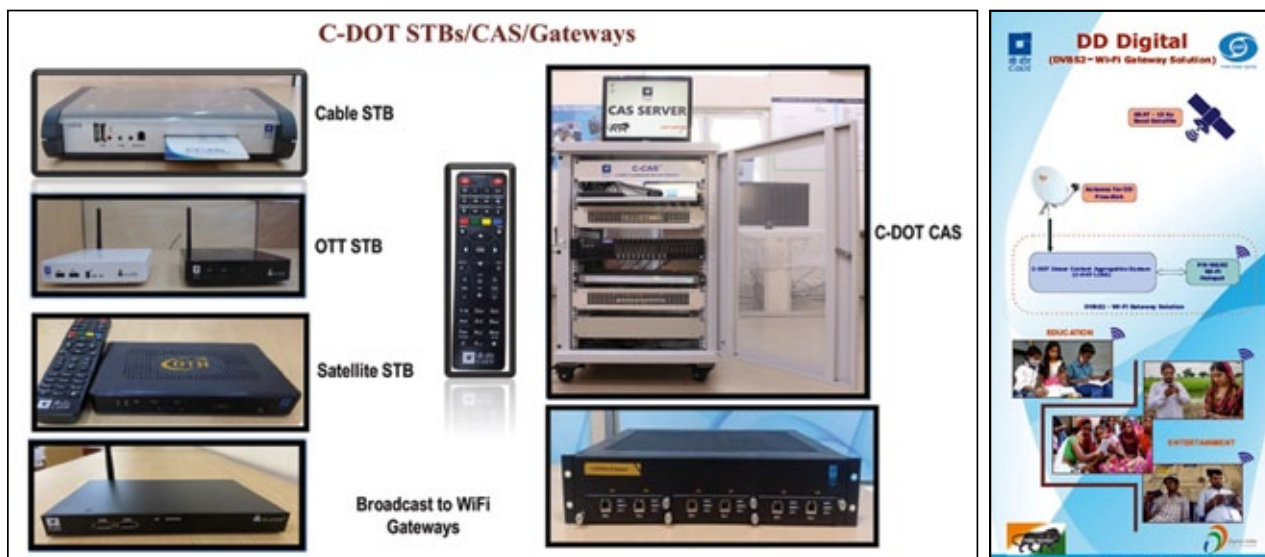
As on date, most of CAS deployed in Indian Network are imported from foreign vendors.

Need for Indigenous Development

- Presently, a sizeable percentage of STBs are imported to India from China and Taiwan.
- Indigenized STB can pave the path to achieve "Target NET ZERO IMPORTS by 2020" under the 7 pillars (Electronics Manufacturing) of "DIGITAL INDIA" program.
- It will boost manufacturing in India and be an enabler towards "MAKE IN INDIA" program of Govt. of India.
- With the Design and Development initiative for STB (and related network elements) in India, innovation will take place and will enable generation of Indian IP in this technology/product vertical.
- This will provide the necessary impetus to product design ecosystem and reduction in product costs in the country, improve product/service quality and will also reduce the dependency on foreign vendors.
- Reduction in e-waste with better quality and service for locally manufactured STB.
- Content and Network security will be improved.
- Misuse of Broadcast network by Anti-national elements needs to be ascertained in the era of cyber threats. An indigenously developed secure CAS can mitigate this huge risk.
- Indigenous development & manufacturing of STB, the service and repair for this will certainly be a value proposition towards "SKILL INDIA" initiative.
- Presently the servicing/repair of STBs is not enabled in India due to lack of technical knowhow.
- Also indigenously solutions will encourage development of innovative 3rd party applications and will be a firm step towards "START-UP INDIA" program of Govt. Of India.

Indigenized STB can pave the path to achieve “Target NET ZERO IMPORTS by 2020” under the 7 (Electronics Manufacturing) pillars of “DIGITAL INDIA” program.

Present C-DOT Solutions



Future Technology & Product trends in Broadcast/ Converged networks vertical

- Converged Service Delivery platform with convergence of Linear and non-linear TV services. Interactions/ integration of linear and non-linear channels/paths to enable value added services.
- Network aware adaptations for content delivery – such as multicast DASH server for video content delivery at adaptive rate. 3GPP 5G FeMBMS X-cast integration.
- Evolution of IoT enabled Home Gateway
- Evolution of DRM agnostic platforms
- Ultra High resolution/3D content delivery via wired/ wireless medium
- Total personalization of services including targeted advertisements using machine learning algorithms/ data analytics / context aware recommender systems.
- Seamless integration of natural language processing (NLP)/gesture /image recognition for user interactions with high level of accuracy.

These are enabled by synergy and a coherent cross mapping of various technology verticals: Broadcast, Broadband (wired & wireless), convergence, High speed networking, Data analytics, AI, advanced cryptography

etc.to name a few. C-DOT product portfolio and solutions in this segment is moving away from the traditional one-way broadcast network to two-way converged networks. Driven by ever growing consumer needs and expectations towards secure and reliable video content – reception and consumption with a strong business case for all stakeholders involved in the overall value chain.

This will be a true enabler for Indian content providers, content aggregators and OTT STB manufacturers. At present, there is a vendor lockin which strangles small content providers/content aggregators. An indigenous DRM will solve this problem and will also be more secure as the keys/content will reside within the country.

