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VOL 27 ISSUE 04 APRIL 2020

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COLLABORATED WE STAND

COVID-19 has made WFH happen at an unprecedented scale. Here is how companies in India are dealing with it

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Voice&Data is printed and published by Pradeep Gupta on behalf of Cyber Media (India) Ltd, D-74, Panchsheel Enclave, New Delhi - 110 017, and printed by him at Ratna Offset, C-101, Okhla Industrial Area Phase—I, New Delhi – 110 020. Editor: Syed Ibrahim Ahmad

SUBSCRIPTION: Foreign— US $40 (SAARC Countries),
US $50 (Rest of the world).
For Subscription queries contact rsevoicendata@cybermedia.co.in

All Payments Favoring: CYBER MEDIA (INDIA) LTD
Distributors in India: IBH Books & Magazines Dist. Pvt. Ltd, Mumbai.

Corporate Website: www.cybermedia.co.in
www.ciol.com (India's #1 IT Portal)

April 2020

[CONTENTS]

[CONTENTS]

COVER STORY

STRATEGY

INTERVIEW

VIEWPOINT

INSIGHT

RESEARCH

TECHNOLOGY

REPORT

REGULARS

[NEXT ISSUE]

MARCH 2020

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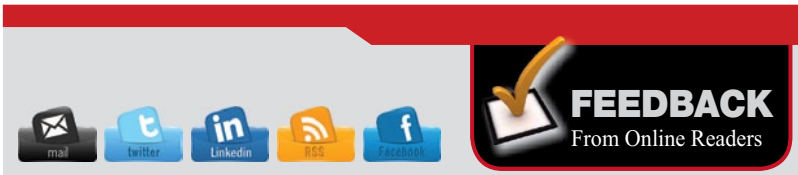

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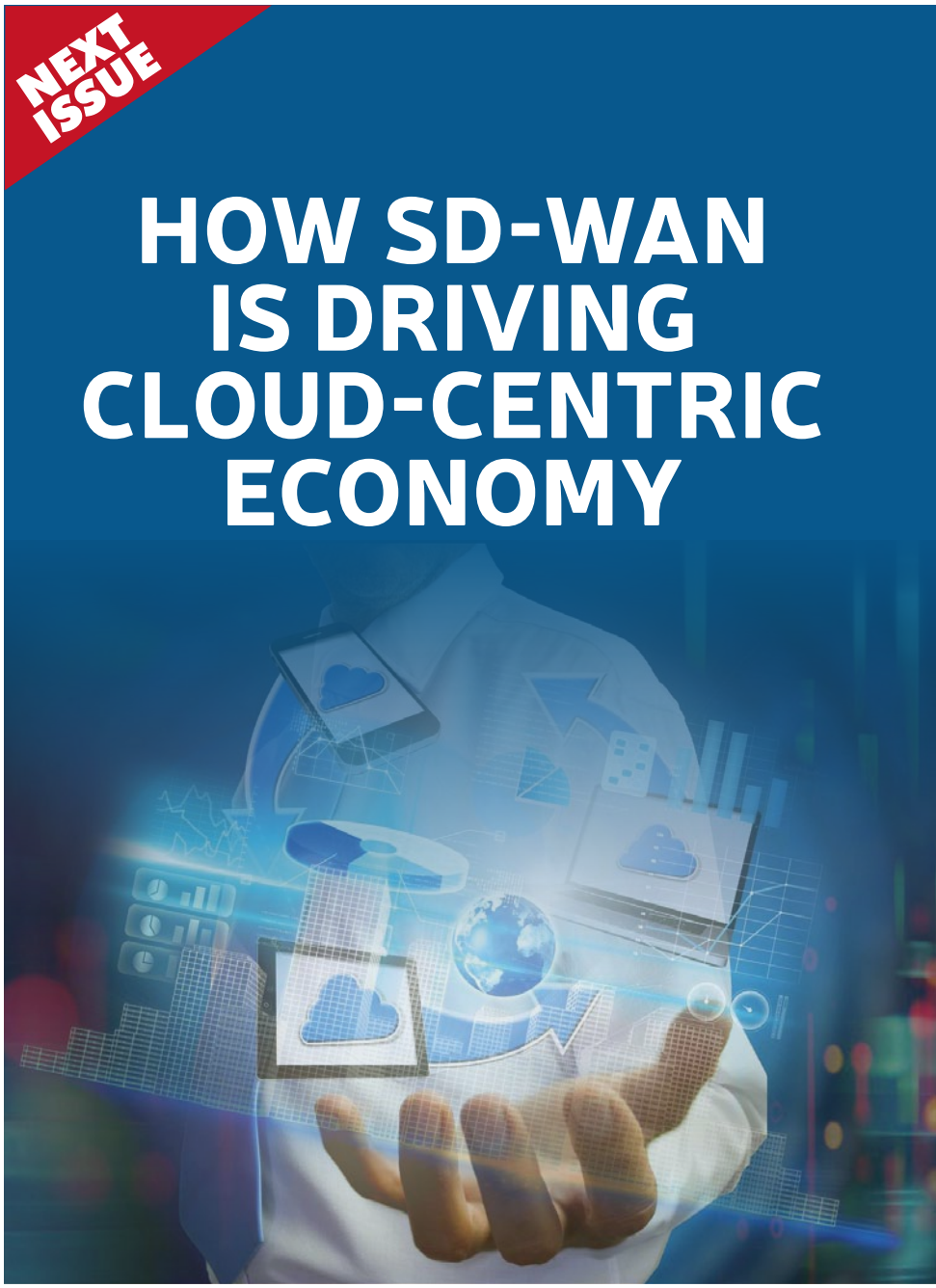

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SHUBHENDU
PARTH

[OPENING NOTE]

Getting ready for India after COVID-19

The world is on its knee, and how. While there have been innumerable attempts to harm the world by the state- and non-state actors who have spent an astronomically absurd amount on weapons and wars, the magnitude of the disaster caused by COVID-19 is unprecedented. The novel Coronavirus has infected over 2.4 million people in 210 countries and territories and has snuffed out 167,000 lives so far.

While the fight against the deadly virus has so far proved to be an uphill task, it is only a matter of time when the human ingenuity will be able to catch up, and get the vaccine ready to end the pandemic that has started to ruin human health, businesses, livelihood and put the global economy under economic stress, which is the worst since the Great Depression of the 1930s.

India has moved to the second phase of nation-wide lockdown and hopes to make steady progress in containing the spread of the disease. However, the post-COVID-19 path to recovery of the economy will be exigent and require much more than just a sincere effort. It will also need innovative measures, including substantial fiscal sops to stimulate the economy to recover what has lost.

While the government has taken the right step by amending the FDI policy to prevent "opportunistic takeovers" of firms affected by the crisis, it also needs to take steps to help the SMB sector tide over short-term cash flow problem. This is also the time for India to prepare herself for the post-COVID-19 world that has started to see "made in China" as a dirty word. To capitalize on this opportunity and become a potential global supplier of electronics, India needs further improve on all 10 parameters related to ease of doing business.

On the USP front, it may take a leaf from the Circular Economy Action Plan adopted by the European Commission (EC) in March this year. The action plan envisages steps for increasing the average life cycle of products and strengthening competitiveness, while protecting the environment, and enacting new consumer rights.

Under the new initiative, the Commission aims to propose legislation on Sustainable Product Policy to ensure that products sold in the EU market are designed to last longer, are easier to reuse, repair and recycle, and incorporate as much as possible recycled material instead of primary raw material. The new Action Plan also includes initiatives from design and manufacturing, to consumption, repair, reuse, recycling, and bringing resources back into the economy, and is at the core of the European Green Deal, the EU roadmap towards climate-neutrality.

An early adoption of similar legislation by India will certainly help the country boost its "Make in India" initiative and increase the FDI inflow from Europe and other environmentally conscious countries. While this will add up to the other revival measures, it will also enable circularity as the way of life and speed up the green transition of India's economy, which is an important aspect of the SDG.

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COLLABORATED WE STAND

While we had the technology to create a mesh of remote workers, COVID-19 pushed its adoption at an unprecedented scale. Here is how companies in India are dealing with it

BY JATINDER SINGH

At the outset of 2020, nobody would have thought that the world would be facing one of the most difficult times since World War II or any of the known health crisis within a few months. It would have seemed improbable that the entire human race would be engaged in an uphill battle against a contagious virus with no cure and COVID-19 bringing public life to a standstill.

Amid government's lockdown measures to contain the virus spread, many businesses are finding it difficult to meet their contractual obligations despite their best intention. Holding face-to-face meetings have become unworkable, uncertainty is palpable, and work-from-home has become the new normal.

In such a scenario, when communicating with clients and employees has become more significant than ever, adoption of good technology and availability of uninterrupted connectivity is the only way that can help businesses survive and sail through such challenging times. It is interesting to note that the telcos faced an unprecedented 40-45% surge in the demand for data volume during the initial week of the lockdown, with a majority of this spike happening because of remote working.

Optimizing remote work tools

Amid the ongoing pandemic, besides accomplishing work-related projects, employees are dealing with stress and anxiety, and hence need uninterrupted access to data connectivity and seamless platforms so that they can share their ideas and grievances. This has compelled organizations across the globe to utilize digital tools and solutions—from web conferencing and e-mail to mobile collaboration suits and virtual event platforms—to engage their employees, protect their health and ensure business continuity.

Virtual collaboration tools are being used not only to enable employees to work together remotely on everyday work-related tasks, but are also empowering organizations to conduct coordinated sessions such as weekly meetings, workshops, training, fun activities, and yoga sessions for employees in multiple locations.

"The ability to stay connected, collaborate, and get secure access to all work-related documents remotely has become more critical than ever. Organizations are also taking appropriate measures to keep track of their employee's health and well-being. These have become the core to ensure that business continuity and connectivity is maintained, and work continues," says Vinay Bhartia, India's head of Lark, a remote collaboration solutions provider company.

Zoom, WhatsApp, Microsoft Teams, Skype, Cisco WebEx, Slack, Lark, Google Meet are some of the prominent collaboration tools being used by enterprises

"The ability to stay connected, collaborate, and get secure access to all work-related documents remotely has become more critical than ever."

Vinay Bhartia, India Head, Lark

"Apart from last-mile connectivity to ensure customer delight, the insurance sector must unite to find solutions and new ways to interact with customers virtually."

Mohit Rochlani, Director – IT & Operations, IndiaFirst Life Insurance Company Limited

across sectors to stay connected with their remote teams (see Voice&Data Top 5). Many of these tools are also equipped with real-time language translation solutions, helping global organizations connect effectively in a global virtual environment.

During this lockdown period, Raritan is ensuring that its customers are not left behind and is constantly providing support on different platforms for easy communication and service. "We are using Office 365 Teams, teleconferencing, and 8x8 video conferencing tools for customer interactions. We have also ensured remote maintenance of their systems, along with collection and saving of video snapshots from equipment for viewing and sharing device status with multiple users," says Anjani Kommisetti, Country Manager, India & SAARC, Raritan & Servertech, a power, access and control solutions provider.

Because of the lockdown many companies are forced to shut down their local offices, logistics, shipments and deliveries. Yet, despite these challenges, many are still able to create opportunities due to effective remote work management policies. "We have suspended field operations as per the government directives and are mitigating the impact via mobility solutions. Our senior management is continuously in touch with our employees via videoconferencing solutions to minimize the disruption in business processes," says Mangesh Wadaje, CEO, Highbar Technocrat Limited, an enterprise business solutions provider.

The company is helping its clients to cope with this complexity through many best practices and cloud-based tools such as ERP, electronic Document Management Solution (DMS), business intelligence, IoT and CRM.

But are all employees comfortable with these tools and work-from-home concept?

"Understandably, it is a new experience for many, and we are adapting ourselves to respond in the most efficient way. Apart from last-mile connectivity to ensure customer delight, the insurance sector must unite to find solutions and new ways to interact with customers virtually. Strengthening of Salesforce tools is also a must. The collaboration platforms need to look beyond communication and file sharing, evolve to enable business and operational process visibility," says Mohit Rochlani, Director – IT and Operations, IndiaFirst Life Insurance Company Limited.

There are also companies like Anmol Feeds who have their own challenges. The company manufactures livestock feed, which has been categorized as an essential commodity and exempted from the lockdown. "Our team from the office has been working from their respective homes to ensure continuity in every aspect of the business. Apart from phone calls, we use mobile apps like WhatsApp to communicate with every employee of the company. Further online meetings are scheduled using videoconferencing tools like Zoom. We are also using a dedicated toll-free number for

"We have a virtual cafe set up where employees can hang out and share a cup of coffee together. This is a 'water cooler' zone that we are trying to create."

Kavita Viswanath, GM, Jfrog (India)

taking up orders and ensuring no there are no hiccups in fulfil the market demand," says Amit Saraogi, MD, Anmol Feeds.

Choosing the right solution

Like any technology implementation, every collaboration tool has its own benefits and limitations and may not appeal to all sectors alike. According to industry experts, one should not expect a collaboration tool to do wonder even if it is the best in the market. It is important for every organization to use its own discernment before deploying any such tools.

"With work from home being a new normal, it is imperative that you deploy the right set of tools to keep distant teams connected on a day-to-day basis, for ensuring business as usual. Digital collaboration tools definitely help the teams but these may be specific to organizational requirements and may differ from one to another," elucidates Alok Malik, Associate VP and Head of Global Information Security, GlobalLogic.

While deploying any technology solution, businesses also need to ensure that the tools are suited to work in the existing IT infrastructure of a company. It is also important to consider factors such as organizations' security ecosystem, service support, ease of use, employee understanding and manageability while selecting the platform.

For many enterprises catering to hospitality and travel, these are overwhelming times. "Work from home as a policy is commonly followed by our teams in times of personal need but when we implemented a self-quarantine policy for team members, it seemed almost difficult to function. Time like this, where the entire office across the cities including our sales team who are majorly on the field will work from home is something we never imagined," says Ankit Mehrotra, Co-Founder and CEO of Dineout, a dining out and restaurant tech solutions platform.

The new-age company says it is leveraging tools such as Google Hangouts, Slack, Trello, and Google Meets to enable work-from-home and to ensure business continuity.

However, for online and digital company like ADDA that provides app-based management solution for gated communities the transition was relatively easier. "From the very beginning our system has been crafted in such a way that we can attend to our work from anywhere and at anytime. This foundation is coming in handy today. The ADDA app has in built systems to ensure going to an external platform to communicate with the support team is not necessary," says San Banerjee, CEO of the company.

CallHealth Services, which provides healthcare consultation through its online platform, also has a similar story to share. "Our platform by design is enabled for virtual engagement for both internal and external meetings. We have different home-grown solutions for managing our Contact Centre inbound and outbound calls, for managing our audio and video consultations between doctors and customers, and for managing internal collaboration through chat, audio, and video mediums," highlights Ratnesh Sharma, the company's Partner Ecosystem and Chief of Human Resources Operations.

Security is the key

One of the important questions that many organizations had to think about was their preparedness to open up the entire information and data infrastructure to multiple, external home- and mobile-networks, which in turn can prove to be a security nightmare. While many of the new-age organizations, including IT and services companies and start-ups, were comparatively less worried, a majority in the manufacturing sector and those with higher headcounts and multiple operational teams had a bigger task cut out for them.

"Being FY closing, it was critical that departments are able to work together seamlessly. It was also important to

"Despite being the financial year-end, our business operation went on as usual, like any other normal day."

Malaya Kanta Barik, General Manager-IT & CISO, Shriram General Insurance Co

"We are maintaining business continuity by focusing on preventing outage through redundancy of telecommunications, systems and business operations."

Adarsh Noronha, Director-Indian sub-continent, HubSpot

ensure that we continue to service our partners without disruption," says Neeraj Mehta, Head of Corporate IT at Apollo Tyres. "While opening our core restricted area for operations from home, we had to take utmost care about the protection from possible data leakage. Users were advised not to download data on their personal machines and all large queries, and report creations are being monitored by the Business Applications Support teams."

His concerns were echoed by Sterling & Wilson's Chief Information Officer Manoj Deorukhkar: "The sudden lockdown meant that many employees did not have their laptops to work from home and there was no way for them to pick it up from the office. Hence, employees started using their personal computers. This prompted us to quickly come up with Use Your Own Device (UYOD) policy, with necessary precautions, to ensure continuity of work."

"This large scale (almost 100%) shift to work-from-home had a massive implication on IT security posture, especially on network and application security. This involved revisiting our security policy, processes, and tools," he added.

"For resources without a laptop, we made arrangements to handover the devices with only the required software. These have been configured in a way that no new software can be installed without the approval from the admin. We also ensured that data transfer access using USB was disabled," R Mohan, Chief Innovative Officer at FIA Global said.

Most of the organizations that responded to the Voice&Data survey indicated that they facilitated Virtual Private Network (VPN) to all remote-workers to ensure seamless and secure access to business and critical applications like ERP and CRM. "While we are using several tech tools for our internal and external communication to maintain transparency in work, VPN connectivity and Citrix log in is helping us manage work desk at home and provide global support," says Shivaji Chatterjee, Sr. VP and Head of Enterprise Business at Hughes Communications India.

Reports also indicate government organizations were not behind in quickly ramping up their infrastructure to enable remote working. The Goods and Services Network (GSTN), for example, provided VPN for its 1,700 tax officers across India to enable them to work from home. This enabled the officers to process over 10,000 new GSTN registrations and about 8,000 refund applications during the first 10 days of lockdown until 3 April 2020.

Planning for business continuity

While many enterprises had already spotted the future of work early and were ready to deal with the situations like lockdown, several others were caught off guard. A virtual meeting is a good idea to dodge disruptions, however only for those who are prepared for this sudden transition.

"We had decided to move to a work from home scenario, even before the lockdown, which—looking back—proved to be a smart move. We had identified such employees who did not have a reliable internet connection

"We had anticipated that people would have connectivity issues as they move out of the cities and back to their home towns."

Aftab Ullah, Chief Operating & Delivery Officer, Brillio

and asked them to procure internet devices such as a WiFi or a portable internet connection such as JioFi. We ensured that our employees have access to at least two different networks at their respective places," says Amit Aggarwal, Co-Founder and Director of Effectual Services, an advisory firm offering IP support solutions.

Situation like this presents loss of productivity and low employee morale due to lack of continuous face-to-face interactions and discussion when the workplaces are active. Moreover, the market sentiments are expectedly low, and uncertainty is looming large. For many companies, existing customers have either asked to temporarily discontinue their services or make payment considerations. The absence of a strong business continuity plan can, hence, make it really difficult to keep your workforce motivated while staying afloat in the business.

According to Aftab Ullah, Chief Operating & Delivery Officer of Brillio, it took the organization five working days to implement 100% WFH across all its offices globally. "We were fully on the cloud, had laptops for all our people, and most importantly had an organizational culture that had previously been very flexible with WFH. Of course, we had to augment connectivity infrastructure for our people, especially since we anticipated that people would have connectivity issues as they also moved out of the cities back to their home towns," he said.

Industry experts point out that business continuity planning should be built with a sense of urgency and empathy. "To ensure the health and safety of our employees and of the communities, we serve we closed all global offices and implemented remote working all across the organization. We are in the process of evaluating if anything requires shutting down. However, we are maintaining business continuity and disaster recovery plans focusing on preventing outage through redundancy of telecommunications, systems and business operations, and rapid recovery strategies in the event of an availability or performance issue," says Adarsh Noronha, Director of Indian Sub-Continent at HubSpot.

Understandably, due to the current travel restrictions and work-from-home policy implementation, companies are experiencing higher traffic on their digital channels, requiring them to grow their IT capabilities. "We've had multiple all-hands meeting globally, daily stand-up routines that cover the entire firm, and digital channels like WhatsApp groups, Teams and Slack channels to make sure that everyone is hearing directly from the leaders and the leaders are able to rapidly change policies and support for our people as we all adjust to this new normal," says Ullah.