CDOT is playing a pivotal role in this era of natural seamless convergence of broadcast and broadband technologies to create a high content driven consumption space in-line with socio cultural uniqueness of the country. 🌟

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PM launches C-DOT's Indigenous 5G NSA Core at IMC 2022

During the IMC 2022, Prime Minister, Shri Narendra Modi, launched the 5G Non-Standalone (NSA) Core, indigenously designed and developed by C-DOT at C-DOT pavilion in India Mobile Congress (IMC), 2022 at Pragati Maidan, New Delhi. An End-to-end 5G call was demonstrated using C-DOT 5G NSA Core installed at BSNL Chandigarh and 5G Radio Access Network (RAN) developed in collaboration with Wisig Networks, VVDN Technologies and Radisys India Pvt Ltd.

Dr. Rajkumar Upadhyay, Executive Director & Chairman, C-DOT expressed his sincere thanks and heartfelt gratitude to the Prime Minister for launching indigenous 5G NSA that would inspire and motivate young engineers and research community to innovate for achieving "Atmanirbharta" that would usher-in a new revolution by giving India a distinction amongst the top technology hubs in the world.

Centre for Development of Telematics (C-DOT), the Telecom R&D center of the Department of Telecommunications, Ministry of Communications, Government of India, has been keenly working towards evolving an indigenous technology framework driven by synergistic collaboration amongst R&D, academia,

industry, startups and other relevant stakeholders of the Telecom ecosystem to expedite the design, development and production of globally-competitive, cost-effective and market-ready Telecom technology systems for wider reach and deployment in diverse scenarios.

Various 5G use-cases have been implemented in collaboration with national academic institutions and local start-ups. An innovative use-case of extending remote medical assistance to the citizens was demonstrated to Prime Minister by making video calls to Primary Health Centres in Bhora Kalan village of Haryana and Matiana village of Himachal Pradesh using the wholly indigenous 5G NSA system and e-health solutions of start-ups. This is a true manifestation of the harmonious spirit of "Gati Shakti" leading to the creation of "Aatmanirbhar Bharat".

In its booth at IMC 2022, C-DOT, staged a live demonstration of its diverse Telecom products and solutions spanning a wide array of technologies including Optical Communication, Switching & Routing Systems, Wireless Communication – WiFi, 4G & 5G, Cyber Security, Quantum Communication, Network Management and a host of Telecom software applications based on IoT/M2M, AI/ML, AR/VR and Big Data.



Mavenir Wins a TrustRadius Tech Cares Award for 2022

Richardson, TX: Mavenir, has been recognized with a 2022 Tech Cares Award from TrustRadius, one of the most trusted research and review platforms. This third-annual Tech Cares Award celebrates companies that have gone above and beyond to provide impactful corporate social responsibility (CSR) programs for their employees and surrounding communities.

“Mavenir has earned a 2022 Tech Cares Award for demonstrating a strong commitment to corporate social responsibility,” said Megan Headley, VP of Research at TrustRadius. “By pledging to match employee donations and volunteer time, Mavenir and its employees have donated over \$50,000 to organizations like the Ukraine Red Cross Society, UNICEF, and Girls Who Code.”

In 2022, Mavenir has sponsored giving opportunities across 36 global sites, in support of 67 global NGOs and charities. Mavenir also subscribes to economic, environmental, and social principles, reporting into charters under the UN Global Compact, EcoVadis, CDP, Quest Sustainability, and the Global Reporting initiative.


“We’re extremely proud of our pledge to Corporate, Environmental and Social Responsibility,” said Ramnik Kamo, EVP, CIO and CPO at Mavenir. “Mavenir’s commitment to its employees, customers, and

stakeholders has never been stronger. We are fully engaged to protect our diverse, growing, and hybrid global workforce and the world we live in. We believe this to be essential for the future of our communities, and the environments we do business across.”

The company is advancing environmental performance through innovative and ongoing initiatives, including increasing the use of renewables in operations and lowering carbon intensity while investing in breakthrough technologies.

“We work tirelessly to foster a positive workplace culture that supports a diverse group of remote and in-office employees at TrustRadius. Tech leaders throughout the industry are embracing similar corporate social responsibility initiatives, and we’re excited to give them the recognition they deserve with a Tech Cares Award,” said TrustRadius Founder and CEO Vinay Bhagat. “We believe corporate social responsibility will continue to become more important each year for employees, customers, and stakeholders.”

Over the past year, Mavenir teams around the world have united for change through Mavenir’s MAVcares program, advocating for social issues, while furthering global giving initiatives through employee donations and volunteerism.



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Palo Alto Networks Selected to Secure Cloud-Native 5G Networks in Canada

SANTA CLARA, Calif.,- Palo Alto Networks (NASDAQ: PANW) today announced that it has been selected by communications technology company TELUS to assist with securing one of the largest and fastest 5G networks in Canada.

Palo Alto Networks will help TELUS secure its 5G network and provide real-time threat mitigation. TELUS will leverage Palo Alto Networks' hardware and software firewalls to protect high-capacity network interfaces across its 5G stand-alone core and internet perimeter as well as to provide security to its IoT customers. Palo Alto Networks will leverage its Zero Trust approach, a security framework that is rigorously applied through to the full ecosystem of controls – network, endpoint, cloud, application, IoT, identity and more – and that many organizations rely on for protection that goes beyond the traditional network edge.

“Securing 5G requires a Zero Trust approach to protect all elements of the mobile network across key network interfaces, cloud workloads and user traffic,” said Anand Oswal, senior vice president, Network Security at Palo Alto Networks. “Our 5G-Native Security is the industry’s most comprehensive Zero Trust solution, with best-in-class capabilities to safeguard mobile infrastructure and the business-critical applications that run on it. We’re thrilled to help TELUS create a 5G network that provides enterprise-grade security to their customers.”

For a comprehensive Zero Trust approach to the cloud-native mobile infrastructure, TELUS will use Palo Alto Networks industry-leading cloud workload protection to safeguard its cloud-based network functions. TELUS joins a set of the most advanced service providers securing their 5G networks, including DISH.

“We know security is a top priority for our customers, and we are deeply engaged in keeping people safe while optimizing our customer experience on our world-leading network,” said Ibrahim Gedeon, chief technology officer, TELUS. “The 5G market is rapidly evolving, propelling innovations through data insight and AI, and it is critical that we implement robust solutions that allow for flexible growth, without compromising security. We are proud to build on our decade-long partnership with Palo Alto Networks to ensure our sophisticated, multi-awarded networks remain safeguarded against all kinds of threats, protecting Canadians and unlocking the infinite possibilities of 5G.”

Ciena to Manufacture Select Routing and Switching Solutions in India



New Delhi, INDIA – In support of the Make in India initiative, Ciena is working with its existing electronics manufacturing services partner, Flex to add additional manufacturing capacity for its Routing and Switching portfolio. Ciena expects to deliver the first of these India-made products to customers early in 2023.

Ciena has had a presence in India for more than 15 years, including a Research & Development center of excellence with critical intellectual property being developed in India and a growing customer base, including all the local Tier 1 service providers.

With the introduction of 5G in India, web traffic flows are changing and moving toward the metro and network edge, increasing the need for common routing and switching aggregation platforms. Ciena’s move to manufacture in India supports the growing local demand for this specific category of products.

“We see growing interest in our lean, automation-centric routing and switching products because of the rise in 5G use cases and applications that enable video streaming, mobile gaming, and augmented reality. By manufacturing locally, Ciena is bringing these products and supply chain closer to the customers in India, potentially accelerating delivery schedules,” said Steve Haley, Global Supply Chain Leader, Ciena.

Tech Mahindra Unveils Telco Smart Analytics Lab in UK Dedicated for Google Cloud



New Delhi – September: Tech Mahindra, today announced its dedicated Google Cloud Telco Smart Analytics Lab in Milton Keynes, UK. The lab will aim to accelerate data-driven digital transformation for enterprises across diverse sectors, including the telecommunications industry.

The Telco Smart Analytics Lab will focus on developing data analytics solutions on Google Cloud to help Communications Service Providers (CSPs) across the globe to modernize their data ecosystems and encourage analytics-driven operations. It will harness the capabilities of Tech Mahindra's intellectual property (IP) and in-house accelerators customized for CSPs to better engage their customers through analytics-driven experiences, modernize their business platform, enable data cloud migration, and thereby deliver operational efficiencies. It will further empower customers to accelerate their data cloud journeys as they move towards a digital-first future.

Rajesh Chandiramani, Business Head of Communication-Media-Entertainment for EMEA & APJI, Tech Mahindra, said, "Our deep technology, domain expertise and business analytics capabilities coupled with Google Cloud will bring advanced analytics solutions to the forefront. The synergy will further act as a catalyst for enterprises in their data-led digital transformation journeys and help modernize existing applications. Additionally, the partnership will also introduce opportunities to create new revenue streams for our customers by providing in-depth data analysis to make efficient and informed decisions."

Tech Mahindra recently earned Google Cloud Data

Analytics Specialization solidifying its expertise within the data analytics space. The specialization is awarded to select Google Cloud Partners that have demonstrated success with ingestion, transformation, querying, exploration, analysis, storage and warehousing, and deployment using pipelines of both batch and streaming data.

The lab will further support CSPs to leverage 5G and Edge Computing technologies to create new products, services, and business models fueling revenue growth. It will also showcase how CSPs can better monetize their significant network data assets. As part of the NXT.NOW™ framework, Tech Mahindra aims to enhance human-centric experiences for businesses. This means focusing on investing in emerging technologies and solutions that enable digital transformation to better meet the evolving needs of its customers through our DigitALL framework.

Amol Phadke, MD and GM, Global Telecom Industry, Google Cloud, said, "Tech Mahindra's offerings for telco businesses, and its newly launched lab, will be assets for undergoing digital transformations, and will help these businesses better understand how they can deploy cloud capabilities and services to modernize their networks and operations."

The lab will provide intelligent analytics capabilities for organizations to generate incremental revenue opportunities through hyper-personalized customer experience and offers across customer journey. It will be equipped to migrate large datasets to power decisions such as segmenting customers, measuring experience effectiveness, and reducing customer churn.

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Mavenir Announces Indian Made 2G, 4G and 5G O-RAN Radios Made in India



Bengaluru, India: Mavenir announced to have commenced the production of 2G, 4G and 5G Open RAN Radios for the OpenBeam™ portfolio in India, for Indian and other prominent worldwide bands.

OpenBeam offers an innovative radio portfolio, cost-efficient, intelligent radios that meet the critical demands placed on today's networks including massive MIMO, mmWave and multi-band remote radio heads (RRHs) allowing improved network capacity as the network expands. The OpenBeam Open RAN radio solutions are available across all frequency bands and can be used for a wide range of use cases, including enterprises and public settings across urban or rural environments.