It is important that organizations which started late should also look at providing virtual training for those employees, who may not be at ease with working from home. It's equally important that the technology is used to engage employees, not just from a work perspective, but also to conduct team-building activities in these stressful times. "As far as the work environment is concerned, we have virtual cafes setup where employees hang out, share a cup of coffee together etc. This is a 'water cooler' zone that we are trying to create. We also have a separate Slack channel where we share jokes, memes, etc to keep the laughter going during such stressful times," says Kavita Viswanath, GM of Jfrog (India), a company that provides DevOps solutions and platforms for enterprises.

It is likewise important to note that in such conditions, the overall risk to the data also gets increased. This may require organizations, especially who are new to the remote work culture, to revisit some of their policies, evaluate and upgrade latest technologies and identify areas to ensure a secure work from home experience of their employees.

"Our business continuity planning efforts are mainly concerned with keeping the organization's business operation intact while ensuring every individual's safety. We have allowed work-from-home for all employees,

Tech practices for the remote workforce

GET SUITABLE COLLABORATION TOOL: Supporting employees to work remotely by providing them access to the best collaboration technologies and tools such as Zoom, Microsoft Teams, WebEx, Skype, Yammer, Google Hangouts, WhatsApp, GotoMeeting, Slack, Flowdock, Google Docs, and Quip, among others.

PRIORITIZE COMMUNICATION PLAN: During tough times like these, communication is paramount, be it internally amongst employees or with customers. Ensure daily check-ins with teams so that work continues to progress without any hiccups.

PROVIDE WORK ESSENTIALS: For resources not possessing a laptop or work essentials, organizations should arrange to hand over the devices installed with only approved software, configured with all security measures.

ENABLE WEB SUPPORT: Ensure that the technologies deployed such as laptops, private corporate networks, or even employee communications and collaboration tools are at par to support our workforce working remotely for extended periods.

PROVISION DATA CONNECTIVITY: Talk to your connectivity service providers to ensure uninterrupted network connectivity supply from their end. Ensure taking various technical measures for network connectivity and provide redundancy through datacards and mobile connectivity.

PROVIDE REGULAR TRAINING: Leverage virtual training tools, and a transparent reporting mechanism to ensure that employees work is fully visible, and they stay highly productive during this time.

ENACT STRONG POLICIES: Implement strong policies to ensure that all critical data remains within the company's IT perimeter and doesn't go out unless it is absolutely required and is approved by the relevant management team members.

"We have suspended field operations as per the government directives and are mitigating the impact via mobility solutions."

Mangesh Wadaje, CEO, Highbar Technocrat Limited

be at the branch locations or at centralized support office and meticulously planned the entire strategy and executed the same in a minimal timeframe providing the necessary remote infrastructure to all employees. In fact, despite being the financial year-end, our business operation went on as usual, like any other normal day," says Malaya Kanta Barik, General Manager IT and CISO, Shriram General Insurance Co.

Getting ready for the future

Over the next few months as we come out and fight this crisis, organizations across the world are expected to gain solid experience and take in how remote processes can be done effectively. Clients are also expected to gain meaningful comfort with remote ways of working. Social media is playing an important role too, and many companies are constantly available on their social media platforms for customer interactions.

Sensing slowdown in business, many companies are utilizing the time to innovate and rework their strategies for the future. "We are using this time to rework on our business strategies and research designs. We expect to develop advanced products when the market opens for business. We are also leveraging our social media channels to keep in touch with our existing and prospective customers," says Tarun Bhutani, Managing Director, AMANI, a mobile accessories company.

Many start-ups and technology providers are also offering extended trials to their solutions to keep their customers engaged and help them cut costs during these times. "Regarding new clients, most organizations are reluctant to experiment with new technologies during the uncertainty. We have tried to cushion this by giving all new customers a free two-month trial to ride this storm and experiment with the product," says Siddharth Goenka, CEO and Founder, Aiosell Technologies, a Bengaluru-based B2B startup that leverages artificial intelligence (AI) and machine learning (ML) for dynamic pricing and revenue optimization of hotels.

Similarly, leading technology company Salesforce has made some of their technology solutions free for the next couple of months to help their customers and partners navigate through the crisis. The company recently launched Salesforce Care rapid response solutions to help users stay connected to their employees, customers and communities. Besides, it has also made available Quip Starter, a suite of collaborative platforms, to any business and is providing access to Health Cloud for healthcare systems experiencing an influx of COVID-19 requests.

In its report 'Coronavirus People Technology Path', Deloitte notes that the current crisis is a big opportunity for organizations to accelerate into the future of work. According to the point of perspective, many of the major technology shifts proposed are either underway or should be underway for many organizations. As the current crisis unfolds, there is an opportunity to accelerate these efforts.

"The key is to enable present workarounds and use this as an opportunity to shape the future ways of working, which are more efficient, effective and collaborative, beyond the boundaries of the function and the enterprise," Deloitte adds.

Given the history of such pandemics, remaining focused, calm and human-centric behaviour should guide most organizations through the new normal. In the long-term, however, according to the industry experts, the lessons learned from the temporary crisis will present an opportunity for organizations to create a more resilient workforce, with a focus on employee health and well-being, enabled through a new perspective on the digital workplace.

With inputs from Shubhendu Parth

This report was prepared based on insight from over 35 industry and enterprise experts, some of whom have been quoted, while inputs from others have been presented as interviews and columns in the print and on V&D website.

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Enabling remote-working during COVID-19 times

Zoom, WhatsApp, Microsoft Teams, Skype, and Webex are most used collaboration and conferencing tools during lockdown in India

BY SHUBHENDU PARTH

Security and privacy concerns notwithstanding, the US-based video meeting app Zoom has clearly emerged as the preferred collaboration and conferencing tool being used in India by remote workers to ensure business continuity during the lockdown in the country.

It is followed by WhatsApp and Microsoft Teams, which share the top three slots of the most-used tools by the corporate sector to facilitate work-from-home and during the COVID-19 times.

According to an industry survey by Voice&Data, an overwhelming 54% of corporate respondents in India indicated that they were using Zoom as a tool to enable collaboration between remote workers, as well as for communicating and networking with clients since 25 March 2020, when the nationwide lockdown became effective in India.

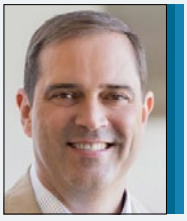
While 40% of respondents said they use WhatsApp, over 31% indicated using Microsoft Teams for collaboration and communication. Skype and Webex are the other two most popular tools ranking #4 and #5 respectively, with 29% and 26% of those surveyed saying they are using these for business continuity.

It is important to note that most of the respondents indicated that they are using two to three different tools for their business collaboration and communication needs during the lockdown phase.

Reacting to the news, Zoom Video Communications India country leader Sameer Raje said, "It is truly an honour to be recognized as the #1 collaboration and communication tool used by organizations in the country. This endorses our core values of being transparent, honest and caring with a focus of delivering happiness."

"To support and secure this massive growth, we are taking an aggressive, proactive posture to get well ahead of the highest demands on record."

Chuck Robbins, Chairman & CEO, Cisco



"We have seen the acceptance of our solution across a wide spectrum of organizations, from small to very large enterprises, and industry verticals."

Sameer Raje, India Country Leader, Zoom Video Communications

"The ability of our platform to perform through fluctuating bandwidth makes it a real winner in India. While the simple and easy to use interface ensures speedy end-user acceptance and adoption, robust controls, report, and visibility for the IT team makes it a platform they can trust. We have seen the acceptance of our solution across a wide spectrum of organizations, from small to very large enterprises, and industry verticals. We will continue our journey with the same dedicated focus on keeping our customers happy," Raje stated.

Commenting on the massive growth of Webex, Cisco Chairman and CEO Chuck Robbins said, "We've seen the need for collaboration technology skyrocket, and the demand for our secure Webex capabilities increase dramatically. We have also hosted 14 billion meeting minutes in March, more than double the number in February. To support and secure this massive growth, we are taking an aggressive, proactive posture to get well ahead of the highest demands on record."

He further stated that being the world's largest enterprise security company Cisco was uniquely positioned to protect customers as their workforces go remote.

Reflecting on the role played by WhatsApp during the lockdown, the company's Head of India Abhijit Bose said: "The global crisis is having an unprecedented impact on people all around the world, and we are happy that businesses across India are finding WhatsApp to be a lifeline to communicate and collaborate with those who matter the most—their colleagues and customers in a reliable and secure way."

Speaking on the role played by Microsoft Teams, which is a part of the Microsoft 365 solution stack, the company's Modern Workplace Country Head for India Samik Roy said that Teams enables communication and collaboration in a secured environment and is designed as a virtual office that one can take anywhere they go.

"You can quickly jump into calls and meetings, collaborate by co-creating and co-authoring documents directly, and securely store files where the right people can access them. In the absence of a physical conference room, bringing everyone together can feel like the biggest remote-work challenge," he said, adding that the meetings functionality in Teams help in creating an online conference room and remote meetings on Teams can be as effective as being present in person.

"Features like background blur, real-time noise suppression, meeting recording and many more can be leveraged by users to get more out of working on Teams. In remote working environments, security often gets compromised as users are not working on office networks or organizations devices. Security and privacy should be of paramount importance as users and devices are vulnerable to attacks. We offer a variety of privacy and security controls for video conferences in Teams, safeguard your privacy by design, protect your identity and account information as well as your data from cybersecurity threats and comply with global, national, regional, and industry-specific regulations," Roy said.

"Businesses across India are finding WhatsApp to be a lifeline to communicate and collaborate with those who matter the most in a reliable and secure way."

Abhijit Bose, Head of India, WhatsApp

"Teams enables communication and collaboration in a secured environment and is designed as a virtual office that you can take anywhere you go."

Samik Roy, Country Head, Modern Workplace, Microsoft India

Overall the respondents listed 17 different tools, including Google Hangouts (20%) and Slack (11%). The other tools and apps used by the companies to facilitate communication during work-from-home due to lockdown in India include Bluejeans, Facetime, Google Duo, GoToMeeting, Lifesize, Loom, Ozonetel, Tencent QQ, and WeChat.

However, some of the organizations also indicated using their own proprietary tools for both, internal and external communication and collaboration, including that with the partners. Salesforce, for example, informed that globally the organization uses Quip, the collaborative platforms that it acquired in July 2016. The platform helps combine documents, spreadsheets, and chat enabling the distributed teams to work together effectively.

Similarly, besides using off-the-shelf communication tools, Orange Business Services (India) also uses its internal social networking tool 'Plazza'. The legal support services company Effectual Services indicated using its internal chat interface Pidgin, while Simpliance—a Bengaluru-based compliance technology startup—uses its online virtual office 'Sococo'.

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"REMOTE WORKING IS NOT NEW TO CISCO"

DHARMENDRA RANGAIN
CIO, Cisco India & SAARC

On business continuity process and plan

Cisco has a well-established process to coordinate our efforts during an event like this. We are conducting all meetings and discussions over Webex; even our customer briefings, proof of concept proposals, etc. are being delivered virtually. With the relaxation of the regulation on other service providers (OSP) by the Department of Telecommunications, we have implemented WFH solutions for our customer support specialists.

On collaboration and communication tools being used during WFH

Remote working is not new to Cisco. We were among the early adopters of flexible timings and now provide the work-from-anywhere option to over 80% of our workforce. To ensure productivity, Cisco has a vast portfolio of solutions that enable seamless and secure collaboration from anywhere, anytime, and on any device.

During this time, Webex Teams is our preferred tool for virtual collaboration. Over the last few weeks, our videoconferencing tools have been leveraged across industries to enable employees, business leaders, and governments to stay connected. We are also working towards enabling schools, colleges, and medical facilities to connect remotely.

On tools to keep customer service up and running during the lockdown

To support businesses in making the shift to working from home, we have expanded our capabilities on Webex and extended free licenses for key security technologies. We are also partnering closely with customers, who are rapidly scaling their work-from-home efforts, and ensuring they get the support they need at this time.

On strategies and facilities to enable safe and secure remote connectivity

As early adopters of flexible timings, and with a large number of our employees having the flexibility to work from home, we have always prioritized the need for comprehensive security that allows safe and secure collaboration from anywhere, and on any device. To this effect, we have fine-tuned various solutions to provide the best user experience possible without compromising on security. We use multiple layers of defense to ensure secure remote working at scale.

On access devices to facilitate work-from-home

While Cisco's Webex platform offers a user-friendly interface and can be accessed from any device, like a mobile phone, for a lot of employees, their homes may just not be very conducive to work. Bandwidth issues may lead to an unproductive work atmosphere. Here, it is important to optimize bandwidth availability and help them stay productive and motivated while working from home.

On technology and business challenges faced by the company during the lockdown

We all had to adapt quickly to a dynamic situation and respond to unprecedented scenarios. At times like these, organizations face two challenges in enabling productive and safe work from home. The first is data security. As work boundaries extend beyond the office, it is essential to put in place a robust security infrastructure that can support remote working at scale.

The second challenge, one that organizations may find more daunting, is facilitating a mind-shift amongst their employees. Here, leaders must work towards easing the shift to a new way of working, without a loss in delivery and operations.

At Cisco, we are encouraging our employees to communicate regularly with each other and to our customers and partners, leveraging technology to stay connected, and dispense support and expertise as the need arise.

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"WE ENABLED REMOTE AND LOCAL ACCESS WITH MULTIPLE USERS"

ANJANI KOMMISETTI
Country Manager (India & SAARC), Raritan & Servertech

On business continuity process and plan

Our India operations are mostly related to sales and we don't have any factories in the country. Because of the lockdown, our local offices, logistics, shipments, deliveries have been shut down. However, despite these challenges our business is running smoothly even remotely, considering we're in the business of remote management solutions for more than two decades.

On collaboration and communication tools being used during WFH

We have trained the resources to use online tools like Office 365 Teams and Skype to conduct meetings, training, and have established an online support system for our customers as well. We also use telephone conferencing and 8x8 video conferencing tools.

On tools to keep customer service up and running during the lockdown

During this lockdown period, Raritan is ensuring that its customers are not left behind, and we are constantly providing them with telephonic support and our teams are waiting on different platforms for easy communication and service. We have also ensured remote maintenance of their systems, along with collection and saving video snapshots from equipment for viewing and sharing device status with multiple users.

On strategies and facilities to enable safe and secure remote connectivity

Accessing tools from home, from a security point of view has been addressed way back when the industry moved from IPSEC VPN connections to SSL VPN secured connectivity. And today, we have tools like office 365 teams that are completely on the cloud and nothing has to be installed at the branch office or on an individual's device. Employees realize that they now have limited access to the IT help desk and as a measure, all these employees have been given online training to ensure they are well equipped on their own. We have several types of training that are accessible on our website by simply logging in.

On access devices to facilitate work-from-home

We have enabled remote and local access with multiple users. Enabling access from smartphones, mobile devices, laptops, PCs or workstations allows control of equipment by different-level personnel over the corporate network for uninterrupted operations.

On technology and business challenges faced by the company during the lockdown

We offer KVM and IP solutions on very secure connectivity. The best part of this is that one can reach the test machines, lab machines or the data centers even when the core network is not available. With these kinds of solutions being offered to the world, one can say that we are technologically equipped to manage our work internally as well. From a business standpoint, we have seen many of our customers—R&D labs and data centers—sourcing more of KVM solutions during the last one-to-two months. There has been a dependency on Indian labs and for employees to have access to colleagues, customers from other locations like Europe, China, and the US. These labs have been equipped to give remote management, which can also help in conducting a real lab test and development activity, which usually requires a physical presence.

Our KVM or IP solutions have enabled our customers to have the same feel and the control as if they are in front of the machine. The only challenge is that we are unable to move any equipment from our warehouse to customers or import some of the goods due to the complete lockdown of freight forwarders, couriers and logistics currently in the country and other locations.

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"REMOTE WORKING CULTURE IS ON THE RISE"

ASHISH CHATTORAJ
CHRO, PayU India

On business continuity process and plan

While it may seem difficult to get entire teams to work remotely, the reality is that remote working culture is on the rise. Our business continuity and security policies are designed to adhere to this principle and regular rehearsals on these principles make us well-equipped to manage the new situation of working remotely

We have put in place a robust business continuity plan to ensure that business runs as usual and our merchants, employees, and vendors do not get impacted. All our employees are using video calls, messaging, collaboration and document sharing tools to enable smooth functioning of operations. We are focused that our productivity should not go down during these challenging times and have advised our employees to work with their managers on productivity metrics.

The IT support has enabled VPN connections for everyone and they are on standby to troubleshoot any problems on hardware, software, connectivity, the performance of systems and applications.

PayU is also helping local businesses by assisting them in going online and accepting payments digitally. Besides ensuring seamless routine operations, we have also introduced initiatives to help SMBs as well as entrepreneurs. Our initiative 'Bringing India Online' helps businesses accept digital payments and connect with customers who cannot step out of their house due to the lockdown. Our other initiative is 'Startups Helping Startups', a platform to connect businesses so they can help each other and thrive even in this time of crisis. All our business functions are running as usual.

On collaboration and communication tools being used during WFH

We have our global online community Workplace by Facebook, which enables teams to stay connected, share documents and collaborate on projects. The social aspect of the platform also helps increase morale during this period of social distancing. Employees also have access to Bluejeans for video conferencing. We also use it for communicating and network with clients. Besides, we have used the BlueJeans event feature to conduct virtual town-hall meetings with the senior leadership.

On strategies and facilities to enable safe and secure remote connectivity

All PayU employees are well-connected and have been provided with proper connectivity suite and solutions to maximize productivity. While employees use video-conferencing facilities like Bluejeans to discuss and deliberate, we have also provided VPN connections to employees for ensuring secured data transfer. Besides, we have provided internet dongles and access to online Workplace communities, and a host of other technology solutions to overcome the work-from-home challenges.

On tools to keep customer service up and running during the lockdown

PayU has the largest merchant base in the country today and is using Salesforce, C-Zentrix and OneDirect tools to ensure smooth coordination and servicing of these merchants. We are also using the PayUMoney Merchant Panel, PayU Biz Merchant Panel and Citrus Merchant Panel, which are support tools for query resolution. PayU Assist, which is an automated customer service experience addresses merchant queries in real-time; merchants have access to support around the clock, 24 by 7, and are able to solve queries on their own, reducing delays and leading to faster query resolution.

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"MORE THAN 90% OF OUR STAFF WORLDWIDE IS TELEWORKING"

BALA MAHADEVAN
CEO, Orange Business Services (India)

On business continuity process and plan

We have in place a business continuity and disaster recovery plan for key business areas—critical networks, IT systems, sites, and assets. We routinely test our business continuity plans (BCP) and also retest plans that have not been tested in the last four months.

Field intervention is currently being assessed on a case-by-case basis and it is authorized based on the local situation. In many countries, our field services personnel are considered essential workers. In India, we have obtained a limited number of curfew passes for our staff in charge of critical activities.

On collaboration and communication tools being used during WFH

We are using a variety of tools like remote access via Pulse Secure, VPN connectivity and multiple collaboration solutions, including audio and videoconferencing services. Our internal social network 'Plazza' is also enabling employees to share information and documents.

We are fully equipped to provide a range of managed services to support collaboration and remote working using Microsoft Teams or Cisco Webex Teams. Both, small groups and large project teams can easily work together with Cisco Webex Teams, while audio-conference solutions can be delivered through PGI. Overall, we have doubled the capacity for simultaneous connections on our platforms. The use of remote collaboration solutions, such as video-conferencing, has also risen with usage increasing by 20% to 100% depending on the solution.