"Our manufacturing partner network is very well positioned for the sustainable and rapid scaling of Open RAN volumes and made in India requirements. With these new production sites coming online, we have reached another important milestone in our strategy to expand and evolve the Open RAN ecosystem", said Ramnik Kamo, EVP, CIO and CPO of Mavenir.

Mavenir's robust set of radio options address the needs of the CSPs to be agile and cost-efficient with low power consumption, low wind load, and built with integrated intelligence and automation. Designed for the growing needs of private enterprises to public networks, the portfolio supports both new and legacy radio access technologies. All radios have a modular design, using proven technology to support both MIMO beamforming and multi-band needs.

Tata Communications launches Private 5G Global CoE in India

Mumbai, INDIA: Tata Communications, launched a dedicated Private 5G Global Centre of Excellence (CoE) in Pune, India to accelerate Industry 4.0 applications and capabilities for enterprises. This new CoE is an agile, secure and indoor facility to test and trial industry use cases. Tata Communications has developed use cases across automotive, metals and mining, airports and seaports, manufacturing, logistics and healthcare sectors. The Company will be well positioned to enable and empower global enterprises to seamlessly progress into the hyperconnected world.

Speaking on the occasion, Mysore Madhusudhan, Executive Vice President, Collaboration and Connected Solutions, Tata Communications, said, "5G has the transformative power to be a game changer for all. We are encouraged and excited about leveraging this technology to enable the future of enterprises and economies. Early test results in our Global Centre of Excellence have proved to be very positive providing an evolutionary path towards Industry 4.0 scenarios to varied industries. We believe this Centre is well poised to empower enterprises for a hyperconnected tomorrow."

With trials underway, Tata Communications will be able to demonstrate private 5G use cases such as automated quality inspection of equipment using video and image analytics, inventory management and asset tracking, warehouse theft detection, AR/VR-based remote worker collaboration, and video-powered retail purchase, to name a few. The Company is following robust measures, including Interoperability tests to assess compatibility of the Company's private network with different devices and, rigorous monitoring and testing to ensure stable connectivity throughout the test duration at the CoE.

In addition, Tata Communications already has two Centres of Excellence (CoEs) in Delhi and Mumbai, India engaged in designing, building and demonstrating multiple Internet of Things (IoT) use cases.

Tata Communications envisions the 5G era to focus on automating the interplay between Man-Machine-Material-Method-Market to enable a holistic ecosystem. This ecosystem will enable enterprises to achieve business goals, unlock new revenue sources, business models and have the ability to address new markets through secure and digital experiences.

Tejas Networks Demonstrates end-to-end Network based on its indigenous 4G/5G wireless, optical and satellite products

New Delhi: Tejas Networks today announced that the company successfully demonstrated 4G/5G network and applications on an end-to-end indigenous network, using its designed-and-made in India hardware and software products, in the presence of Hon'ble Prime Minister of India, Shri Narendra Modi, at the India Mobile Congress (IMC) being held at Pragati Maidan, New Delhi.

The end-to-end network showed a full range of innovative wireless and wireline products from Tejas Networks and its subsidiary Saankhya Labs. These included advanced 4G and 5G macro-Radio Access Network (RAN) equipment and broadcast radios, multi-terabit optical aggregation and backbone equipment, all managed from a versatile, universal network management system. Also on display was the world's first ultra-converged broadband product (TJ1400 UCB) that combines 4G/5G Radio RAN, fiber broadband access (GPON/XGS-PON OLT), and packet-optical transport technologies in a single, compact shelf. The demonstrations included multiple use cases over the

4G/5G network such as video calling, Direct to Mobile (D2M) broadcasting and e-learning.

Mr. Sanjay Nayak, CEO & Managing Director of Tejas Networks said, "Today's successful live demonstration of indigenous end-to-end network and applications is a critical milestone in India's journey towards achieving Atmanirbharta in telecom technologies. We are committed to continue building on this success by sustaining our R&D and manufacturing investments, with a vision to create a global-scale telecom OEM from India in the coming years".

Dr. Kumar N. Sivarajan, Chief Technology Officer of Tejas Networks said, "We are delighted to have played a leadership role in setting up India's most comprehensive end-to-end indigenous technology demonstrator, covering our latest 4G and 5G RAN equipment as well as our optical transport and access product. It reinforces our position as India's leading deep-technology innovator in the telecom product space, with a complete portfolio of products to deliver ubiquitous high-speed connectivity in urban, semi-urban, rural and remote areas."

ARTPARK@IISc and Nokia Jointly demonstrate next-gen telecom networks in business communication and automation at IMC 2022

New Delhi: Bangalore-based not-for-profit foundation, AI & Robotics Technology Park (ARTPARK) @ the Indian Institute of Science (IISc) and Nokia partnered to demonstrate two innovative use cases at the ongoing India Mobile Congress: Robotic Telepresence for seamless workplace interactions in a hybrid setup and Network as a "Third Eye" to automate manual warehousing processes, which can take advantage of ultra-reliable low latency communication (URLLC) of 5G.

As part of the first use case, AHAM Robotics, a venture incubated at ARTPARK, showcased robotic teleportation solution which provides real-time, virtual teleportation that enables untethered collaboration between people in different geographical locations. The solution enables users to move around during the meeting physically, and permits more versatile interactions and use cases than the usual web meetings. The demos allowed visitors in IMC to enjoy live interactions with exhibitors in IISc via robotic teleportation.

In the second use case, ARTPARK showcased how blind robots can still work autonomously by

using advanced network-enabled perception. Such technologies, enabled by advanced, low latency and ultra-reliable services in 5G, will help cost-effective and efficient automation of warehousing functions. The demo showcased how a simple robot with no in-built vision capability, could still use cameras installed outside (third eye) and have meaningful interactions with visitors.

Prof. Bharadwaj Amrutur, Research Head, ARTPARK, Professor, IISc, "As workplaces move towards a more hybrid setup, we will need tools to digitize global business communications to ensure productivity and profitability. This is where robotic teleportation comes into play. They offer both technological benefits and collaboration advantages, benefiting businesses and clients alike. Although video conferencing emerged as a saviour during the pandemic, allowing businesses to interact virtually, it won't be enough to cater to the rapidly evolving needs of today's hybrid world. AHAM Robotics, incubated at ARTPARK, aims to address this challenge by making the best of AI & robotics innovations to help businesses bridge their collaboration gaps."

Trellix Expands XDR Platform to Transform Security Operations

LAS VEGAS –Trellix, announced the expansion of its XDR platform. Trellix XDR enables the company's 40,000+ customers to build greater cyber resiliency, maximize the value of their existing security tools, and reduce mean time to detection and response.

Trellix XDR

Arriving in the fourth quarter of 2022, the upgraded XDR engine provides security operations teams with enhanced playbooks for guided investigations, upgraded threat intelligence through the integration of McAfee and FireEye assets, and the launch of Trellix Event Fabric. Trellix Event Fabric bridges disparate security data from any cloud provider allowing security analysts to access and correlate data from anywhere. This combination of machine learning and automation allows security operations teams to reduce mean time detection and improve mean time to response.

"We have the most comprehensive XDR platform in the industry," said Bryan Palma, CEO, Trellix. "Legacy security information and event management (SIEM) technology has failed to modernize security operations. We are confident Trellix XDR fills this critical gap."

"Trellix XDR gives us more visibility and context into threats," said Kate Downing, Senior Director Security & Risk, Clario. "Events that would have not been addressed before, surface to a higher level of awareness, allowing our security teams to quickly focus and eliminate any further impact, thereby reducing the severity and scope of the attack."

Trellix XConsole

XConsole simplifies the user experience across Trellix XDR providing a single interface for security operations teams. Delivering a common operating picture allows customers to maximize their investments in native Trellix technologies and third-party security tools. By leveraging a single user interface, analysts and responders can quickly baseline their overall threat posture through added visibility across network, endpoint, data, email, and cloud attack surfaces. Available early in 2023, XConsole becomes the control center for Trellix XDR.

"Trellix XDR, now incorporating a unified security operations console, brings it all together by ingesting data from all technologies in an organization," said Dr. Ali Baghdadi, Senior Vice President & Chief Country Executive, Ingram Micro. "This easy-to-use platform is very attractive to our customers."

Trellix Endpoint

Arriving early 2023, Trellix Endpoint unifies the best of McAfee and FireEye technologies across endpoint protection, endpoint detection and response, and forensics to deliver best-in-class layered endpoint defense.

This first step on the XDR journey provides:

- multi-stage ransomware prevention
- identity detection and response to prevent credential theft and abuse
- attack surface management to prioritize threats that matter
- digital forensics and incident response to quickly find root causes.

Trellix Network Detection & Response (NDR)

Trellix Network Investigator, now available to all customers, provides a holistic solution to detect, investigate and address threats across the kill chain. By combining our existing machine learning modules, event-based packet capture, and network traffic hunting into a single solution, customers can rapidly deploy NDR capabilities across their existing Trellix network products. Using signals from Trellix Intrusion Prevention System, Trellix Network Security, and Trellix Network Forensics products to identify activity after initial infection, customers are now able to prevent lateral movement and data exfiltration. In combination with triage and investigation features, the Trellix NDR solution immediately applies patching to protect against further exploitation. Trellix Network Investigator is complemented by our Detection as a Service subscription. Available now for all Trellix Intrusion Prevention System customers, and deployable with SaaS and private cloud options, customers receive zero-day protection and malware analysis.

Trellix Advanced Research Center

The Advanced Research Center brings together an elite team of security researchers, analysts, and responders to produce novel insights and actionable real-time intelligence. Leveraging security telemetry from Trellix's network of sensors in the market coupled with unparalleled industry intelligence, ensures Trellix technology is powered by cutting edge threat indicators. The Advanced Research Center provides Trellix's 40,000 customers with continuous adversarial research, threat intelligence, product updates, and machine learning algorithms.

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Telecom Minister Ashwini launches InfiBharat Encryption

India Mobile Congress, Day 2 witnessed technological leap with historic launch of 5G and indigenous use cases. Shri Ashwini Vaishnaw, Hon'ble Minister for Communications, Electronics & Information Technology and Railways, Government of India, launched InfiBharat, an indigenous encryption technique developed by Infinity Labs Ltd.

It is a Make in India Security solution launched under Atmanirbhar Bharat drive of the government of India, showcasing Indian technical strength synchronised to global standards. Infinity Labs Ltd is a technology company with a clear vision to Innovate, Automate and Secure the Networks. The inaugural session was also hosted by Mr. Mohit Saxena, CTO, Infinity Labs Ltd.