On tools to keep customer service up and running during the lockdown

Being a global organization with 27,000 employees across more than 100 countries, we have five Major Service Centers (MSCs) located in different continents to provide 24x7 support. We have increased the network capacity and upgraded our service platforms. This allows us to support the ongoing exponential increase in needs and uses. The number of customers connecting to our platforms enabling secured remote connections for teleworkers has already increased by 700%.

On strategies and facilities to enable safe and secure remote connectivity

We have extensively tested massive homeworking scenarios in all our MSCs since January. This has enabled us to anticipate social distancing measures. More than 90% of our staff worldwide is teleworking. We have provided our teams and managers with appropriate practice kits to optimize this working mode and ensure that we maintain close contact with all staff and they remain connected with each other during this period.

All staff members are equipped with laptops and remote working tools, while VPN gateways have been upgraded to meet the required capacity for remote working. Employees have also been advised not to open any suspicious emails to prevent Phishing attacks.

On technology and business challenges faced by the company during the lockdown

The spread of the Coronavirus is impacting the delivery of some equipment around the world. To date, there is no major equipment shortage with our suppliers; however, there are some delivery delays. In response, we have established a joint Supply Chain Crisis Team with representatives from our partners to actively monitor the supply position as the situation evolves. Cisco, for example, has a robust supply chain risk management program, and where necessary, they are diverting production to other manufacturing sites around the world. It should be stressed that production and shipments out of China continue, but with a reduced capacity, which is why they have secured additional capacity from other sources.

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"WE QUADRUPLED OUR VPN CAPACITY WITHIN TWO DAYS"

MOHIT ROCHLANI
Director of IT & Operations, IndiaFirst Life Insurance

On business continuity process and plan

In these extraordinary times, IndiaFirst Life Insurance has ensured continued and seamless service to policyholders and customers with its robust Business Continuity Plan (BCP), invoked since 19 March 2020. Since then, the organization has been optimizing alternate modes including digital, IVR and telephones to connect with both internal and external stakeholders. We have moved to a complete work-from-home (WFH) policy—both for employees and critical partners—with zero impact on operations and services.

On collaboration and communication tools being used during WFH

IndiaFirst Life's digital focus includes business agility, enhanced and effective customer service, analytics-driven insights and decisions, and secure and scalable systems ability. We have already moved to a paperless, automated sales management process with a seamless customer on-boarding and fulfillment journey. We have also ensured omnichannel experience across touch points for customer acquisition and retention.

Many of our applications used at touchpoints are web-based, and hence, they are easily accessible. We use ACCOPS VPN solution and we quadrupled the capacity within two days of WFH to meet the requirements of all employees. We use Office 365 and have optimized all Microsoft tools for collaboration. The desktop-based- and/or thick-client applications are accessed through Remote Desktop Protocol (RDP) to a single system through a VPN. We have diverted incoming calls of the call centre to predefined and identified devices through software.

Across the organization, we are using Microsoft Teams and Skype for the meetings and videoconferencing extensively. Other tools such as Zoom and WhatsApp are being used at the individual level.

On tools to keep customer service up and running during the lockdown

Apart from the tools mentioned above, we are also using Ameyo's Drishti software, which enables our call centre executive to attend customer calls from home.

On strategies and facilities to enable safe and secure remote connectivity

For IndiaFirst Life, data and information safety of customers and employees are above everything else. As all remote access enablement is through VPN, we haven't compromised on information security policies. Besides, we are also adhering to all authentications and security policies.

On access devices to facilitate work-from-home

We have quite an advanced digital infrastructure at IndiaFirst Life Insurance, which has been developed as per the technology architecture that we have built in the last three years. We have built applications, which can work offline and consume low bandwidth during sync. This has been built keeping in mind the challenges in terms of the limited bandwidth available at the last mile through broadband providers.

On technology and business challenges faced by the company during the lockdown

It is a new experience and we all are adapting ourselves to respond in the most efficient way. People will adapt to the new way of working remotely in some time. Apart from the last mile connectivity to ensure customer delight, the insurance sector must unite to find solutions and new ways to interact with customers virtually. Strengthening of the Salesforce tools and technology is also a must. The collaboration platforms need to look beyond communication and file sharing, and evolve to enable business process and operational process visibility.

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"WORK-FROM-HOME WILL BE THE NEW NORMAL IN FEW YEARS"

SACHIN DUTTA
COO, Canara HSBC Oriental Bank of Commerce Life Insurance

On business continuity process and plan

All critical operations, including customer call center, claims, servicing, and new business processing is running at service levels that we normally see on a day-to-day basis. When we used to talk of BCP, we used to discuss and plan for a certain percentage of the recovery. In reality, we are currently operating at nearly +95%, with all our critical services up and running. We are engaging with our customers with these digital avenues 24/7.

On collaboration and communication tools being used during WFH

The core processing is happening via remote VPN, virtual desktop and Citrix capability. This has allowed the workforce to operate from home. We have redundancy and adequate bandwidth provisioned to take up the load and avoid any service disruption. Since everyone is operating from home, it is important to stay connected and we are using Zoom, Facetime, and WhatsApp to connect with each other. We are also using dedicated subscribed telecons, conference calls and video-conferencing bridges to enable virtual business meetings. Softphones have been enabled for those handling customer queries at the inbound center. This is enabling our front-line servicing staff to speak with customers while the supervisors are able to monitor the daily KPIs and customer satisfaction scores via dashboards.

On strategies and facilities to enable safe and secure remote connectivity

We have VPN and Virtual Desktop to ensure the safety and security of information at all levels, 24/7. All our device endpoints are hardened with company policies and we monitor those endpoints centrally via security operations center. If for some reason, the staff is not able to access the system, we have the IT Service Desk which is supported by the core IT staff and managed service partner to provide remote troubleshooting and resolution of any such issues.

On access devices to facilitate work-from-home

We picked this earlier during the day before the lockdown was announced. Early preparedness helped us meet the challenge since we had provisioned for connectivity dongles and Wi-Fi at home for select staff working on critical operations. All these aspects have been taken care of to facilitate work-from-home.

On technology and business challenges faced by the company during the lockdown

With corporate across the country adopting mandatory work-from-home, there is a lot of load on the telecom services. Hence, we have occasionally noted some latency issues. But given the scenario, people are aware of this and there is a degree of understanding of this. I appreciate the strength of our technology vendors who are working round the clock to provide uninterrupted services during such time.

From a business opportunity perspective, online channels are seeing an increase and the momentum is picking up nationally. We are working with our customers, reinsurers and our partners to keep this channel growing and running. Digital was pitched as the next big thing in the future but guess what, it is now the present and digital transactions are currently the only mode available to interact and do business. The global event is going to leave us with a lot of technology-enabled capabilities and once we are out of the crisis, it would be important to further propagate these initiatives. We should further build on these rather than going back to the old style of operations. This will bring the world closer technologically with distancing required only in the context of information security and safety. This will be the new normal in few years.

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Business continuity amidst work-from-home

Being FY closing, it was critical that all departments at Apollo Tyres were able to work together seamlessly. It was also important to ensure that the company continued to service its partners without disruption

BY NEERAJ MEHTA

The world is going through some unprecedented times, and we are in unchartered waters. It is time for everyone to work together and get over the disruption caused by COVID-19. Luckily for us, even before the lockdown was announced, some of our employees, especially those working in offices, had been put on a weekly roster and others who had a travel history, were working from home.

While dealing with the requirement of the employees who had started to work from home, we started to prepare for what lay ahead of us in terms of IT and communication infrastructure requirement. A quick discussion with business teams and senior management helped us identify the areas where business continuity was critical.

Apollo Tyres primarily follows the B2B sales process and so we identified the process areas like 'order to cash'. This area has two touch points: one is through the telephone, which is managed by the dedicated Call Centre. To deal with this, we identified the components of the Call Centre that required continuity and provided executives with laptops and data cards so that they can work from home.

To ensure there is no disruption in their services, we decided to divert the Call Centre telephone extensions to the individual mobile phone numbers. Using the laptop and data card, the executives connect to the VPN from their home network, log into the company's CRM of the through it, and continue to book orders received on the phones from the dealers.

The second touch point is our B2B (Sampark) Portal. This portal is already available to all our dealers through web. Our team encourages dealers to make maximum use of this portal and the Apollo Sampark App to place an order and call the agents only if they face a problem.

Keeping the back office running

To keep the organization running, it was important to ensure seamless back-office operation and we facilitated

> To keep the organization running, it was important to ensure seamless back-office operation and we facilitated this by extending VPN to all the users.

this by extending VPN to all the users. March being the year-end period, and since the lockdown came into effect from 25th, it was critical for us to ensure that finance, accounts, commercial and supply chain teams are able to work together for proper closure of the financial year account and the books. Hence, all users who were working on desktops were provided with laptops and data cards, and VPN was enabled for everyone so that they can access the ERP and other core business applications needed for the job.

As part of the business continuity strategy, all employees have been allowed to access their departmental data on functional shared drives. All users have been made aware about the variable speed of their home networks and probable choking of their bandwidth, and the need to remain patient while working. March is also a month when the annual performance review of our employees happens. To facilitate this, all HR partners have been given VPN access to their shared drives to seamlessly work on the annual performance review cycle.

Ensuring data security

While opening our core restricted area for operations from home, we have taken utmost care about the protection from possible data leakage. Users have been advised not to download data on their personal machines and all large queries, and report creations are being monitored by the Business Applications support teams.

Business Heads have also been advised not to ask for too big and complex reports. All the large file transfer, from, and to the shared drive folders, have been restricted using firewalls, while we are using DLP tools to monitor any possible data leak through emails. Users have been advised to keep the Operating System and anti-virus patches up-to-date, while the password reset policy has been tweaked to ensure that reset of password doesn't restrict the users to work from home and they are allowed to reset it using self-help tools.

Collaboration and network support

For an organization to work seamlessly, it is important to have a robust collaboration tool. To achieve this, we enabled Zoom video-conferencing tool for all users. This will help employees across all functions to connect and collaborate within, and with other functions, during the lockdown phase and for smooth working from home.

To provide complete digital infrastructure support, we have redirected the IT helpdesk numbers to the respective mobile phones so that users can call the engineers and take remote help. A status quo has been maintained on all the business applications in production environment and no new patches/features are being rolled out. This is to minimize complexities of breakdown, users training and hand-holding.

We are also ensuring that all the systems enabling VPN and core applications are patched regularly. This is aimed to eliminate any vulnerability. While all incidents of brute force attack or attempt of intrusion are also being addressed immediately, all the firewalls are also being patched regularly by Security Operations Centre, which is also being managed remotely. The capacity of MPLS and traditional internet leased lines or ILL are being monitored continuously by our Network Operations Centre; this is also managed by engineers remotely.

On the data backup front, all backups on disk are being monitored, but backups on tapes where physical rotation of tapes is required to avoid regular rewrite on the same tapes have been stopped. Besides, we have put in place systems to monitor and control all the network access, and web traffic is being filtered to avoid any threat or misuse.

Connectivity is the lifeline of any organization, more so when all employees in the organizations are on mandatory work-from-home. Hence, all third party consultants have also been provided with limited VPN access to our development and quality environments so that can continue to work on existing projects and application. This will help us avoid unnecessary loss due to delays in projects go live dates.

Mehta is the Head of Corporate IT at Apollo Tyres Ltd

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Facilitating remote working through technology

While working from home was new to most at Sterling and Wilson, backed by the support from the IT infrastructure team, the employees quickly got into the groove

BY MANOJ DEORUKHKAR

Do all medium to large size companies have a good Business Continuity Planning (BCP) strategy and action plan in place? The answer most certainly is a "yes". So, did any of these companies foresee the speed and magnitude with which the disaster—Covid-19 pandemic—would hit the world?

No surprises: the answer certainly is a "no".

The current situation is a perfect example of VUCA—volatility, uncertainty, complexity, and ambiguity—unleashed by natural forces, and hence, it was not on the risk radar of any organization. It has forced all organizations to think out of the box, and the IT team had to fight the situation with whatever preparedness they had and come up with solutions that were not acceptable earlier.

At Sterling and Wilson, we have aligned ourselves with the evolving situation. Our IT policy and infrastructure are robust, which ensures that the entire value-chain is fully informed on the status of all ongoing assignments. We have strong processes in place that empowers employees to remain fully productive while working remotely or working from home.

For us, this was a defining experience that changed our mindset on several parameters, both on technology and non-technology front. Here are a few examples that highlight the challenges and steps taken by the company to deal with the lockdown in India and the tough situation.

- **User Mindset:** Working from home was new to most of our employees, and they quickly got into the mode. Many of them realized the importance of high speed and reliable internet connectivity at home.

- **Communication:** Using video conferencing instead of the personal meeting has now become a natural way to collaborate. Our investments in collaboration tools like MS Teams, LifeSize, and GoTo meetings have paid a rich dividend, enabling us to continue the work seamlessly. Employees quickly adapted to the etiquette of multi-party meetings and presentations.

- **Cloud:** Our investment into cloud footprint has proved to be immensely beneficial – it ensures no physical presence is required to keep on-premise data centres operational.

- **Remote Connectivity:** Our Virtual Private Network (VPN) connections have jumped multi-fold to provide secure and trusted link to employees working from home.

- **Personal Devices:** The sudden lockdown meant that many employees did not have their laptops to work from home and there was no way for them to pick it up from office. Hence, employees started using their personal computers. This prompted us to quickly come up with Use Your Own Device (UYOD) policy, with necessary precautions, to ensure continuity of work.

- **User Support:** It's been challenging to maintain the Service Level Agreements (SLAs) and the effectiveness of the end-user support process. However, everybody has been enabled to adopt a remote support model with the use of tools for remote support and resolution. This is a welcome change to sustain and optimize the IT support model.

- **IT Security:** This large scale (almost 100%) shift to work from home has a massive implication on IT security posture, especially on network and application security. This involves revisiting our security policy, processes, and tools.

We have also seen a huge surge in attempts from hackers after the lockdown, and that has prompted us to vigorously restart the IT security awareness campaign as well as the actual deployment of few tools like anti-virus on personal computers.

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Working smart amidst pandemic

The lockdown signifies a noteworthy change in the way teams at SBI General Insurance collaborate, communicate, and work

BY PRAKASH CHANDRA

With the outbreak of the pandemic, we established an emergency management team (EMT), comprising senior management and leadership teams of the SBI General Insurance (SBIGI). The EMT has been closely monitoring the situation and issuing necessary advisory to all employees and stakeholders. It has also taken significant steps to reshape business strategy, maintain business continuity, build resilience, and prepare for recovery.

To ensure that our customer care channel is up and running, we activated voice mail at the contact center for those who are unable to get through the helpline. We also started processing motor claims through online streaming. Our e-mail and SMS shortcode responses are being managed from home by our customer service executives, while the claims team is continuously supporting the policyholders and call centers.

Accelerating smart work

An important component of business continuity in a lockdown situation is the ability to work remotely. We have implemented a remote working strategy for employees, focusing on the strategic implications. We enabled mobile hardware tools, virtual collaboration and communication, remote project management and employee engagement tools, to ensure all necessary work-from-home and cybersecurity protocols are adhered to.

We also increased the infrastructure outlay, such as cloud platforms to enable employees to work and collaborate effectively from home. All SBIJI employees have been provided with a laptop, phone, OneDrive, Lifesize VC, and Microsoft Teams, etc to meet their work requirements.

The teams follow daily virtual morning stand-ups to discuss progress and challenges. Sharing of discussion materials and agenda prior to every virtual meeting via Microsoft Teams help in context setting and bring clarity of objective. For days to come, and as part of the WFH framework, we have decided to conduct weekly end-of-the-week team calls to discuss and give feedback on the previous week, and plan for the upcoming week.

Using teleconferencing and video conferencing has become the new normal and is part of business as usual (BAU) for managing the day-to-day activities and collaboration. All virtual meetings of the EMT and HoDs are conducted using Lifesize video-conferencing tool.

Getting digital-ready

As the crisis began to emerge, our BCP team tested the critical functions, including investments, information technology, and customer service. We envisaged the technological infrastructure requirements assuming various scenarios and accordingly arranged for inventories and back up resources. Employees with critical roles having laptops were provided with a virtual private network (VPN), while virtual desktop infrastructure (VDI) was provided for others to enable remote working.

Our operation teams have leveraged the digitally agile platform of policy booking and have issued policies from the employee portal over the web. To service a large volume of retail policy bookings, we identified senior sales resources to generate proposals and do quality checks based on a defined checklist. This helped the operations team speed up the policy-booking process.

Accelerating ahead

No matter what tools and technologies one chooses to implement remote working strategy, it is critical to have the right communication and IT infrastructure in place. Collaboration and work aren't limited to the office or between 9 AM to 5 PM any longer. Employees are always connected—checking emails, reading texts, and sending messages. Hence 24x7 support and simplified and seamless managed solutions are crucial for businesses to succeed in this new era.

What this signifies is a noteworthy change in the way people collaborate, communicate, and get work done. This black swan event will certainly compel companies to revisit their remote working policies, and redesign them to cater to business as usual activities in addition to business continuity.

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Emerging voice based Technology and Challenges before the Telecom Industry

Indian telecom industry which took a giant leap almost two decades ago and went through a significant transformation, is again standing at a crossroad. The emergence of voice technology is not only phenomenal but also disruptive with its rapid speed and expansion. Google Assistant, Apple Siri and Amazon Alexa leads the pack and are slated to penetrate deep into Indian telecommunication era. What is illuminating and alarming for Indian telecommunication industry is India's young demographics, it is estimated that India has around 600 million people under the age of 25 and it constitutes almost half of India's population. Why it is illuminating because this is mostly a technology driven consumer base and why it is alarming because they are more informed, empowered and demanding than their previous generations.

Speech and voice recognition driven data consumption are growing at the highest CAGR of approximately 73%, which indicates paradigm shift from voice to data. Telecommunication industry needs to forecast this now that how the usage of voice assistant and smart home management will change their outlook for now and ever. It is also remarkable to note that India's data usage per smartphone is highest in the world at 10 GB and set to double to 18 GB by 2024. The penetration of smart devices, affordable data tariff plans, and hike in data-intensive content is fuelling this growth. However, it should not be misinterpreted that the growth of data is only due to the user's entertainment quotient and convenience but also from Enterprise. We can categorise the data consumption in two categories:

- User specific data consumption
- Enterprise data consumption

User specific data consumption generally is attributed to video streaming, entertainment and gaming. The user preference for video streaming services like Netflix, Hotstar or Amazon will add to Internet speed and data requirement. The gaming market is also gaining at phenomenal rate and now integrates virtual realities as part of the games. Social networking is another category which until was the prime source of data consumption and will continue so.

Enterprise data consumption can mainly be attributed to Internet of Things (IoT), Artificial Intelligence (AI) and Machine Learning (ML). As the organizations move into complex strategic challenges, and big data plays a vital role in analytical decision making the consumption of data is bound to grow exponentially. IoT devices which use machine learning and artificial intelligence in processing and analysing Big Data are the prime source of data consumption by the enterprise. The more connected world means more data consumption.

NK Bhattacharya
Sr. VP Operations, Savitri Telecom Services

Keeping in mind above outcomes and predictions, the challenge before the Indian telecommunication industry is vast. The last couple of years have been a challenging part for the Indian telecom industry as there has been sluggish growth. The shift of preference from voice to data has been quicker than anticipated, and the next phase looks even more rapid. The 5G devices could soon roll out in the consumer market at a large number for which the industry must be ready in advance. The liquidity crunch in the industry is the biggest worry as the technology deployment demands more substantial investments. So in an overall perspective with emerging technology opportunities in abundance, the telecom industry needs to be ready with focussed solutions to offer what the end user expects.