The minister also inaugurated the VoICE Atmanirbhar Pavilion, comprising of 22 member companies. Infinity labs is the market leader in SDWAN, NGFW and Network Automation Solutions and is a privileged member of VoICE group as it brings together the best of breed companies contributing to make in India mission and collaborating into multiple 5G use cases for revolutionizing the connectivity solutions in the country.



Mr. Rakesh Goyal, CEO, Infinity Labs said, "The launch of InfiBharat marks the beginning of new era of self-reliance in security and encryption domain"

Mr. Mohit Saxena, CTO, Infinity labs Ltd said, "InfiBharat is an indigenous security encryption solution under Atma Nirbhar Bharat mission and marks our ahuti towards this mahayagya"

STL launches Multiverse - India's first Multicore fibre and cable

New Delhi: STL, one of the industry's leading integrators of digital networks, today launched India's first Multicore fibre and cable. This breakthrough innovation will change the optical connectivity landscape of India.

This has been conceptualised and developed indigenously at STL's Centre of Excellence in Maharashtra with top interdisciplinary R&D experts. STL's Multiverse leverages Space Division Multiplexing to gain 4X transmission capacity per fibre, within the same diameter.

Speaking at the launch, Randeep Sekhon, CTO, Bharti Airtel, said, "I am excited to see this optical fibre innovation from a homegrown company. STL's Multiverse fibre and cable will enable 4X capacity and play a vital role in 5G scale-up. I wish STL all the very best for their efforts towards supporting network build outs."

STL Multiverse offers features that can revolutionize connectivity for network builders such as

High capacity per 5G cell site that make it now possible to connect multiple radio heads through a single Multicore fibre and reduce the cabling footprint

for 5G networks

Quad-core fibre connectivity in data centres -Today most advanced fibre cables have ~7000 cores. This advancement takes it upto ~28000 cores, thereby powering connectivity for warehouse-scale computing

Quantum communication feasibility - The growth of quantum communication is expected to support the co-existence of quantum communication and telecommunication channels. Multicore fibre offers exciting possibilities in this emerging area.

Carbon footprint reduction - This greenest-ever optical fibre reduces cable surface area by ~75% and plastic in the ground by ~10%

Commenting on the launch, Dr Badri Gomatam, CTO, STL, said, "We have been doing deep research on optical fibre for over 15 years. In the last three years, we have been able to excel in Multicore technology and indigenously developed this product. We are proud to be the first in India to launch this. STL's Multiverse will revolutionize 5G and data center connectivity, actualise quantum computing at scale and make the internet greener."

Translucia Forays into India partnering with Sunovatech to build US\$3 billion Interconnected Metaverses



New Delhi – Translucia, a subsidiary of T&B Media Global (Thailand), today announced its entry into Indian market by forging a partnership with Sunovatech India, a specialist immersive and Extended Reality Company to build a comprehensive ecosystem with metaverse elements to create a virtual world worth US\$3 billion. In this global alliance, other partners include Sygnum world's first digital asset bank and the first to offer secure "Custody" digital banking, Two Bulls, a Metaverse R&D Center in Melbourne and Black flame. Under the partnership, Sunovatech will act as a production hub for building 3D Assets, Environments and modules of the metaverse.

Sunovatech will design a 3D virtual reality experience for Translucia. Specializing in 3D modeling and rendering design, Sunovatech will be helping to develop 3D assets and environments for visualizing Translucia, using its exceptional Unreal Engine technology development and specialists.

Dr. Jwanwat Ahriyavaromp, Founder and CEO of T&B Media Global and Founder of Translucia, said that partnering with global experts would enable Translucia to perfectly integrate with other metaverses. We are delighted to work with Sunovatech India including our global partners, these partners bring their unique expertise, talent and advanced technologies to help

Translucia achieve its goals. Sunovatech contribution is critical as the talent from India will bring in quality, speed of production, cost efficiency, and commitment."

Translucia aims to develop an 'infinite universe' capable of interconnectivity with other metaverses leveraging Web 3.0 capabilities. The Translucia universe will have shared infrastructure, utilities, technologies, hardware, and software. The development will provide a new experience that leads users to a truly immersive experience that connects the real and virtual worlds.

Dr. Jwanwat further added "Early next year, we'll reveal Translucia's uniqueness in our Virtual Experience launch, letting interested parties get a glimpse of Translucia for the first time."

On the partnership, Mr. Rishi Ahuja, Founder, Sunovatech said "We are really excited to be part of this unique and extensive project, this partnership uniquely opens access to a large volume of 3D Assets for Translucia owned by Sunovatech. We will bring in production speed, finest processes of the Metaverse with harmonized international standards and managed production base in India. Sunovatech's resources will build various components and Assets of the Metaverse as a service contract with various stakeholders to deliver in Translucia interconnected Metaverse."

STL unveils 5G cosmos to help Indian telcos fiberise networks for 5G



- Enable Indian Telcos fiberise 5G networks at a fast pace
- Help create high quality and long-lasting fibre infrastructure for the country

New Delhi: STL, one of the industry's leading integrators of digital networks, today unveiled 5G Cosmos - an optical solution for towers and small cells - to lend speed to the 5G rollout.

As India approaches the much-awaited 5G buildouts, telecom operators need to look at fiberisation with a futuristic lens. India's fiberisation will increase ~3X to 60 Mn fkm annually. Tower and small cell fiberisation will be big drivers. Tower fiberisation must increase from ~35% to ~80% to provide high quality 5G services. Additionally, 5G will require upto 4X small cells, backhauled with fibre.

Despite the intent and capital availability, India's fibre space is constrained by deployment speed and scale. 5G Cosmos is an Atmanirbhar, patented solution that can solve these challenges and connect every tower, small cell and node. It comprises of:

1. 5G optical network topology design - The design will deliver a highly competent network with enhanced scalability, bandwidth, and reduced latency
2. StellarTM Fibre - This bend insensitive fibre, apt for congested 5G topology, minimises data loss and ensures speed through seamless splicing

3. Celesta intelligently bonded ribbon cables- These high-density cables will reduce installation time and optimise project costs
4. Plug-and-Play optical devices- STL's Opto-Bolt and Opto-Blaze offer a pre-connectorised, ruggedised Plug-and-play solution, resulting in faster execution and de-skilling of field installations
5. Automation-led fibre deployment- This technology-led approach offers backhaul fiberisation using robotics and AI-driven field management systems

Launching 5G Cosmos at IMC 2022, Pankaj Miglani, Director Supply Chain Management, Bharti Airtel, said: "We are readying our infrastructure for 5G and fiberisation is a core need. We are happy to see the use cases that 5G Cosmos can solve for telcos and enable us to deliver a great 5G experience to our customers."

STL's Managing Director, Ankit Agarwal, remarked, "Indian telecom operators are ready to install fibre-dense networks for 5G. This will need an integrated and futuristic solution. We have built 5G Cosmos to enable fiberisation of macro and small cells at scale and achieve the full potential of 5G. We wish telecom operators the very best for one of the largest 5G rollouts in the world."

This October 2022, DATAQUEST highlights the challenges in the retention of talent faced by the organisation. A perspective about the new ways to look beyond the workforce.

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UiPath Appoints Lee Hawksley to Lead Company's Asia Pacific and Japan Region



Experienced Twilio and Salesforce executive joins enterprise automation leader to accelerate innovation and drive business transformation and growth.

MUMBAI, INDIA – UiPath (NYSE: PATH), a leading enterprise automation software company, today announced Lee Hawksley has joined the Company as Senior Vice President and Managing Director of Asia Pacific and Japan, effective November 2022. A seasoned executive with more than 20 years' experience in leadership and senior management roles in the technology industry across all of Asia, Hawksley has a track record in leading hyper-growth sales, go-to-market operations, and developing new markets. He will report directly to UiPath Chief Business Officer Chris Weber.

Hawksley most recently served as Senior Vice President and General Manager for Asia Pacific Japan at Twilio, Inc. Prior to that, he was Executive Vice President of Sales at Salesforce, having joined Salesforce by way of the acquisition of ExactTarget in June 2013. Prior to joining ExactTarget, Hawksley was a founder and key driver of two international software businesses – Esker Software and FortyTwo International – the former listing on the French secondary market, Nouveau Marche, and the latter listing on the ASX via Bluefreeway.

“As an experienced and successful sales executive with a deep understanding of the enterprise software market, Lee’s appointment will further help UiPath solidify our leadership across Asia Pacific and Japan,” said Weber. “His experience in leading disruptive

technology companies will be vital, and he is well positioned to engage with the local ecosystem to create new opportunities and strengthen our existing customer and partner relationships. Asia Pacific, India, and Japan hold huge promise for UiPath, and I look forward to accelerating our leadership as the partner of choice for C-suite leaders driving digital transformation initiatives.”

“Asia Pacific and Japan represents one of most diverse and exciting business communities on the planet and in turn, I believe one of the biggest opportunities for UiPath,” said Hawksley. “As businesses of all shapes and sizes, and across all industries, accelerate their digital transformation initiatives, it’s clear that automation is a key value driver that will get bigger over time. As the market leader, UiPath is uniquely positioned to play a key role as a strategic partner to our customers in the region.”

Hawksley is an active participant in and advocate of Australia’s entrepreneur-led innovation economy acting as an advisor, mentor, and investor in several promising Australian start-ups. He is also a thought leader on Digital Transformation and Marketing and regularly speaks at events and conferences.

Hawksley continued: “It’s a privilege to join the company at such an exciting time and to work with the talented team in Asia Pacific and Japan. I’m excited about the future and exploring new and innovative ways to help our customers.”

Tejas Networks wins “Best Made in India Telecom Innovation award” at India Mobile Congress (IMC)

New Delhi, October: Tejas Networks [BSE: 540595, NSE: TEJASNET] today announced that the company has won the “Best Made in India Telecom Innovation” award at IMC yesterday. The company won the award for its ultra-converged broadband networking product, TJ1400 UCB, that has been fully designed, developed and manufactured in India.

Mr. Sanjay Nayak, CEO & Managing Director of Tejas Networks said, “We are honoured to be selected for this prestigious award and thank the jury for their strong endorsement of our “Designed and Made in India” innovation. TJ1400 UCB is the world’s first ultra-converged broadband networking equipment to combine wireless RAN (4G/5G), xPON-based fiber-to-the-home (FTTH), multi-gigabit IP/Ethernet access and packet-optical transmission technologies in a single, compact

shelf. We have seen strong customer success for this versatile product, which has been installed in all major public and private sector networks in India and in several international carrier networks”.