Vishant Vora
CTO, Vodafone Idea Limited

"Vodafone registered nearly one year of traffic growth in first week of lockdown"

As India moves towards the second phase of nation-wide lockdown, the increased demand for the internet seems to have stabilized after the sudden surge—over 45%—during the first week beginning 25 March 2020, when the whole country started working from home and education went nearly 100% online. According to industry sources, the data traffic of the three private-sector players jumped from 250 petabytes per day in December 2019 to nearly 365 petabytes per day end of March 2020. This has kept the telcos and their technology heads on their toes and Vodafone Idea Limited (VIL) CTO ***Vishant Vora*** *is no exception. In an email interview with* ***Shubhendu Parth****, he shared details of the initiatives taken by VIL in ensuring uninterrupted voice and data services, and how its investments in cutting-edge technologies helped in meeting the surge in demand.*

Shubhendu Parth (SP): What is your estimation of the surge in demand for data across India during the lockdown? Are we moving closer to the full capacity utilization of mobile networks in the country?

Vishant Vora (VV): As lockdown came into effect, people were suddenly isolated and they started spending more time on their smartphones. Whether it is to buy medicines or groceries, answer work emails, consume news and entertainment or even stay in touch with loved ones via various social media apps, the smartphone has become our primary link with the outside world. We witnessed a sharp spike in data usage since the COVID-19 outbreak in India. After the initial steep rise, we are seeing data demand stabilizing a little. The telecom industry is working closely with the government and other stakeholders to ensure seamless connectivity and access to the internet, especially for delivering critical services.

We have experienced nearly one year of traffic growth within the first week of lockdown. The world's largest network integration project undertaken by VIL over the last year gives us more capacity headroom, as do some of our latest technology deployments that make the utilization of the spectrum far more efficient. Our 12,000+ ma-MIMOs (multiple-input and multiple-output) that are deployed across key markets are substantially helping in managing the traffic spike. We are deploying capacities across using all means, including the addition of cell on wheels (COW) sites wherever appropriate.

SP: Experts believe that none of the telcos in India is equipped to handle this sudden rise in data consumption across the country. How is VIL managing the spike in load?

VV: Vodafone Idea's pan India telecom network reaches over 1.1 billion Indians. Our engineers have been working tirelessly over the last few weeks to support millions of customers to stay safe at home by ensuring Vodafone Idea's 4G+ network availability.

We have set up virtual war rooms where key team members are participating through audio calls and VCs. Senior team members from operations, circles, Super Network Operations Centre (SNOC) and partners are continuously on the call with field staff to ensure uptime and operational continuity. We are continuously monitoring the traffic pattern and are confident of handling the growing demand for voice and data services during the lockdown period.

We have also requested the Department of Telecommunications (DoT) to clear our pending applications for

spectrum allocation. We are hopeful that the DoT would expedite our spectrum liberalization requests and regularize our backhaul spectrum.

SP: COAI has suggested allocation of additional spectrum for both "access and backhaul microwave" for the short term to tide over the situation. How do you look at it from the VIL perspective?

VV: As mentioned earlier, in the initial phase the telecom companies saw a sharp spike in demand, particularly for mobile internet. Over the last few days, the industry worked with the DoT and other stakeholders to assess and monitor the rising demand. We are now seeing the traffic and demand flattening.

At VIL, our primary aim was to provide continued connectivity to our individual and enterprise customers. We worked with our partners in the ecosystem to ensure that the consumers' demand is met without disruption, especially for accessing internet through mobile for critical services. A comprehensive pandemic response plan with requisite risk mitigation protocols has been activated while ensuring continuity of mission-critical processes for keeping our networks working as telecom is an essential service.

Besides, requesting DoT to clear our pending applications for spectrum allocation, we are also adding more soft capacities in our network to better the experience for our customers.

SP: Will the availability of E band spectrum for backhaul help improve the network capacity to ensure QoS during this national emergency?

VV: Yes, it will surely help to increase backhaul capacity significantly. This band is also considered as an alternative to fiber. In this lockdown situation, wireless backhaul can be deployed faster as fiber execution will not be possible in this scenario.

SP: The lockdown has also lead to a sudden spurt in mobile apps and platform usage. Is Vodafone working with such platform and app firms to ensure better collaboration and experience?

VV: Smartphones have become the primary medium of entertainment for Indians during this lockdown phase. We have also seen the usages of the mobile app increasing on our own platforms, Vodafone Play and Idea Movies and TV App.

Globally, all the leading OTT players and online entertainment platforms have responded by switching to SD viewing experience. India has also followed the same pattern. VIL is actively collaborating with our partners to ensure customers get better brand experience and to maintain reliability, and high quality of network experience.

SP: According to a company release, Vodafone India is enhancing its 4G+ network speed and connectivity through ma-MIMO deployments across Mumbai. Please share details of the initiatives taken in the rest of India.

VV: Our investment in ma-MIMO technology to set up a 4G+ network is helping us meet the growing data demand during this crisis. We have installed over 12000 ma-MIMOs across India and more than 3,500 ma-MIMOs are deployed in Mumbai and Delhi, the highest by any operator in the region. Our deployment of COW sites for additional capacity has led to enhanced throughput and better spectrum efficiency. Third-party reports indicate better speeds for VIL customers in Mumbai and Delhi, even during the lockdown period.

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Stressed, stretched, and supporting

Despite the financial tangle and the lockdown to deal with COVID-19, the telecom industry is leading from the front, keeping India connected and working

Over the last 20 years, the telecom sector has designed, implemented and maintained in India, one of the largest, most complex and innovative voice and data networks that have been seen anywhere in the world. It supports a customer base of close to 1.2 billion—globally second only to China—with monthly data consumption above that of the USA and China put together and a growing infrastructure base of over 550,000 cell towers and 2.23 million BTSs. This network now provides broadband connectivity to around 650 million of the total subscribers in the country.

The telecom industry that contributes 6.5% to the GDP, has invested over Rs 11.25 lakh crore to take the benefit of mobile services to every Indian at rock bottom tariff, which is globally the most affordable. The industry looks forward to continuing to attract both domestic investments and FDIs so that it can continue to improve

> The NDCP 2018 gave much hope to the strained telecom sector and the industry expected its early implementation, but it has been languishing.

the reach and quality of its networks and introduce innovative services and state-of-the-art technology. Rural connectivity and the empowerment of women remain key foci of the industry.

Telecom is now an essential service and the very backbone of the economy, and without it, most of the government's ambitious programs like digital India, smart city, etc. will not be possible.

The Union Budget 2020-21, and NTP-2018 have reiterated the importance of telecom networks for digital India, a priority initiative of the central government. Hence It would be wise not to discount the role of IT and Telecommunications in many policy initiatives announced in the country.

The success of many government and private company initiatives and programs, hinges largely on adequate telecom and, internet-infrastructure being in place. The renewed focus on technologies such as Cloud Computing, IoT, AI, VR, Robotics, device-agnostic tech solutions, as outlined by the government in the recent Union Budget, reiterate the importance of the industry.

Since the liberalization of the economy in the 1990s, the sector, which was the first to be opened up, has achieved many noteworthy milestones. The telecom sector, since the last two decades, has been a critical contributor to the economy and is often dubbed as the economic backbone of the nation. Today, it not only provides the lowest voice and data rates compared to the rest of the world, but it is also counted amongst the highest contributors when it comes to FDI.

However, the telecom industry is under tremendous financial pressures with a debt of more than Rs 4 lakh crore and the payment of adjusted gross revenue (AGR) in the billions of US dollars, as per the order of Supreme Court, among others. Besides, the sector faces heavy taxes and levies in the range of 29% to 32%, which are globally the highest.

The fact that around 30 paise of every rupee earned by telcos is paid as fees and taxes to the government along with the heavy prices paid for spectrum are key reasons for the Industry's Rs 4.6 lakh crore debt. High levies and low returns have been plaguing the telecom sector for long. Comparatively, telecom operators globally pay only around 10% taxes. For example, in many countries across Europe, there are very low annual spectrum fees or no charges at all. Similarly, in the US and Australia, the yearly fee is levied only for the management and regulation of the spectrum.

While the spectrum prices paid by international operators are multiple times lower than those paid by Indian operators, in many jurisdictions, the spectrum is given in perpetuity and becomes the company's asset.

Under the circumstances, it is not surprising that the industry is knocking at the doors of government for financial relief from the distressing financial condition, it is facing. The industry has urged policymakers to use the many "tools" available to it, to find appropriate solutions expeditiously to prevent the sector from slipping into a crisis.

Keeping the sector's weakened financial health in perspective, the government had released the National Digital Communications Policy (NDCP 2018). The document did give much hope to the strained sector and the industry expected its early implementation, but it has been languishing. One of the key points included in the NDCP is the rationalization of multiple taxes and levies, such as license fees, spectrum usage charges, universal service obligation fund, and GST.

The COVID-19 whammy

Even as the industry was still coming to terms with the massive financial burden, a tsunami in the form of the COVID-19 has hit both the country and the industry. The telecom industry has witnessed an enormous surge in data usage, following the lockdown announced by the government to counter the virus, which has driven people to work from home.

Despite the deep financial stress, the industry continues to ensure the uptime of their networks remain at 99.99% while maintaining the key quality of service

> The industry has gone the extra mile to ensure those at the "bottom of the pyramid" receive some free voice and SMS services during the quarantine.

parameters. All telecom networks in India is geared to meet the increase in demand for bandwidth due to work from home communication needs and data usage for entertainment.

This would not have been possible without the proactive support received from the Department of Telecommunication (DoT), Ministry of Home (local police), Ministry of Health, the state governments and others, as they are at the forefront fighting the COVID-19 virus. The standard operating procedure issued by the Ministry of Home in the movement of staff and logistics to maintain the network was a significant relief.

The state governments were also quick to respond. It would not have been possible for the industry to maintain the operations if, problems in telecom towers were not attended to immediately. Telecom industry is also in the process of implementing intra-circle roaming (ICR), so as to facilitate seamless connectivity to the subscribers.

The industry is aggressively pursuing with all the stakeholders to provide safety, accessibility, and bandwidth to mobile phone users during these challenging times. Very early, it directed many of their non-essential staff to work from home. It has placed personnel at the medical and grocery stores, and other locations approved to be kept open by the government so that customers can top up their service packs. Online access through company websites have been streamlined and made easy to navigate and for payments to be made.

The industry has also gone the extra mile to ensure those at the "bottom of the pyramid" receive some free voice and SMS services during the period quarantine. It is hoped that customers would exercise prudence in usage and avoid binging on broadband services so that critical services and applications are able to perform their tasks effectively. The ultimate objective for all the exercises and efforts is to keep people connected and safe until the authorities working to solve the COVID-19 threat can come up with a permanent solution.

With support from government departments and various ministries, the telcos have successfully managed to provide service to the users in such a difficult phase. Over the past few days, the industry has witnessed a flattening of traffic demand on the networks. We believe this has been made possible by the active engagement of the telecom services providers with stakeholders such as streaming platform players, the state governments and DoT.

Some of these actions relate to streaming services reducing their content from HD to SD, local municipalities working with operators to bring sealed towers back online, some redistribution of traffic on the network, among other things. Based on the current status, operators believe they can continue to provide reliable and quality services to customers.

We live in a world where communications, manufacturing, commerce, logistics, virtual reality, gaming, entertainment, autonomous vehicles, IoT, among other things, are all converging on the mobile networks. The critical nature of mobile networks is becoming increasingly clear, especially as seen in the most recent national and global emergency. In such a situation, it would not be cavalier to say that the health of the industry is also the health of the nation! In such a scenario the government support for a vibrant telecom sector is critical.

The industry strongly believes that all stakeholders—government, civil society, the judiciary, industry, and operators—must pull together and move forward uniformly, if we are to achieve the Prime Minister's vision of making India a data and knowledge powerhouse. A 5-trillion dollar economy is not a pipe-dream but a reality to be grasped and executed once we overcome the pandemic, and I am confident that the telecom sector will play its part in achieving this milestone.

Mathews is Director General of the Cellular Operators Association of India (COAI)

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Efficient monitoring 5G networks

Integration of dynamic device components is a critical component of 5G network efficiency monitoring and optimization. Here is a list of Do's and Don'ts

BY PRADEEP CHAKRABORTY

Since 2019, 5G networks are being deployed and run across the world. According to Twimbit MD Manoj Menon, 2019 was a really busy year for telecom. In Korea, SK Telecom launched a 5G network nation-wide. Thailand's first 5G spectrum auction raised USD 3.2 billion. In Singapore, StarHub and M1 have teamed up for a 5G licence bid. In Japan, Rakuten is challenging the three large giants. We are going to see different ways how folks bid for 5G.

Let us examine how crucial is the testing of the 5G networks. According to L&T Technology Services CEO and MD Dr. Keshab Panda, 5G technology involves more than confirming lightning fast download, extremely low latency and comprehensive coverage range. Simplified, end-to-end 5G test implementations are essential for the growth, adoption, and organizational success of emerging 5G networks. Research approaches have adjusted to complex and diverse use-cases and wholesale technological developments including crucial, transmission, RAN and fiber network components at the same time.

This integration of dynamic device components allows continuous, real-time information systems, which is a critical component of 5G network efficiency monitoring and optimization. The efficient monitoring of 5G networks and their enhancement is mandatory for the best 5G approach.

How challenging can spreading out access to rural areas be? He added that at this stage, the stakeholders need to adopt a measured approach from the point of view of 5G rollout. The obvious focus will be urban areas, particularly metros and prominent cities. Leaping to 5G

> Simplified, end-to-end 5G test implementations are essential for the growth, adoption, and success of emerging 5G networks

without adequate infrastructure development may work against the interests of rural connectivity.

5G NR deployments

5G NR deployments in low and high frequencies come with various scopes and challenges. How will these be managed?

According to Dr. Panda, the first imminent challenge apprehended is that 5G operates on millimetre wave frequencies, and needs to ensure universal interoperability. With 5G operating on the high frequency band, it is susceptible to atmospheric absorption. The industry is proactively working towards developing technologies such as beam forming and massive MIMO to help overcome this limitation.

Moreover, the data scientists are also experimenting with 5G new radio (NR), which is a new orthogonal frequency-division multiplexing (OFDM)-based air interface, engineered to support a wide variation of 5G spectrum, deployments, services, and device-types. This will further help encode digital data on various carrier frequencies.

While there are challenges, the industry preparedness is encouraging indeed for viability of 5G on a long-term basis.

So, how will operators handle mMiMO/3D beamforming performance? The technological avenue lies in the OFDM encoding digital data on various carrier frequencies. With 5G NR prototype operating in the sub-6 GHz spectrum bands and being utilized to achieve multi-gigabit per second data rates as well as low latency, operators and other stakeholders involved in implementation of 5G will be required to reach a consensus on pre-standardization to design a flexible security roadmap.

Regulatory compliance with the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), and the Cloud Security Alliance (CSA) will also have a significant impact on the spectrum.

Let us also look at the throughput and latency performance challenges. Dr. Panda elaborated that today's networks will have a lot of ground to cover. Questions often arise on what is an acceptable network performance, and what more can be done to improve it.

"When we talk of network coverage, we also need to consider latency or the delay—the time needed for a packet of data to travel from one stage to another".

"All networks experience some measure of latency. But first off, latency is affected by the distance between two points of transmission. Network congestion or overloaded routers, like in public domain, may be another reason for its challenging performance. Some applications, such as using a data center for off-site backup and mirroring, will work only in a low-latency environment."

Without proper acceptance from relevant jurisdictions, won't rolling out 5G in a timely manner difficult? According to him, the ecosystem players are working towards arriving at a consensus on the standardization. This will pave the way for seamless rollout of 5G across the globe.

What CEOs should do

There are three recommendations for the CEOs. According to Menon, they should first, focus on the user experience. There should be user engagement, acquire, engage and transact digitally. For example, Circles.life is an MVNO in Singapore. It is Asia's first fully digital telco and consumer company that measures itself like a super app of today. Telcos are not yet able to capture the consumer engagement. How do we get the best user digital engagement experience on our apps? How can that become a platform and a channel to sell more subscriptions?

Second, they need to be transforming from being a network provider to being a platform provider / network service provider. How can we use the network as a service provider? How can we provision services on the go?

Third, we are looking at media and content that offer a great adjacency. OTT streaming is going to be a huge

> Data scientists are experimenting with 5G new radio, which is a new orthogonal frequency-division multiplexing based air interface.

The 7 megatrends

Here is a list of technologies that will impact the telecom sector

1. **CLOUD:** Any business on the cloud is able to scale and serve customers well. We are still at day 1 of the cloud era. That's such a huge growth opportunity area. How can we help enterprises move to the cloud?
2. **5G:** It will present the biggest growth opportunity for the next 10-15 years. It will be a lot harder to develop proper business cases in developing countries. Maybe, it can also be an alternative to fixed broadband.
3. **DIGITAL TRANSFORMATION:** How can telecom operators play a role in developing the Industry 4.0 roadmap across enterprises?
4. **SECURITY:** With all the issues and interconnection of networks, this remains a major challenge. We need to automate security.
5. **PRIVACY AND DATA:** This is key for financial institutions, governments and consumers. We haven't done much.
6. **EDGE:** How 5G and edge can potentiallly come together to unlock a very differentiated opportunity for telcos to play.
7. **MEDIA AND CONTENT:** This is a good adjacent that the telecom companies should follow. It will be relatively easier for them to execute these.

(As shared by Twimbit MD Manoj Menon at a web conference on the future of telecom)

key growth engine. Some big names are Netflix, Prime, Disney, ESPN, Hulu, HBO Max, Hotstar India, Iqiyi China, Tencent Video and Youku.

We envisage a world where any consumer will have 50-60 different subscriptions by the end of this decade. These subscriptions will be for media, content, travel, transportation, etc. Telecom companies will also have their own pieces of content. They will have specific content for different geographies. They can also be partners.

All of this makes it even more crucial for telcos to meet all of their network design challenges and ensure smooth telecom and other services!

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Industrial digitization is driving demand for private networks

Public safety, utilities, oil and gas, and railways are the top industry segments driving the need of private networks globally

BY NITIN BANSAL

Connectivity has been the single most important factor in revolutionizing industries. Enterprises have come far from having simple voice and data requirements to now having the need for industrial internet. The rising digitalization in industries is creating the demand for reliable, secure and future proof networks that can support the evolving needs of businesses. According to Ericsson Mobility Report 2019, public safety, utilities, oil and gas, and railways are the top industry segments driving the need of private networks globally. Even though various industries have different needs from their cellular technology it is identified that 90% of network connectivity requirements remain the same.

Most commonly used mobile access technologies such as WiFi or public LTE networks are unable to meet the connectivity requirements of industries. The continuous investments and improvements in cellular technology on a global scale are making it compelling for governments and industries to explore its use for private networks. Enterprises and service providers both are looking at the efficiencies that a private LTE or 5G network can bring to their business.

Improved security

Industrial connectivity is business-critical and there can't be any compromises on the security front. In industries such as public safety, mining, oil and gas, railways etc. their networks are tasked with mission critical processes where consumer and employee safety are at stake. With a private network, enterprises can get full local control and edge processing to guarantee reliability and security. It can be designed to meet the tough business- and mission-critical requirements of users with critical communication needs to be fully reliable when even lives are dependent on the performance of the communication.

Going wireless

A private LTE network can decrease a company's dependency on network cables and also reduce maintenance cost especially for the manufacturing

> Service providers can leverage existing network assets to gain business scalability and build an attractive offering for private networks.

industry. Before this time, wireless connectivity has not been able to deliver on the ultra-reliable communication required to fulfill all industry criteria. But now, factories are free to cut their network cables to acquire adaptive production. Enter flexible factories; where line changes are efficient and contributing workflows are optimized. Wireless connectivity will make intelligent automation possible and simple on a much larger scale.

Adaptability

Service providers can help enterprises create scalable growth, by leveraging their existing network and spectrum assets through deployment models that best suit the needs of the business. A private network can be tailored to serve various scenarios e.g. indoor and outdoor, data and voice, standalone or integrated with public networks. Further it can be enhanced with edge computing and network slicing to adapt to customer needs. Sensors, machines, in-vehicle and hand-held devices can all be integrated across a wide range of enterprise applications.

Ultra-low latency

Once 5G comes into play, private networks can prove to be even more important for business to provide ultra-low latency for mission critical enterprise use cases for example: At Mercedes- Benz's Factory 56 in Germany, all production systems and machines will be connected and operated via secure 5G that will achieve real-time low latency performance while handling enormous amounts of data. The 5G network, built by Ericsson and Telefónica Germany, will help Mercedes-Benz to boost the flexibility, precision and efficiency of its production operation.

At the e.GO electric car factory in Aachen, Germany, network slicing and mobile edge computing are set to enable secure automatic identification and delivery of production materials to each vehicle as it goes through the assembly process. The private 5G network, built together with Vodafone Germany, will support fully autonomous vehicles to replace the traditional production line, increasing operational speed and efficiency throughout the production chain.

Recently, Telstra's Mining Services announced its second official Private LTE mining partnership with Ericsson as the technology partner. The project involves the development of an underground private 4G network for South32's Cannington mine in North West Queensland. At full installation, it would be one of the largest LTE networks for underground mining in the world.

Ericsson is also using dedicated cellular network solutions at its own production facilities to increase production efficiency and sustainability. The private LTE network at our factory in Tallinn, Estonia, is enabling the use of automated guided vehicles and augmented reality (AR) along with massive real-time data collection and analytics to create a more sustainable, efficient and safer production environment.

The extreme low latency and highly adaptable characteristics of Ericsson Private Networks is enabling the rapid integration of sensors, machines, in-vehicles such as built-in remote-control devices in a ship-to-shore crane at a port, and hand-held devices across a wide range of applications for industry enterprises.

Spectrum is a key enabler for private networks

Regulators have been releasing more and more spectrum to traditional mobile network operators as well as specialist service providers, and in some countries even directly to local industries and enterprises. These moves have all helped to accelerate the growth and deployment of private networks. Private networks can use licensed, unlicensed and, in some countries, shared spectrum in the 3.5-4.2GHz and 5GHz bands to provide connectivity. Hence, it is an attractive and flexible option to meet varied market demands.

Private networks can cover a building, a factory or an entire campus and deliver secure communication with full control of coverage, devices and quality of services. Enterprises understand these problems and have a growing demand to look beyond Wi-Fi for secure and highly reliable connectivity. Service providers can leverage existing network assets such as infrastructure, spectrum licenses and operational capabilities, to gain business scalability and build an attractive offering for private networks.

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Shivaji Chatterjee
Sr. VP & Head -Enterprise Business,
Hughes Communications India

"Hughes as an entity is everybody's friend"

Satellite is an important layer in the enterprise networks across all sectors—from retail to petroleum to banking and military. With the explosive growth in cloud and rich-media applications deployed at branches, distributed enterprises are seeking next-generation WAN architectures that can deliver non-stop application availability, cutting-edge security environment and higher performance. Leveraging over 20 years of its experience in providing business solutions, Hughes Communications India (HCIL) is rapidly building on its enterprise offerings to provide Managed Network Services to Indian and global customers. The company's Sr. Vice President for Enterprise ***Shivaji Chatterjee*** *in an interaction with* ***Anusha Ashwin*** *talks about the satellite broadband industry and how it is driving the WAN services, and LTE MPLS technology. Excerpts:*

Anusha Ashwin (AA): The world is witnessing major broadband revolution and the time seems to be just right for the satellite broadband industry. How do you look at it?

Shivaji Chatterjee (SC): In today's world, connectivity is a necessity and it needs to be accessible at anytime, anywhere and to everyone. Satellite plays a key role in realizing this. Generally speaking, satellite is preferred and also performs well in regions where terrestrial or wireless broadband doesn't reach. In the past, the regions were identified largely as rural or remote areas. Earlier, there was not much demand for connectivity in rural areas. But thanks to the mobile revolution, the demand for data in extremely rural and remote areas is now picking up. Today, every individual needs voice, video and some form of data connectivity. That's the macro point of it.

On the other hand, satellite industry has undergone a technological evolution. The satellites that were used a few years back were built for video broadcasting. There used to a broadcast beam for DTH or TV and so we were using bandwidth suitable for such broadcast. It was a common bandwidth across India. However, when it comes to the broadband, each subscriber has a unique requirement. Therefore, the satellite industry built high-throughput satellite, which basically became like a cellular technology in the sky.

The cellular technology breaks the geography into small cells and it reuses the frequency and creates multiple cells. Using the same technology, we built satellites around it. Hence, instead of giving one frequency like a broadcast across the country, the technology allows satellites to break it into smaller cells (beams) and re-use of the frequency. As a result, the amount of bandwidth went 20-100 times more and the cost changed because we were now using the same amount of frequency. With this HTS technology, satellite broadband supply-side has become very cost effective and has enough capacity to service the growing demands of rural and remote regions.

AA: So where does Hughes fit in as a service provider to telecom players?

SC: Hughes has been providing service providers with solution to enable their services requirements. We have two different types of engagement with the cellular service providers. In situations where service providers are unable to give 4G services in remote areas (like Reliance or Vodafone) they take satellite technology from us and connect the node B or base transceiver station

(BTS). That's one thing we do to help cellular companies connect the remote areas. We also have solutions to serve the enterprise market. In this case we take capacity from cellular service providers or telecom companies and provide service to the enterprise market.

There are two types of non-satellite-based services that we specialize in. One, one the 4G networking front we are able to work with all 4G service providers where they offer enterprise SIM cards and we are able to combine them and provide integrated managed services. We have deployed over 15,000 links up in the last two years. Enterprises like this because instead of using just MPLS and VSAT, they get the option to use wireless network, the quality of which is improving in the country. They use 3G and 4G as an enterprise solution. We call the solution HughesON.

Last year, we started SD-WAN services. Our idea of SD-WAN is not to just to apply technology but to provide it as a service. We host it on a cloud and it has all the advantages that a customer of SD-WAN expects—centrally managed system, virtualized devices, and easy zero touch provisioning. That's the hosted model we provide. We have structured it around technology and service and have a vendor neutral approach because we are not just looking at selling the bandwidth.

In SD-WAN arrangement, many companies don't want to manage but just run the network. Now various enterprises and their IT departments feel they have become service providers themselves and large offices are always calling them for managing the network. Since, so many applications are on the cloud, each branch takes their own bandwidth (part of internal bandwidth) and with SD-WAN they are able to apply the management layer, control layer, and security layer. This trend is increasingly making way into India.

AA: What kind of partnerships do you have with the telcos in India?

SC: We have a kind of give and take relationship with telecom providers—they are our customers, partners, and even vendors. To our customers we provide satellite based cellular backhaul and we have some big customers that handle SIM solution (HughesON). Today, our biggest customers of managed SIM services include Tata Communications, Bharti Airtel, and Tata Teleservices. These enterprise telecom providers use our wireless service and integrate it into their MPLS portfolio to provide service to their customers.

On the other hand, we also buy a lot of capacity from these providers to run our network. So, somewhere we also act as their customers. One of the good things is that Hughes as an entity is everybody's friend. Our mindset is that we are not a threat to them in the cellular or MPLS space as we don't operate in those spaces, and at the same time we are big enough to be able to provide a good integrated service that they can sell. We don't compete with them but we work with them in all these different manners to provide solutions in the market.

AA: How do you see India's LTE Network undergo a change towards betterment?

SC: As far as LTE network transformation is concerned, since all the spectrum is getting reframed from 3G to 4G, there's more spectrum available. In India, the ever-increasing problem of service congestion has always been that you have limited spectrum. So, when there is less spectrum availability, the spectrum is expensive, the ARPU was very low and people were just in a customer acquisition mode without bothering about the service.

Thanks to what has happened in the last few years with Reliance Jio's entry, a lot of spectrum has got released from smaller players and got distributed between the bigger three companies. Secondly, the auction prices have also come down if you look at the 4G auction prices are much lower compared to 2010 auction price of 3G. As a result, there is more spectrum today, it's more affordable and people are even shutting down 3G networks to make way for 4G.

At the end of the day, it's all about bandwidth—if you have to provide high speed services and if you don't have enough MHz, you cannot provide enough capacity for the users. With each generation, the MHz to Mbps conversion keeps getting better and that's the technology revolution we are seeing in the LTE space.

AA: Powering rural communities of India with data and voice networks is a big vision for the current government. What role do you see Hughes playing in this?

SC: Hughes has always been committed to supporting the government vision to use digital technologies to power rural communities. We have been working closely

on creating solution to address the digital connectivity gaps. One of key or the big vehicle doing this is Bharat Broadband Network.

We are currently doing a project with Bharat Broadband where there are more than 5,000 locations, gram panchayats, and border control areas of the army across 12 states. This project aims to enable voice and data services at a speed of 3200 Mbps. The project is already live. We were awarded this project in March last years and we started rolling this project about four months back. Out of the 5,000 sites identified, we have so far covered around 500-600 sites and the plan is to complete this project by June. It's working so well that people are amazed that there is such a high speed available on satellite. This is because of ISRO's new satellite GSAT-11 which is an HTS satellite, and secondly it doesn't have the other complications which BharatNet has.

AA: Hughes also has the license to provide flight and maritime connectivity (FMC). How has the experience been so far?

SC: It's been nearly 9-10 months since we got the license. We launched the service in August last year and have two big customers in the Maritime. We are talking to many more. It's something that is new in the maritime space. People are not used to providing connectivity, having bandwidth. So, they have to have a different kind of equipment. Recently DG Shipping has instructed all the ships to look at connectivity. Like in any other industry, Maritime was not very connected or automated and now they are making that transition towards being more connected and automated. That's what is happening in the Maritime space. It needs some top-down push to create momentum. Till now it was happening at a slower pace but now it's picking up.

With regards to in-flight connectivity, it's unfortunate that the most innovative airline that could have implemented this has gone down. The others airlines have expressed intent and by end of this year you may see the services going live on couple of these airlines. This space is uniquely suited to satellite communication. It's an area that has been very successful globally. Given that it's new to India, it is taking time for adoption and finding the right business model.

This is the abridged version of the interview. For full version visit https://www.voicendata.com/

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Calibrating the right environment for Digital India

Delivering on the envisioned 5G outcomes require an enabling policy environment and regulatory solutions that address the needs of industry players and consumers alike

BY YI SHEN CHAN & AKHILJEET KAUR

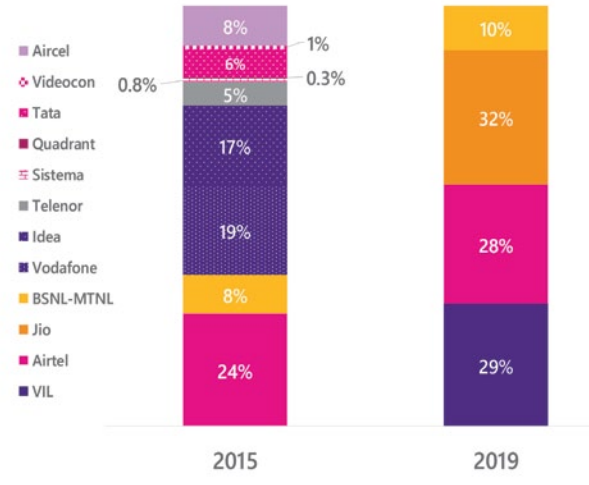
In the last five years, the Indian mobile market has witnessed significant changes. From an extremely fragmented marketplace with more than 10 private operators at one point operating in different licensed service areas, there is now a much consolidated marketplace with three main players – Bharti Airtel (Airtel), Vodafone Idea (VIL) and Reliance Industries (Jio) – and the state-owned operator Bharat Sanchar Nigam Limited and Mahanagar Telephone Nigam Limited (BSNL-MTNL). The entry of Jio in 2016 – with its initial strategy of free voice and data services, followed by low-priced service packages – has shaken up the market and triggered this wave of consolidation. With the falling subscriber base and decreasing revenues, many operators had to either shut down, sell or merge their operations (see Figure 1: Market shares by subscriptions).

The global telecommunications sector has seen its fair share of mergers and acquisitions in recent years. For most telecoms operators, consolidation usually leads to improvements in market position, better growth prospects and gains in competitive advantages. However, in the India context such benefits have been scarce to date, particularly in the case of Airtel and VIL who have had to expand their 4G coverage and manage network integration while facing pressure on tariffs against a fast-expanding Jio.

A question of long-term sustainability

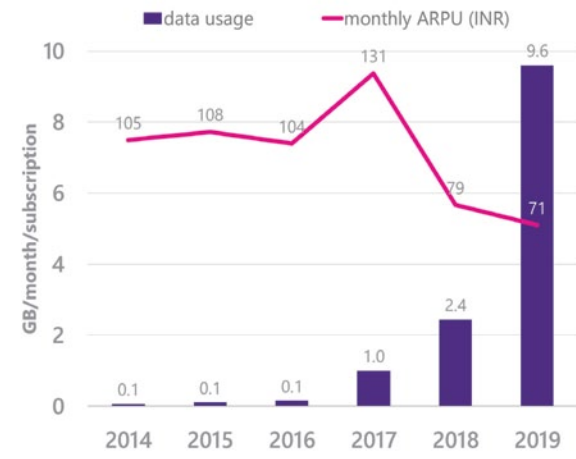
India is one of the world's fastest growing markets for mobile broadband – the GSMA projected a 3% per annum growth from 750 million unique subscribers at the end of 2018 to 920 million by 2025. Much of this will be driven by the recent expansion of 4G LTE networks as the base

Figure 1: Market shares by subscriptions



Source: TRAI

Figure 2: Data usage and ARPU trends (2014-2019)



Source: TRAI

> Agriculture uses may require wide area coverage in rural areas and so require spectrum below 6 GHz, but other industrial applications, such as those in indoor environments may be better suited to mmWave bands.

of 4G connections grows. By 2020 the number of 4G connections is expected to overtake legacy 2G and 3G connections. Mobile data growth has risen sharply since 2016 while average revenue per user (ARPU) has declined in the same period. Data demand between 2014 and 2019 has increased by 160 times to reach 9.6 GB/month/sub in 2019. Ericsson projects monthly data traffic per user to increase to around 24 GB.

While Jio's entry has translated into benefits for consumers in the short term, the bruising price war was clearly unsustainable. The recent hike in tariffs by the three main players suggests stabilization in the market environment and a return to future revenue growth, driven by the rise in 4G penetration. However, as a result of the recent Supreme Court ruling on the running license fee dispute, Airtel and VIL are now reported to be facing financial distress which could further jeopardize the market dynamics and future 5G developments.

National policy objectives

The government's National Digital Communications Policy 2018 has set ambitious targets to be achieved by 2022. These include: broadband for all; creating four million additional jobs; 8% contribution to India's GDP up from 6% in 2017; and scoring in the top 50 in ITU's ICT Development index.

Specific to 5G, the Department of Telecommunications' (DoT) steering committee has identified three key priorities – rolling out efficient, early and pervasive 5G networks; building India's industrial and R&D capacity to support 5G roll-out; and expanding the manufacturing base of 5G network equipment with specific recommendations across various regulatory, policy, technology and application domains.

What are the key challenges for 5G?

Just as 4G paved the way for the digital economy in India, 5G has the potential to be as transformative, especially for enterprises and in sectors such as manufacturing, education, finance, healthcare and agriculture. Delivering on the promises of 5G will require favourable policies and regulatory framework.

The challenges associated with 5G in terms of business cases, infrastructure requirements and underlying economics are well recognized. While these are by no means unique to India the challenges are exacerbated by the market and regulatory conditions in India. Below we discuss some of the key aspects which need to be addressed by both government and industry in order to pave the way for 5G in the coming years.

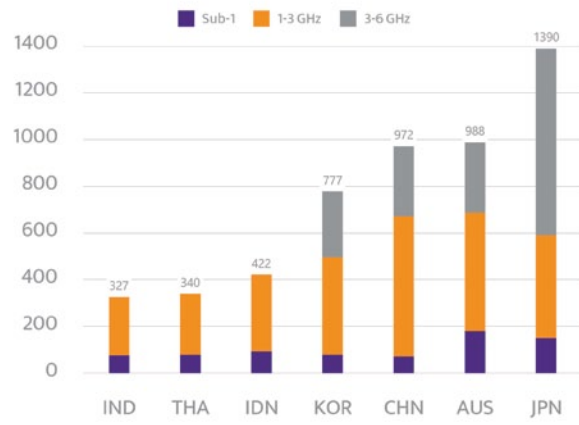
1. Ensuring 5G spectrum supply

Spectrum is the critical input for mobile service provision. Unlike 4G where operators were able to rely, at least in part, on the refarming of existing spectrum, such as 900 MHz and 1800 MHz, for 4G deployment, 5G requires large, contiguous blocks of spectrum particularly at the mid-band (1-6 GHz) and high-band (>6 GHz) frequencies to meet 5G performance specifications. The assignment of new bands will be necessary.

While 5G will eventually be deployed over a range of frequency bands in the long term, the focus so far has mainly been a handful of bands, namely 700 MHz, 3.3 – 3.8 GHz (C-band), 26 GHz (24.25 -27.5 GHz) and 28 GHz (26.5 – 29.5 GHz). Among these, the C-band (3.3-3.8 GHz) spectrum has been earmarked by the mobile industry as the key band for 5G enhanced mobile broadband (eMBB) services.

Many countries have either completed, or are preparing for, the award of this band. In India, it is expected that up to 300 MHz in the 3.3 – 3.6 GHz range will be put up for auction later in 2020, alongside the 700 MHz and several existing bands (850, 900, 1800, 2100, 2300, 2500 MHz). Plans for the 26 GHz (24.25 – 27.5 GHz) band are still unclear.

Figure 3: Spectrum assigned for IMT (end-2019)



Source: Plum Consulting

Since 2012 there have been five auctions in India for a variety of frequency bands and each one has ended up with a significant amount of unsold spectrum despite the operators' clear need for additional spectrum, which suggests that the reserve prices were too high in most instances. In other words, the market-clearing price (equilibrium price) was not achieved in most circumstances. The practice of using previous reserve prices as a guide in determining reserve prices for new auctions, of the same or new spectrum, is thus questionable, particularly where those auctions have failed to produce market clearing prices.

In terms of spectrum assigned for mobile (IMT), India has lagged behind the other major economies in the Asia Pacific region (see Figure 3: Spectrum assigned for IMT [end-2019]). With 4G, operators in India were able to mitigate spectrum constraints by refarming 2G and 3G spectrum. Given growing 4G demand and the 5G bandwidth requirements, access to new bands (700 MHz and C-band) will be essential for the first phase of 5G rollout.

Thus, a successful outcome in the upcoming auction particularly in relation to the 700 MHz and 3.3-3.6 GHz bands will be a crucial first step. To this end, reserve prices should be decoupled from those of previous auctions and should instead be set conservatively to take into consideration recent industry developments and national policy objectives and the considerable investment required to deploy 5G networks.

2. Licensing of 5G to address user needs

Unlike previous generations of mobile technology, 5G is envisaged to serve a multitude of applications with heterogeneous performance and spectrum requirements. Techniques such as Software Defined Networking (SDN) and Network Function Virtualization (NFV) will allow 5G connectivity to be much more flexible, simultaneously addressing different use cases. From the regulatory perspective this is likely to require new approaches to spectrum award and authorization.