Mr. Arnob Roy, Chief Operating Officer & Executive Director of Tejas Networks said, “The innovation and unique software-defined hardware™ architecture of TJ1400 UCB is a testimony to the outstanding engineering and R&D talent available in Tejas. The recent addition of 4G/5G wireless RAN capabilities vastly expands the addressable market for this product. TJ1400 UCB offers a very compelling value proposition to our customers who now get the flexibility to offer mobile as well as various wireline services from a single equipment, saving them significant amount of capex and opex, and potentially translating to lower service costs for consumers”.

Yotta Forays into Cybersecurity Arena

Mumbai: Yotta Infrastructure has launched its extensive suite of enterprise-grade cybersecurity solutions for the diverse needs of businesses of varied scales. Delivering holistic, end-to-end protection from the evolving threat landscape across Infrastructure, Network, Web, Platform & Application layers, Yotta’s cybersecurity solutions harness the proven domain expertise of industry leaders with cutting-edge infrastructure and service delivery capabilities of Yotta.

Yotta’s Cybersecurity Solutions Suite is infrastructure-agnostic and secures enterprises’ digital assets regardless of where they are hosted – on-premise, multi-tenant colocation or public cloud. Furthermore, with its diverse spread of services, the portfolio effectively caters to the varied cybersecurity needs of enterprises. The cybersecurity services Business Unit will be headed by Rajesh Garg – Yotta’s Chief Digital Officer.

Sunil Gupta, Co-founder & CEO, Yotta Infrastructure, said, “With accelerated digital transformation and growing digital maturity, businesses are staring at the resultant evolving threats. Leaving no area unplugged, enterprises are increasingly demanding robust solutions that place the security of their digital initiatives ahead of the curve. At Yotta, we have always prioritised holistic, fail-proof cybersecurity. We’re now thrilled to launch Yotta’s Smart Cybersecurity suite that safeguards digital transformation at the granular level.”

Yotta’s cybersecurity solutions portfolio comprises a slew of managed, subscription-based solutions



encapsulating Governance & Risk Management, Platform Security, Security Testing Services, Cybersecurity Maturity Assessment, Application Security, Data Leak Prevention, Distributed Denial of Services (DDoS) Protection, Managed Detection & Response (MDR), Endpoint Security and End-user Protection among other areas. The services under the cybersecurity portfolio are unique and offered in partnership with leading security companies like Check Point, Radware, Sectona, Virsec, Zeronsec, and more.

Speaking on the occasion, Rajesh Garg, EVP, Chief Digital Officer & Head - Cybersecurity, Yotta Infrastructure, said, “Businesses are climbing new heights of digitisation, and at the same time, they are also exposed to an increasingly complex cyber threat landscape. While organisations want to maintain a stringent security posture, this often happens in isolation. With our newest portfolio of comprehensive as-a-service cybersecurity solutions, enterprises can be equipped with robust security across multiple layers of their digital footprint. As a result, they can safeguard their critical assets and relieve their teams from the mind-numbing task of gatekeeping their IT environment.”

Digital marketing company, CMRSL listed on NSE; opens with 43.06% premium

One of India's leading digital marketing companies, Cybermedia Research & Service Limited (CMRSL) was listed on the National Stock Exchange (NSE) today. Beginning on a positive note, the CMRSL IPO opened on NSE with a 43.06% premium. The listing of its shares on the regulated market of NSE is an empowering step towards strengthening the future of digital marketing in India.

The ad-tech and data analytics company had earlier announced the launch of its Initial Public Offering (IPO) of 7,80,000 shares. The issue with a face value of Rs 10 per share had remained open for investors between 27-29 September 2022 for listing on National Stock Exchange (NSE) Emerge.

More importantly, the issue was oversubscribed by 29.55x times, highlighting the positive attitude of investors.

Redefining the digital experience for everyone in the ad tech ecosystem, CMRSL has been offering proprietary digital marketing solutions using Artificial Intelligence and Machine Learning (AI/ML), including CM Galaxy for advertisers, Cyber Ads for programmatic advertisements, and Auxo Ads for publishers.

CMRSL has four revenue streams: Digital Marketing, Programmatic Media Buying, Publisher Monetization, and Data Analytics, which together form the pillars of the digital marketing landscape.

Highlighting the success of its issue, Dhaval Gupta, Managing Director, CMRSL, said, "Cybermedia Research & Service Limited (CMRSL) is crossing a new threshold in its development by going public. The funds raised will allow us to invest in our innovative technology platform and to implement our ambitious strategy of bringing newer products to our consumers. We are delighted to welcome the investors and partners on this new endeavour."

"I would like to thank our teams, all of whom showed a great commitment in preparing our IPO and fulfilling our mission of providing proprietary platforms and solutions that enable advertisers and publishers to match the right ad with the right user. This helps drive higher conversions



CMRSL Management Team, (R-L): Thomas George, President, CMRSL; Dhaval Gupta, Managing Director, CMRSL; Pradeep Gupta, Chairman, CMRSL



(R-L) Yogesh Jain, Step Up Capital; Gaurav Kapoor, Vice President, NSE; Pradeep Gupta, Chairman CMRSL; Dhaval Gupta, Managing Director, CMRSL.

and sales for advertisers and enables publishers to earn more," he added.

With over three decades of experience and 500+ Clients, the CyberMedia-backed company is all set to embark on a new growth journey with this listing.

If you are keen on being part of their growth journey, you can follow their Scrip, 'CMRSL' on NSE Emerge and check their progress here: Cyber Media Research & Services Limited Share Price Today, Stock Price, Live NSE News, Quotes, Tips – NSE India.



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