With the variety of frequency bands identified for 5G – low (sub1 GHz), mid (1-6 GHz) and high (above 6 GHz), this form of geographic licensing may no longer for appropriate for the type of use cases in the 5G era. New users (industry verticals) and applications will not necessarily require spectrum access on a wide geographic scale. Often these will be on a limited, highly localized basis and may involve a range of frequency bands. For example, agriculture uses may require wide area coverage in rural areas and so require spectrum below 6 GHz, but other industrial applications, such as those in indoor environments may be better suited to mmWave bands.

The range of options being considered by regulators to address these vertical markets includes spectrum leasing, spectrum sharing solutions, and Identifying spectrum specifically for new users.

- **Spectrum leasing:** where the mobile network operator (MNO) leases some of their spectrum which they have identified will not be required in the short to medium term at a specific location, generally on a commercial basis, to another user. For MNOs there is the advantage of income generation from spectrum that would otherwise be unused. The disadvantage is that they continue to be responsible for meeting all their licence conditions for the leased spectrum. The new user may also not find such arrangements attractive due to the terms of leasing and cost.

- **Spectrum sharing solutions:** this is similar to leasing but in this case the regulator will issue a licence for the specific spectrum and location, and the conditions to be met by the new user. For example, Ofcom has adopted this approach in the UK for already licensed bands (3.8-4.2 GHz, 2.3 GHz, 1800 MHz) to support innovative use. 10 Another option is Dynamic Spectrum Access (DSA) where the usage of a band at a location can be determined through use of a geo-location database, possibly with beacons or sensors, before being utilized and so avoid interference to the primary or other licensed users.

> As new 5G use cases, not just Enhanced Mobile Broadband, are starting to emerge, it will be timely for the TRAI to review its licensing approaches and consider new forms of spectrum access for innovative use in new 5G bands.

- **Identifying spectrum specifically for new users:** Such an approach will either require the regulator to sub-divide the country into smaller geographic areas or award and licence on the basis of, for example, a per base station area that is coordinated by the regulator. For mmWave bands it may be possible to adopt a light licensing or General Authorization approach where new users coordinate amongst themselves, or if DSA is possible through the use of a database.

With 5G, there is no 'one size fits all' licensing solution. Instead, a range of licensing approaches, including licence exempt spectrum, will be necessary. As new 5G use cases, not just eMBB, are starting to emerge, it will be timely for the TRAI to review its licensing approaches and consider new forms of spectrum access to cater to innovative uses in new 5G bands.

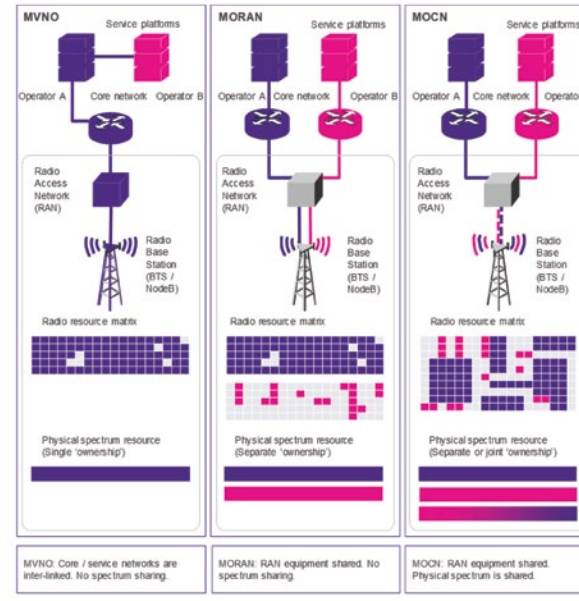
In India, spectrum rights for mobile are assigned by Licensed Service Area (LSA) – there are more than 20 LSAs. It may also make sense to simplify the current LSA regime to allow more contiguous holdings across the whole of India for existing mobile bands, as well as 700 MHz and 3.3-3.6 GHz. Given the pan-India operations of the existing players (Airtel, Jio, VIL), service- and technology-neutral licences on a nation-wide basis will provide more flexibility to operators and allow them to better plan their network rollout.

3. Leveraging on network sharing

Network sharing is not a new concept; MNOs in many countries already engage in network sharing to reduce capital and operating costs, particularly in rural areas where the benefits of cost savings exceed the competitive advantages that one can gain through service differentiation in the self-deployment case.

The economics of 5G will necessitate more extensive and deeper forms of network sharing, potentially involving not just passive network components (e.g. masts, sites, power supply), but also active network elements in the radio access network including spectrum. Active sharing,

Figure 4: Examples of network sharing options



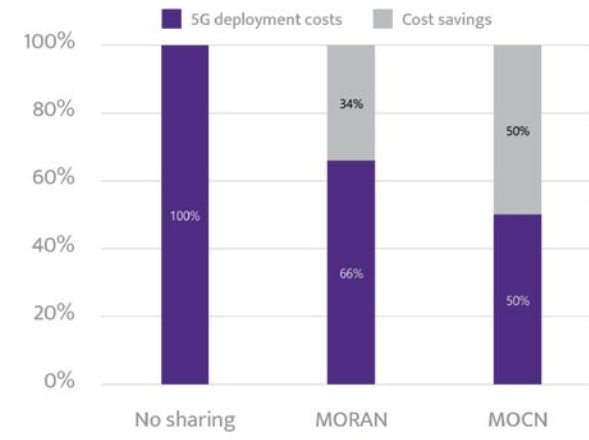
Source: Plum Consulting

such as Multi-operator radio access network (MORAN), Multi-operator core network (MOCN) and other forms of multi-tenancy, neutral hosting solutions will be expected to feature heavily in the 5G environment.

Analysis undertaken by Plum on 5G deployment in the C-band suggests that network sharing between two operators could lead to savings of around one-third to half in 5G deployment costs compared to a situation with no network sharing (See Figure 5: Cost savings from network sharing). Network and infrastructure sharing should be encouraged given the considerable benefits which should help accelerate 5G deployment through the underlying policy and regulations. However, the complexity of these arrangements due to their implications on business strategy, commercial objectives and network planning suggest that these should be left to commercial agreement between MNOs rather than mandated by regulatory authorities.

> While Jio's entry has translated into benefits for consumers in the short term, the bruising price war was clearly unsustainable. The recent hike in tariffs by the three main players suggests stabilization in the market environment and a return to future revenue growth.

Figure 5: Cost savings from network sharing



Source: Plum Consulting

For MNOs the initial phase of 5G eMBB will be driven by expansion of coverage. This is likely to require a densification of networks which is an essential feature of 5G, and better access to high capacity backhaul links (fibre or microwave). Reducing the regulatory or administrative barriers to small cell deployment will help to improve the mobile industry's ability to deploy denser networks quickly and lowering deployment costs.

The simplification and harmonization of application and approval processes for planning permits, access to land, buildings and street furniture will be essential. This will require greater closer coordination among government departments, sector regulators and operators.

The introduction of 5G will precipitate changes in the structure of the mobile industry and there will be implications on the nature of competition. On the supply side, 5G networks will be characterized by fewer radio access networks as a result of more extensive network sharing. At the same time, demand for connectivity, particularly from new 5G use cases, will be much more varied with a multitude of service requirements.

These developments represent a departure from the way mobile networks are run and regulated to date – as vertically integrated competing networks. Regulatory authorities will have to face the tricky challenge of ensuring effective competition in the 5G environment to deliver benefits to the economy and society. There will need to be a change in spectrum management approach and a level of flexibility in licensing not required previously. Whilst on one hand, there is a case to ensure a degree of infrastructure or facilities-based competition to maintain incentives for market players to invest in new technology, optimize the use of spectrum and expand network coverage it is also necessary to encourage service-based competition to bring about greater choice and innovation.

The road to 5G is akin to a marathon, rather than a sprint to the finish-line, and deployment will be gradual over a number of stages and specific to use cases. For network operators, success will depend on a combination of managing deployment costs while adapting their businesses to cater to 5G enterprise uses. For regulators, greater flexibility in spectrum management in relation to licensing and pricing will be needed to cater for all 5G users. At the same time, appropriate steps to maintain effective competition should be considered, while recognizing the investment challenges of 5G.

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This is the edited version of the report published on Plum Consulting website.

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Driving unlimited possibilities

With increased adoption of voice technology, search behaviour among users is likely to undergo a massive change. This will help organizations further individualize consumer experiences

BY HEERU DINGRA

The new age of voice and digital assistants has woven themselves into the fabric of our lives. From getting directions, making reservations, checking the weather forecast, to turning on the lights, buying goods or requesting music. The technology is gradually transforming how we interact with the digital world, radically changing the relationship between human and machine; it's not a product anymore, but an experience reshaping the usual state of things.

Here are some key pointers on the emergence of voice technology in India, based on the Recogn-WATConsult report 'Voice Technology in India: Now and Future - Consumer and business perspective'.

The playground

The Indian voice market is accelerating at a rapid pace and is set to register a 2.8X growth by 2022. According to the latest Recogn-WATConsult report on voice technology, the speech and voice technology market stands at Rs 1.5 billion as of December 2019, nearly 40% over 2018. It is expected to grow at 40.83% CAGR to reach a market size of Rs 4.17 billion by the end of 2022.

The main drivers for this unprecedented growth are: changing consumer demands, smartphone ubiquity, and advancement in smart home technology and mass adoption of artificial intelligence and machine learning in our everyday lives. Voice technologies are unlocking new

> Voice interfaces are advancing in industries of all kinds, racing to release their own voice technology integrations to keep pace with consumer demand and revolutionize each sector.

ways of personalisation to build an authentic and emotional connection with consumers, shifting interactions from transactional to deeper, meaningful relationships.

The players

In the last decade, the digital assistants were added in all digital devices including computers, smart speakers, dashboards and watches. Though, Google Assistant is perceived to be the smartest voice assistant amongst the others, Alexa is reliable in terms of managing smart home devices and usability, while Cortana is perceived to be accurate with search results but less intelligent to understand the lingo and dialect of the user.

- **Smartphones:** When voice assistants began to emerge in 2011, with the introduction of Siri, no one could predict it to become a driver for tech innovation. With high concentration of smartphone penetration in the Indian consumer market, majority of the users are using voice assistants on smartphones.

  Smartphones outnumber smart speakers in terms of ownership and usage. The popularity of Siri and Google is also likely due to the sheer volume of smartphones when compared with smart speakers. Both Siri and Google are more aligned with smartphones while Alexa is more closely aligned with smart speakers. Smartphones (60%) are heavily used to give voice commands followed by laptops (28%) and smart speakers (26%). Convenience and accessibility is yet another factor for the preference of smartphones over other devices to access voice.

- **Smart speakers:** Not too long ago, owning a smart speaker like Amazon's Alexa or Google's Assistant was a rare novelty. But now, they have become household staples. Amazon was the first tech company to develop smart speakers in late November 2014, promising a new easy way to control your music with your voice. Since then the Alexa assistant, that powers Echo devices, evolved from novelty to in-the-home powerhouse. Google Home launched in November 2016, legitimised a multi-platform ecosystem of voice-first devices.

  According to the research report, users prefer Google Assistant for online search queries, to play music and for navigation purposes. Meanwhile, Alexa is used mainly for managing smart home gadgets and devices. When it comes to smart speakers, most users prefer Amazon's Echo (57%) followed by Google Home (54%). The study further indicates that 37% of Indian consumers are planning to purchase a smart speaker soon.

  Recently, technology giant Google added a new feature wherein users can converse with the Assistant in Hindi and eight other Indian languages by saying, "Okay, Google. Hindi mein bolo", without requiring the OS support for local language. This enhanced the brand's reach amongst more Indian users, particularly who were comfortable with using English as their device language but prefer to hold conversations in local language, thereby enabling a more natural way of interaction with machines.

- **Smart homes:** Thanks to the increasing number of IoT devices available today, a smart home no longer requires an elaborate system. There are numerous smart bulbs and other devices that can be connected via smartphones or other home-based smart speaker to enable customisations by using voice commands alone.

  The report indicates that in the home management segment, Amazon's Echo and Google Home is majorly used to operate the TV, while Echo Dot is used to control smart lights. While listening to music on smart speakers, users prefer to employ the Echo. For security and safety of the homes, installed smart devices and synced in and majorly controlled by Google Home Mini. Just few days back, Panasonic too joined the rush of smart home platforms with a new AI and IoT platform – Miraie, which aims to connect Panasonic smart

devices, but with voice control through Amazon Alexa and Google Assistant. Right now, we talk to our homes, but soon our homes might talk back.

The play

Voice interfaces are advancing at an exponential rate in industries of all kinds, ranging from healthcare to banking, racing to release their own voice technology integrations to not only keep up the pace with consumer demand but also revolutionize each sector.

- **Banking and financial services:** In the BFSI sector, there are specific chat and voice-bots developed to address the routine and FAQ-type queries and streamline their customer services. Voice technology offers banks anopportunity to become more effective and create stronger customer relationships. Billed as the first widely-available virtual assistant in financial services, Bank of America's 'Erica' now has more than ten million users, and is on track to complete 100 million client requests since its launch in 2018.

- **Automotive:** Partnerships between voice assistant developers and car companies are becoming more common, like the Tata Motors and Google relationship is notable for not just integrating voice into the vehicle but having the former take part in creating the voice assistant from the ground up. These kinds of deals are only going to become more frequent. For instance, Amazon is partnering with General Motors to bring the voice assistant to several of its next generation of cars.

- **Agriculture:** Even for the agricultural sector, AI based chat-bots are being designed to help farmers become aware of the best agricultural practices and gain knowledge about the latest farming techniques and methods. In collaboration with the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), Microsoft has developed an AI-based sowing app that's powered by Cortana Intelligence Suite, including machine learning and power BI. The application sends advice to the participating farmers, informing them about the optimal sowing date, enabling them to yield better cultivation.

- **Education:** Educational institutions and educators in the higher education space across the world are looking at voice-enabled technology as a legitimately promising tool on campus, inside and outside the classroom. With access to learning material 24/7 and the command of your voice, voice-recognition technology helps students to learn at a comfortable pace.

Source: Recogn-WATConsult

In March, Google rolled out an application named 'Bolo', a speech-based reading tutor application that helps children to learn to read textbooks. Designed for children aged 6-12 years, it is powerful by Google's speech recognition and text-to-speech technology.

With increased adoption, voice assistance technology seems to further ease the learning curve for the population base in terms of accessing and using the power of internet more effectively.

The virtual assistant - Diya, is another reading buddy, who corrects the children when they read aloud.

- **Consumer products and retail:** Over 49% of the consumers have made purchases using a voice assistant. The ability to make a purchase on any channel and the addition of personalized, intelligent elements to the shopping experience is simplifying the transition from product discovery to product purchase. India's gifting brand, Ferns N Petals, recently announced the launch Alexa Skill for gift delivery in Asia, enabling customers to order and send flowers or cakes through the voice assistant by Amazon.

- **Healthcare:** Voice-activated technology has been rolled out into the medical world too, with many solutions automating or simplifying communication between patients and providers. The innovation in voice technology in the form of applications and software enables diagnosis of various speech related disorders, stuttering, speech-language disorders and many more. An application named 'Speech Doctor' has been developed to help in the detection of speech delays in children.

The possibilities

With increased adoption, voice assistance technology seems to further ease the learning curve for the population base in terms of accessing and using the power of internet more effectively.

- **Voice commerce:** Because commerce is such a massive opportunity for voice technology, many companies have already taken advantage of voice commerce to improve their online customer experience. More than 30% of the users use voice assistants to shop for clothes and footwear and arealso interested in exploring food ordering using voice assistants or tend to turn to voice-bots to help them choose food.

- **Digital payments:** Once the voice recognition aspect of the technology is implemented at the user level, voice payments will become more secure and convenient for users to make purchases.

- **Rich consumer data:** Digital Voice Assistance technology is enabling advertisers and marketers with real time consumer data. Efficient mining and analysis of this data will help them better understand consumer needs and behavioural pattern, thus deliver customized messaging to their target audience. Improvements and implementations of digital voice assistance in local Indian language will lead to more personalized and contextual understanding of the customer needs.

- **Security and infrastructure:** As e-commerce and financial services emerge as key adopters of AI and voice AI in India, security will become important as voice AI firms seek to also implement payment interfaces. A clear regulatory framework to allow voice-based authentication for payments along with verification and identification of the user via devices will become paramount as the users will have better experience with more security built around them.

- **Cultural and linguistic diversity:** Currently, the cultural and linguistic diversity of India poses as a hurdle for developers while obtaining higher accuracy with digital voice assistants. Collecting speech data in various accents, and from different diverse groups, especially in a country like India, which has 22 languages officially and numerous dialects will help to offer experiences that are contextually relevant and personal.

With the increased adoption of voice technology, search behaviour among the users will change and more individualized experiences will transpire. This technology will evolve with further advancements and developments such as voice-to-text, text-to-voice, better user interfaces, enhanced data security and payment mechanisms, leading to further acceleration in the digital business transformation and process of automation in India.

Dingra is CEO, WATConsult

The article uses insight and data from the recently launched report by Recogn, WATConsult's research division.

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Plugging the GTP security threat

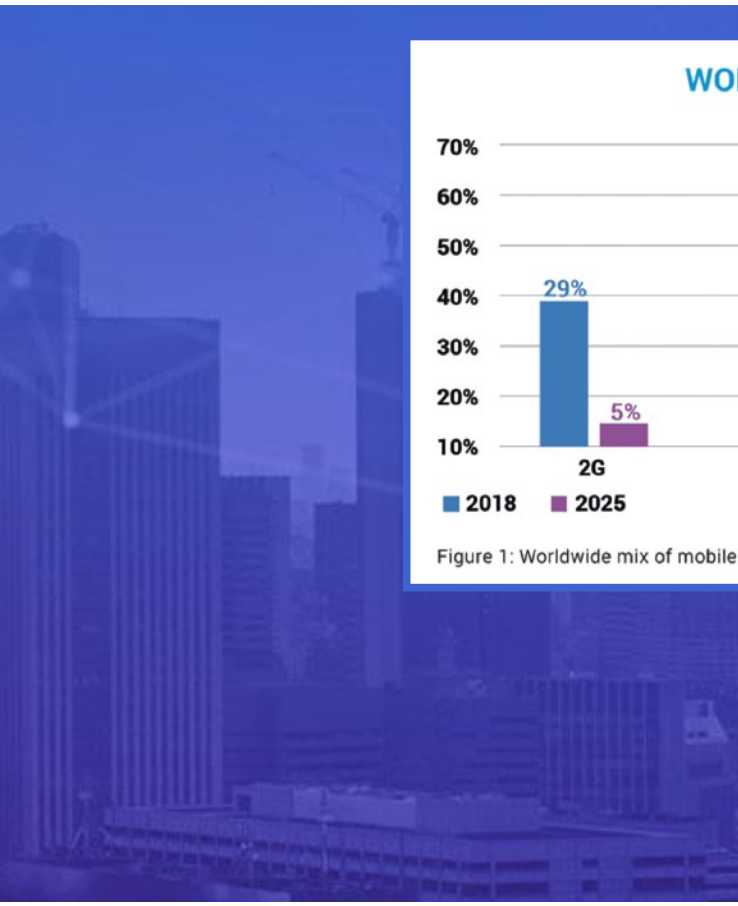
The GPRS Tunneling Protocol was not designed with security in mind. Here is how to protect multi-generational mobile networks from the gap

BY TERRY YOUNG

GPRS Tunneling Protocol (GTP) is a 2.5G technology that provides interconnection between various network interfaces, enabling mobile users to roam seamlessly between networks of different generations. The protocol was developed in tandem with General Packet Radio Service (GPRS), the packet-oriented mobile data standard integrated into GSM (G2) that allows mobile networks to transmit IP to external networks (i.e., the internet). GPRS is the mobile communications service that enables SMS, MMS, IM, WAP, peer-to-peer, smartphone internet apps, and more.

Developed at the "dawn" of the mobile age, GTP was not designed with security in mind and is very lightly protected, because before the advent of smartphones there were virtually no security problems plaguing mobile networks. The technologies were proprietary and difficult to penetrate, resulting in "attack-free" network infrastructures where trust was assumed within what was then a closed industry. As the industry evolved to IP-based technology, the need for secure network interfaces using GTP grew exponentially. Lacking encryption and sender authentication, GTP was not up to the task.

The extensive use of GTP between mobile networks like roaming makes it an attractive target for attackers. With roaming traffic continually on the rise, it is also a growing target.



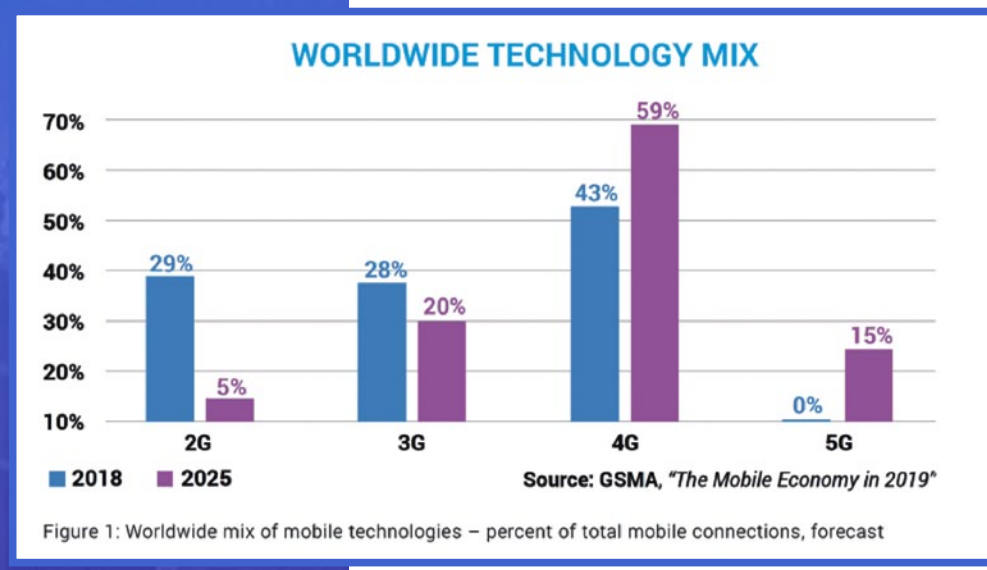


Figure 1: Worldwide mix of mobile technologies – percent of total mobile connections, forecast

Today, we see an increasing number of attacks exploiting vulnerabilities by abusing GTP-exposed interfaces. Both subscribers and carrier-class operators are impacted, as attackers eavesdrop on communications to harvest network information and subscriber IDs, often leading to denial of service (DoS), customer churn, and criminal activity enabled by the exfiltration of confidential data.

A growing attack surface

While 5G provides vast security enhancements, it is important to note that multiple generations of mobile networks will hang on long into the foreseeable future. This means that GTP will still be relevant in a 5G world, as it remains the primary protocol for user-plane and control-plane traffic.

As with all previous generations, 5G introduces new standards. However, new network technologies such as 5G do not replace the previous ones, but rather, they overlap. So as long as earlier generations remain operative, old mobile signaling protocols and their accompanying vulnerabilities will threaten networks.

Today's mobile threats stem from traditional IP-based threats within 4G/LTE networks combined with legacy 2G and 3G technologies. As 5G continues to grow, overlapped with 3G and 4G, a wealth of new services and technologies will lead to an ever-expanding attack surface.

GTP: A key technology for mobile roaming

Changes in EU regulations eliminated international roaming charges. This, combined with the explosive growth in the number of devices, applications, and traveling subscribers, has led to skyrocketing roaming traffic—up as much as 95% according to research.

Within the mobile core, GTP is the main protocol for exchanging user and control data between serving and packet gateways, enabling packet networks to signal and carry data between devices and apps. When it comes

to roaming, GTP connects the local (home) and visited network, allowing subscribers to shift between networks easily. Its extensive use between mobile networks like roaming makes GTP an attractive target for attackers. With roaming traffic continually on the rise, it is also a growing target.

IP-based networks are easier to hack

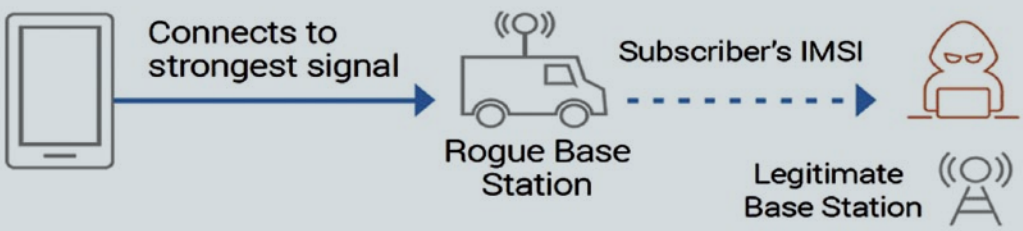
Prior to 4G/LTE attacking mobile networks required sophisticated tools and mastery of little-known protocols used for routing voice calls. IP-based 4G technology changed everything and allowed attackers to leverage readily available internet hacking tools with which they were already familiar. Launching attacks on mobile networks became as easy as hacking any device connected to the internet—no in-depth knowledge of mobile technology required.

Because of the much vulnerability in the protocol's specifications, GTP became a prime attack target. The protocol does not support encryption, so, among other pieces of sensitive information, international mobile

Taxonomy of GTP-enabled attacks

Here's a list of what mobile operators and their customers are up against.

- **Eavesdropping:** Attackers listen in on GTP traffic to intercept subscriber communications containing sensitive information sent in clear text (usually during roaming sessions where long-distance links are often not well-protected and vulnerable to interception).
- **Denial of Service:** Subscriber DoS attacks diminish the quality of service and can lead to customer churn. Attackers need to know the TEID of the subscriber's session, which can be obtained through GTP eavesdropping. A more severe DoS occurs when attackers overwhelm the packet data network gateway (PGW) with a flood of malformed packets. Such attacks can lead to widespread outages and degradation of quality across the entire subscriber base.
- **Fraud:** Here an attacker hijacks the IP address of a legitimate subscriber and uses it to order services that are then billed to the unsuspecting subscriber. In some instances, an attacker will request the creation of a session from the PGW using a legitimate subscriber's IMSI. The traffic usage charges are then billed to the subscriber or borne by the operator.
- **Rogue Base Stations:** Attackers set up a duplicate, rogue base station to act as an IMSI "catcher." Mobile devices automatically connect to the strongest signal nearby using the subscriber's IMSI, which can then be harvested and used to launch attacks or intercept a user's confidential data for fraudulent purposes.
- **Malicious Peers:** The explosive growth of roaming and over-the-top (OTT) content has led to an expanded universe of third-party providers requiring access to mobile networks, many of which may not follow mobile security best practices. Vulnerabilities created by third parties such as roaming partners can open the door to attackers targeting valuable information or seeking to disrupt and degrade network operations.



- **Roaming IoT:** Inefficient and unprotected IoT devices create security risks and cause an exponential increase in network signaling traffic if deployed on a massive scale. Signaling storms can be caused by botnet-driven DoS attacks or triggered by power failures, natural disasters, and coverage problems in a given service area. When roaming smart meters and IoT endpoint devices lose connectivity, they attempt to roam to another network. Numerous, simultaneous roaming requests create signaling storms that can bring a mobile network down.

> GTP firewall needs to include message filtering, exploit detection, message-length control, validity checking, plausibility checking, and information validity for roaming.

subscriber identity (IMSI), integrity session keys, and user data are sent in clear text. Also lacking is integrity protection, which leaves the door open for cyber attackers to hack GTP messages and corrupt signaling commands, alter user data, and redirect their own mobile billing charges onto unwitting victims. Lastly, the protocol lacks any means for authenticating senders, making it impossible to tell legitimate subscribers from imposters.

All in all, these GTP vulnerabilities make it easier for attackers to gain access to critical network and subscriber information, including key identifiers such as the tunnel endpoint identifier (TEID)—a pathway into the network's mobile core assigned by the GTP and the temporary mobile subscriber identity (TMSI). Using such information, impersonators can gain access to the IMSI of legitimate subscribers, drop subscriber communications or overwhelm the network with bot-transmitted messages to instigate a DDoS attack.

Do we have a solution?

As we understand, the GTP is exploited to target mobile networks via the roaming exchange, the radio access network, and internet interfaces. To prevent the severe consequences of GTP-enabled attacks, mobile operators need to deploy strong counter measures at all key network interfaces.

The most important is a GTP firewall, which, as outlined by the GSMA, needs to include message filtering, exploit detection, message-length control, validity checking, plausibility checking, and information validity for roaming.

Will 5G change everything?

5G will still use GTP for user-plane traffic and still be exposed to GTP vulnerabilities. However, the 5G architecture does provide several important cybersecurity enhancements, building on proven 4G improvements, including encryption, mutual authentication, integrity protection, privacy, and availability. Nevertheless, multi-generational security will continue to be critical to protect against 2G, 3G, and 4G threats during—and even beyond—the transition to 5G.

New 5G specifications cover security procedures performed within the 5G system, including the 5G core and the New Radio. Here is a list of key cybersecurity enhancements that 5G brings with it.

- **Roaming Security:** The new Security Edge Protection Proxy (SEPP) provides additional protection against known inter-exchange/roaming vulnerabilities. 5G also enables network operators to steer home customers to preferred visited partner networks to enhance the roaming experience, reduce charges, and prevent fraud.

- **Network Slicing Security:** This allows mobile operators to create unique network "slices" (independent networks running on top of the shared mobile infrastructure) with their own unique security requirements to support diverse use-case scenarios like video conferencing and V2X applications.

- **Identity Privacy:** Similar to IMSI, 5G's subscription permanent identifier includes encryption that prevents its transmission in clear text. 5G also enforces frequent changes to the globally unique temporary identifier. Both new capabilities make it harder for hackers to steal identities via rogue base stations or eavesdropping.

While 5G security is a big step forward, mobile networks will continue to be exposed to GTP threats through roaming partners or prior mobile technologies using GTP. Mobile operators will need to deploy a GTP firewall to protect against GTP-based attacks coming in from access networks, roaming partners, internet of things (IoT), and more to support uninterrupted operations for their networks and subscribers.

Young is Director of 5G Marketing at A10 Networks

This is the edited version of the article published on the A10 Networks blog.

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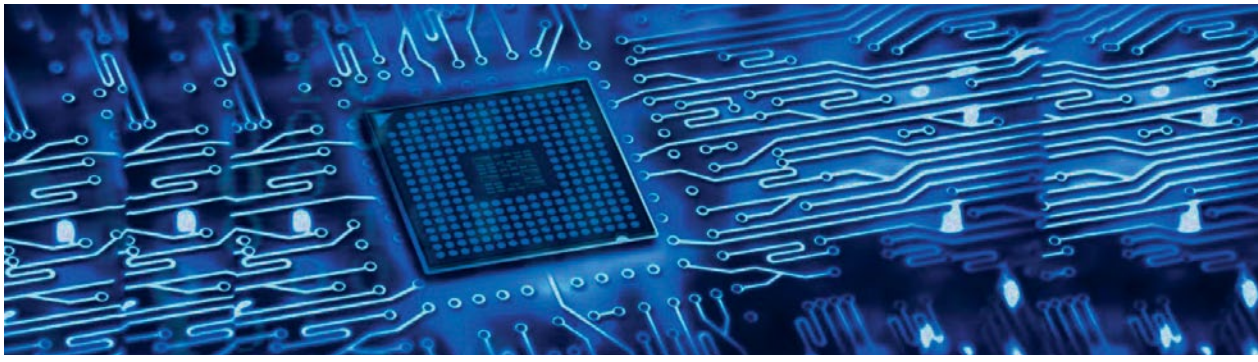
IESA recommends ISRO-style commission for electronics sector

India needs to enhance its design capabilities and nurture it beyond the existing few cities. It also needs to incentivize the sector more to become a global hub



BY PRADEEP CHAKRABORTY

India's dependency on import for its electronics product needs, from smartphones to supercomputers, have been on the rise. The India Electronics and Semiconductor Association (IESA) has put together a report to capture the current status, market trends and opportunities to work closely with the Ministry of Electronics and Information Technology to promote electronics manufacturing in India.

According to IESA Vice Chairman Dr. Satya Gupta, they have recommended setting up of a National Electronics Commission (NEC) on the lines of ISRO. It can bring all of the electronics- and semiconductor-related activities under one single umbrella. It has also suggested setting up a National Institute of Semiconductor and Electronics Research (NISER), on the lines of IMEC, Belgium. "We can create products for new use cases, such as medical, agriculture, defence, 5G or 6G, AI-ML, automation, EV, etc.," he stated.

Electronics: A sunshine market

Underlining the need for India to enhance its design capabilities and the need to go beyond the existing 2-3 cities, IESA Chairman and Intel India Senior Director of Operations and Strategic Relations Jitendra Chaddah said that the demand for electronics products were growing very fast.

The manufacturing segment has grown by 19%. The expected rate of growth will be 21.5% by 2025, moving to USD 260 billion. Our import demand for finished goods will decrease by 29%.

The low-value manufacturing (LVM) and high-value manufacturing (HVM), and electronics design are among the key constituents. LVM will grow from USD 73.7 billion in 2019 to USD 237 billion in 2025, HVM will grow from USD 7.3 billion in 2019 to USD 23 billion in 2025 and electronics design will grow from USD 20 billion in 2019 to USD 60 billion in 2025.

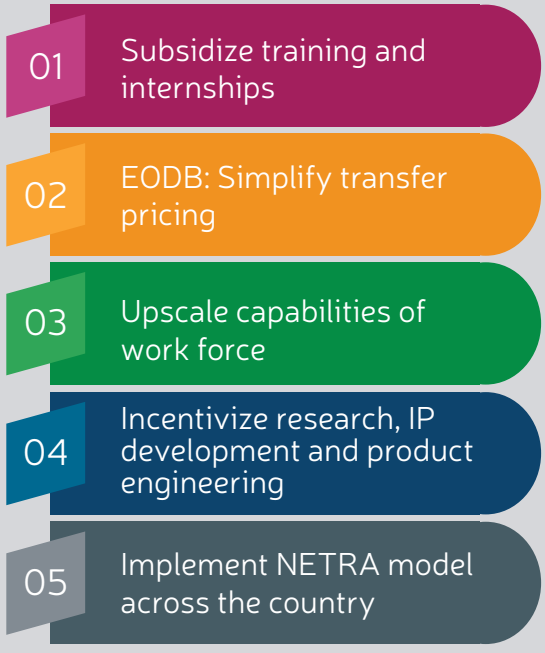
Chip design grew from USD 13 billion to USD 20 billion from 2016-2019 at 15.4% CAGR. It is expected to grow to USD 60 billion by 2025 at 20.1% CAGR. It has become a great source of foreign exchange.

Focus on HVM products

According to Chaddah, among the high-value-add domestic products, only 9% (2025) of the total products are high value-add. "We need to develop products that

> India needs to incentivize training, internship, and IP creation to encourage design companies. It also needs to create a USD 1 billion seed fund for 1K-10K-100K startup program

The way forward: What the government should do



Source: IESA recommendations

have domestic value addition > 60%. From 2016, at USD 4 billion, we moved to 2019, at USD 7 billion. We expect to move to USD 23 billion by 2025. We need innovation-led design and design-led manufacturing. Design innovation and IP will help create high value-add products," he said.

"We also need to look at 1K-10K-100K start-up initiative. The 1K start-ups will do 10K IP creation and generate Rs 100K crore of business value. India has 100 fabless companies and 900 electronics product companies. There is a Rs 7,000-crore seed fund. We also need to expand the SFAL Model. There should be one fabless incubator/accelerator each in five regions. We also need to expand the Electropreneurs Park model, with one EP in each of the 36 states and UTs.

The overall impact should be a 50% increase in high value-add products by 2025. We should be able to make USD 35 billion from the current projection of USD 23 billion.

India should also increase the value addition in LVM products. The current value addition is ~17% in domestic production. Activities contributing include assembly, testing, PCB, PCBA, etc. We are making the recently announced PLI scheme based on value addition. India should also incentivize the setting up of ATMP facilities, display fabs, and display module manufacturing, LED manufacturing fab, power electronics fab, etc. There should be a debt venture fund for working capital. There should be an interest relief of 3% on the financing cost as well.

The impact will be USD 60B additional value creation by moving from 17% to 40%. It will also help the build-up of the components ecosystem and supply chain.

Key recommendations

IESA also highlighted the need to incentivize the training, internship, IP creation for design companies. We need to create a USD 1 billion seed fund for 1K-10K-100K startup program, and geographic inclusions of all states and UTs for innovation in electronics.

We also need to incentivize setting up ATMP, display, LED, power electronics fab for higher value addition. We must make the PLI incentives link to the percentage of value addition and encourage manufacturers with high value-add. There will be debt venture funds and interest relief for working capital and investments in manufacturing.

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[REPORT]
HUAWEI TECHNOLOGIES

An intelligent world calls for global connectivity: Eric Xu

While Huawei posted over 19% revenue growth in 2019 it expects the external environment in 2020 to become more complicated

BY PRADEEP CHAKRABORTY

Huawei released its 2019 annual report, detailing a solid business performance. While its global sales revenue went up 19.1% year-on-year to CNY 858.8 billion, it reported a net profit of CNY 62.7 billion. Its cash flow from operating activities topped CNY 91.4 billion, up 22.4% as compared to 2018.

The company also informed that as part of the long-term, ongoing investment in technological innovation and research, it invested 15.3% of 2019 revenue, or CNY 131.7 billion, in R&D; its total R&D spend over the past decade now exceeds CNY 600 billion.

Sharing details, the company's Rotating Chairman Eric Xu said: "Huawei's production in China has now been restored. In 2019, Huawei saw its net profit increase by 5.6% YoY. It has a robust financial position. Consumer business grew rapidly. Carrier business maintained steady growth. In 2019, China grew rapidly. Americas and EMEA grew steadily, while APAC declined. Huawei is investing in the future. We have CNY 600 billion invested in R&D for over 10 years. We are respecting and protecting the IPR."

"An intelligent world calls for global connectivity and mutual trust. Service security challenges will only be greater. Global co-operation needs to be strengthened, problems need to be resolved, and innovation is the key to get there," he said.

Promoting open innovation

"The external environment will only get more complicated going forward," Xu said, adding that the company needs to keep enhancing the competitiveness of its products and services, promoting open innovation, and creating greater value for customers and society at large. "This is the only way we can seize the historic opportunities presented by the digital and intelligent transformation of industries, and maintain robust growth in the long run," he said.

According to the company, 2019 saw Huawei's carrier business lead the commercial rollout of 5G networks. "To improve commercial adoption and promote new innovation in 5G applications, the company established 5G joint innovation centers, together with carriers worldwide," it stated.

The company further informed that its RuralStar base station solutions can effectively address coverage problems in remote areas. These solutions are being used in over 50 countries and regions, taking mobile internet to more than 40 million people living in remote areas. During 2019, Huawei's revenue from carrier business reached CNY 296.7 billion, up 3.8% year-on-year.

Huawei's enterprise business continues to support the digital transformation of customers across industries as the company helped lay the foundation of a digital world. Globally, more than 700 cities and 228 Fortune Global 500 companies have chosen Huawei as their digital transformation partner.

In 2019, Huawei announced its computing strategy with the aim of cultivating fertile soil for the intelligent world to flourish. As part of this strategy, the company launched the world's fastest AI processor, the Ascend 910, and the AI training cluster Atlas 900. During the year, its sales revenue from enterprise business reached CNY 89.7 billion, up 8.6% year-on-year.

The company also highlighted that its consumer business showed robust growth and it shipped a total of 240 million smartphones during the year. It reports further progress in developing the seamless AI Life ecosystem across all scenarios and devices, including personal computers, tablets, wearables, and smart screens, with revenue from consumer business touching CNY 467.3 billion, up 34% from the previous year.

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5G market growing faster than expected: Börje Ekholm

With its gross cash touching Kronor 72 billion, Ericsson expects to deliver on its 5G promises despite the Coronavirus challenge

BY PRADEEP CHAKRABORTY

Ericsson recently held its virtual annual general meeting, with its CEO Börje Ekholm speaking from his home, highlighting that the company had canceled all non-business critical traveling and was encouraging all co-workers to work from home, wherever possible.

"Today, over 90% of our employees in Sweden work from home. The corona crisis clearly demonstrates how important our technology is. Information and communication are vital ingredients when handling a crisis. These need connectivity. The fact that Ericsson's network enables this is something to be proud of. We work closely with our customers so that we may understand their current needs and make sure that they can provide the best possible connectivity," he said.

Ekholm highlighted that while the company had talked about the world switching to 5G during the last AGM, the year saw the world's first 5G networks being launched using Ericsson technology. "The same was true for Europe's first network, being launched together with Swisscom in Switzerland. Today, Ericsson has 86 commercial agreements, and 27 mobile networks operating in four continents. The 5G market is growing even faster than most analysts expected. Ericsson is well equipped to lead the development," he stated.

Ericsson's joint services and the delivery organization have decreased by 23,000 employees. We have employed 5,000 people in R&D. Today, every fourth employee works in R&D as compared with 17% in 2017.

"Our strategy is working, and for the first time since 2013, we are growing," he said, adding that Ericsson's gross margin increased and the operational margin almost reached the 2020 target one year earlier than expected.

"Our balance sheet is robust with a net cash position of 34 billion Kronor and a gross cash level of 72 billion kronor by the end of 2019. We are well equipped to continue delivering on our strategy despite the challenge Coronavirus presents. We are preparing for the tough times ahead."

Huge impact of 5G

Today, many technologies are being developed as 'mobile-first'. We are right in the middle of a technological switch between 4G and 5G, and 5G will have a huge impact. It is ten times faster, has a tenth of the latency, and provides a much higher connection density. New areas of use will emerge for consumers, fully utilizing the 5G qualities. It will transform entire industries.

The full potential of 5G is so much more profound. Manufacturing will get automated and logistics optimized. Health services will be altered as they gain access to sensors, and so on. Many new applications will emerge. Most of them will be within areas still unimaginable to us today.

Patents position

According to the statement, Ericsson presently has over 54,000 patents and leads the industry with relevant patents in 5G specific areas. Ericsson is also seeing the technology and products perform very well in the field, in the operators' networks. "We are also launching innovative products, such as our unique technology that dynamically allocates frequency bands between 4G and 5G, depending on the amount of the users. This enables the development of the 5G infrastructure to move much quicker," Ekholm stated.

He stressed that 2019 was the year when Ericsson completed its turnaround story. "We watched the 5G market taking off and accelerating. We are well equipped to keep winning in this tough and competitive market. We need to work together to help reduce the risk of spreading the Coronavirus so that society can eventually return to a more normal state."

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The life and travails of smartphones

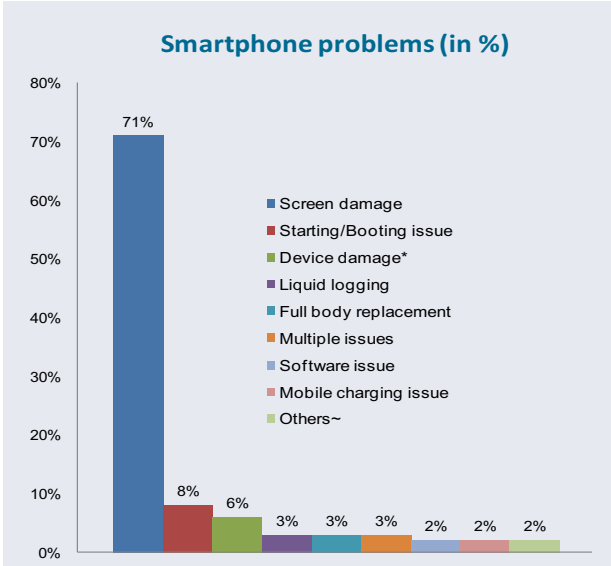
A study of over 30,000 handsets brings out a list of common problems and the average repair cost

BY SHUBHENDU PARTH

The damage of screens is the most common problem that smartphones suffer. According to a recent report by Onsitego, the company which provides repair services for electronic devices, a smartphone often gets damaged well before it becomes obsolete, and in 71% of cases the damaged screen is the primary cause of the problem.

This is followed by the booting or starting issue that accounts for nearly 8% of the reported cases, complete device damage (6%) and damage due to liquid (3%). Other issues included battery damage, software issue, charging malfunction and camera malfunction. The white paper 'Making Smartphones Last Longer' is based on the study of 30,000 smartphone failures over a one year period by the company.

The paper also highlights that there is a need to educate consumers on how they can take better care of their devices. "A smartphone may become slow when apps updated to the latest API version become slow and processor-heavy. When this begins to happen, a phone cannot meet the demands of new apps and becomes challenging to use, which in turn slows down the device," it states.



** Device damage includes all damages other than screen damage*
~ Others include problems with audio/camera/ speaker-receiver or damage of the back cover
Source: Onsitego white paper "Making Smartphones Last Longer"; n=30,000

For devices that were reported to have screen damage, repair or replacement was required in 97% of the cases, while there was a need to repair or replace the back cover in 15% of the cases. Similarly, of the phones with damaged screens, repair or replacement of motherboard was required in 11% phones, and in 13% of the cases the camera and battery needed to be mended.

In cases with booting problems, it was found that installing a lot of third-party apps that were not cross-compatible with other apps and/or with the OS of the phone resulted in frequent crashes in most of the devices. "Such devices have overheated motherboards and repeatedly shut down. The motherboard had to be repaired or replaced in 94% of such cases, while there was a need for repairing the screen in 55% of the instances. In 19% cases the back cover, and in 15% of the cases the battery also required repair."

The whitepaper also pointed out that was also common for phones to suffer damage from liquids. Though many phones claim they are water-resistant, the majority of them are not. While some are only splash-resistant, only a few are waterproof. "The average cost of repairing a phone that suffers liquid damage is Rs 9,700 and the motherboard and screen need repair or replacement in 69% of the cases. In 14% of the cases, the device required full-body replacement, depending on the damage. Also, in 12% of the cases, the battery was changed, while 11% of such cases needed replacement of the back cover."

Onsitego also reported that when a device costing less than Rs 10K or over Rs 50K is damaged, its cost of repair is highest and usually around 40% of the handset price. In case of a device priced between Rs 10K and Rs 20K the cost of repair is often 33% of the device's price, while for a smartphone priced between Rs 20K and Rs 35K, the average spent on repairs was 27%. The cost of repair for a damaged phone priced between Rs 35K and Rs 50K was found to be nearly 32% of the device's price.

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Mobile internet hits gender barrier

Despite the growing importance of connectivity, there is a considerable mobile gender gap that the world needs bridge

The gender gap in mobile internet usage remains substantial, with over 300 million fewer women than men accessing the internet from a mobile device in low- and middle-income countries.

According to a recently released GSMA report, the growth in women's mobile ownership has slowed considerably, remaining nearly constant since 2017, which makes closure of the gender gap unlikely in the near future. The gender gap is widest in South Asia at 51%, and remains fairly consistent in other regions such as Sub-Saharan Africa, which has the second largest gender gap at 37%, the report stated.

Affordability remains the critical barrier to mobile ownership, while lower awareness, as well as a lack of literacy and digital skills, are vital factors preventing women's mobile internet use. The industry is renewing its commitment to reaching women with digital and financial services to address the persistent mobile gender gap.

The report indicates that smartphones drive substantially higher mobile internet use, but there is a significant gender gap in smartphone ownership, with women in low and middle-income countries 20% less likely than men to own one. Among mobile owners, women on average use a smaller range of services in all 15 countries surveyed—a gap that remains even among smartphone owners.

The study, however, reveals that the mobile internet gender gap has narrowed and 54% of women in low- and middle-income countries now use mobile internet, up from 44% in 2017. However, the underlying gender gap in mobile ownership remains largely unchanged and 165 million fewer women than men own a mobile.

The research found that mobile offers essential benefits to users. The majority of male and female mobile owners reported that mobile ownership makes them feel safer, better informed and supports them in their day-to-day lives. It also suggested that bringing women's mobile use in line with men's represents an important commercial opportunity for the mobile industry to drive ARPUs growth and extend more of the benefits of mobile ownership to women.

"We are seeing important progress in driving equal internet access for women, but the pace of progress still remains slow. We urge business and government communities to continue prioritizing efforts to drive more equal access to mobile technology," GSMA Director General Mats Granryd said. "Ensuring digital and financial inclusion for women is critically important, as we know that when women thrive, societies, businesses and economies thrive."

The GSMA introduced the Connected Women Commitment Initiative in 2016 to catalyze action to close the mobile gender gap. Overall, 39 mobile operators across Africa, Asia and Latin America, including all three private-sector telcos in India—Airtel, Vodafone-Idea, and Reliance Jio—have made formal commitments to reduce the gender gap in their mobile money or mobile internet customer base by 2020.

Together, these operators have already reached more than 35 million additional women with mobile internet or mobile money services, and are driving increased digital and financial inclusion for women, the GSM report stated.

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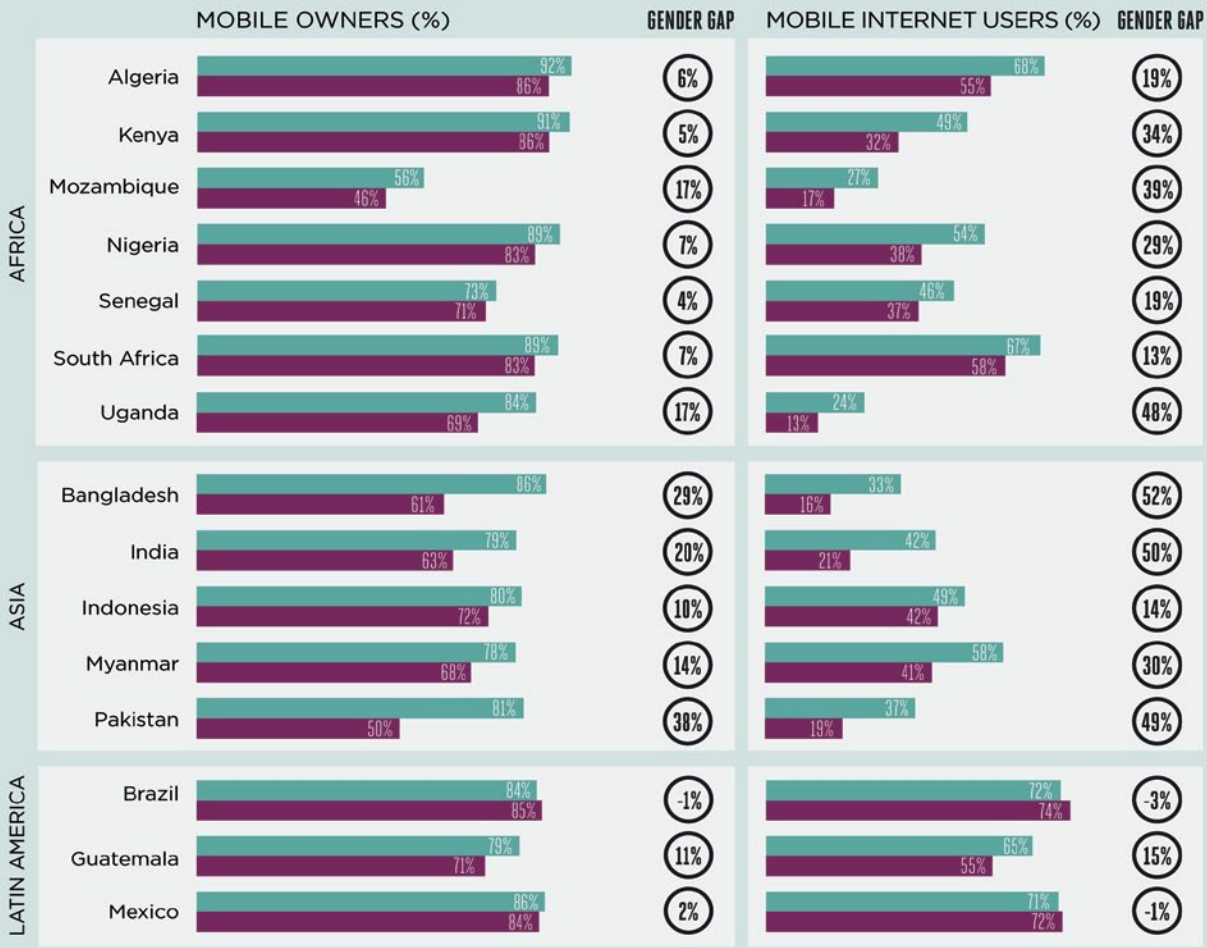
Country-level trends

There are significant variations within regions in overall mobile ownership, mobile internet use and the magnitude of the gender gap. In general, markets with lower levels of mobile ownership tend to have wider gender gaps in mobile ownership and mobile internet use. Of all surveyed countries, Mozambique has the lowest level of ownership, with only 46% of women owning a mobile phone compared to 56% of men. Of the countries surveyed, the widest gender gap is still in Pakistan, where women are 38% less likely than men to own a mobile and 49% less likely to use mobile internet.

Male and female mobile ownership and mobile internet use by country

Percentage of total adult population



Source: GSMA Intelligence Consumer Survey, 2019
Base: Total population aged 18+
A mobile owner is defined as a person who has sole or main use of a SIM card (or a mobile phone that does not require a SIM), and uses it at least once a month.
Mobile internet users do not have to personally own a mobile phone. The gender gap in mobile ownership and mobile internet use refers to how much less likely a woman is to own a mobile (or to use mobile internet) than a man.
n= from 496 to 1,099 for women and n= from 474 to 1,279 for men

Beyond national variations, there are also differences between urban and rural areas. In every country surveyed except Algeria and Brazil, the mobile ownership gender gap is widest in rural areas. For example, in Uganda there is a four per cent urban gender gap in mobile ownership while in rural areas it is over five times that, at 22%. The situation is similar for mobile internet. For example, in Senegal, women in urban areas are 11% less likely than men to use mobile internet, compared to 32 per cent in rural areas.

India issues alert, MHA says Zoom not a safe platform

India's Ministry of Home Affairs (MHA) has warned users that the videoconferencing app Zoom is not safe for use. The videoconferencing tool of US-based Zoom Video Communications has been gaining popularity worldwide ever since the COVID-19 pandemic broke and become one of the most sought after collaboration tool during the lockdown in India.

According to the 16-page advisory issued by the Cyber Coordination Centre (CyCord) of the MHA on the secure use of Zoom by private individuals, the platform is not safe. Quoting the CyCord advisory, the MHA also categorically stated that the platform "is not for use by government officers/officials for official purposes."

Referring to the earlier advisories of the Indian Computer Emergency Response Team (CERT-IN), the CyCord document on 'Secure use of Zoom meeting platform by private individuals' stated, "It is a not a safe platform and advisory of CERT-IN on the same dated 6 February 2020 and 30 March 2020, may kindly be referred."

The CERT-IN had in its 30 March 2020 advisory highlighted that Zoom's videoconferencing application was vulnerable to cyber attacks, including data leak. CyCord also provided guidelines on how users can prevent unauthorized users from entering the conference room carrying out malicious acts while using the tool. It also included a step-by-step guide for security configuration through the website and the mobile app.

"The broad objective of this advisory is to prevent any unauthorized entry into a Zoom Conference Room and prevent the unauthorized participant to carry out malicious attacks on the terminals of other users in the conference," the ministry stated in a press release.

When contacted, Zoom Video Communications said that the company takes user security extremely seriously. "A large number of global institutions ranging from the world's largest financial services companies and telecommunications providers to non-governmental organizations and government agencies, have done exhaustive security reviews of our user, network and datacenter layers and continue to use Zoom for most or all of their unified communications needs," the spokesperson from Zoom India stated.

Earlier, several countries had expressed concern about the security vulnerabilities of the application, including Zoombombing or Zoom Raiding that makes it possible for uninvited participants to gain access and disrupt a meeting, and harass the participants. Concerned, Germany, Singapore, and Taiwan have already banned Zoom, while many companies including Google have stopped using its desktop versions.

Concerns have also been raised about the company routing some of the calls through its data centers in China even if they were outside the country raising further concerns of breach of privacy and snooping. All of this had forced the founder and CEO Eric Yuan to apologize through his blog post on 1 April 2020.

"We recognize that we have fallen short of the community's—and our own—privacy and security expectations," Yuan had stated, adding that he was deeply sorry for it. He further went on to explain the series of steps taken by Zoom to make the platform safer.

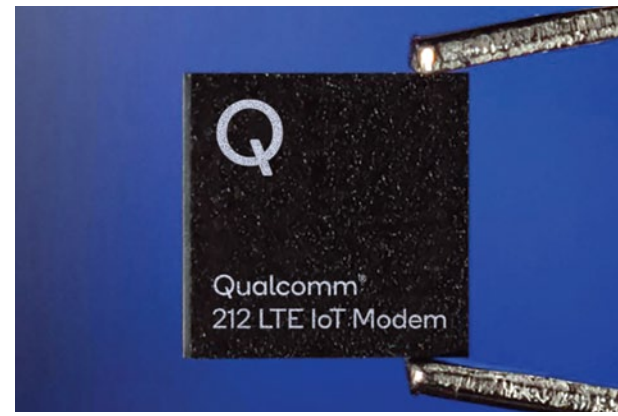
According to a recent Voice&Data survey, an overwhelming 54% of corporate respondents in India had indicated that they were using Zoom as a tool to enable collaboration between remote workers, as well as for communicating and networking with clients since 25 March 2020, when the nationwide lockdown became effective in the country.

Qualcomm launches power-efficient NB2 IoT chipset

Qualcomm Technologies has announced the launch of its cellular IoT product, 212 LTE IoT Modem, a single-mode NB2 (NB-IoT) chipset. Requiring less than one micro-amp (1uA) of sleep current, NB2's architecture allows for extremely low average power consumption, the company claimed, adding that it was the "world's most power-efficient" chipset.

The dime-sized chips are targeted toward applications that are more cost-sensitive and devices that are constrained in footprint space as well as power consumption and supports single-mode 3GPP Release 14 Cat. "The Qualcomm 212 LTE IoT Modem will help usher in a new era for a range of IoT applications around the globe, especially those requiring connectivity deep within buildings combined with low power use, like battery-powered IoT devices that need to operate for 15 years or longer in the field," Qualcomm Europe product management VP Vieri Vanghi said.

The company anticipates that NB2 IoT connectivity will enable extended coverage for delay-tolerant applications on RF frequency bands spanning from 700MHz to 2.1GHz for Global roaming. "Housed in a compact single-

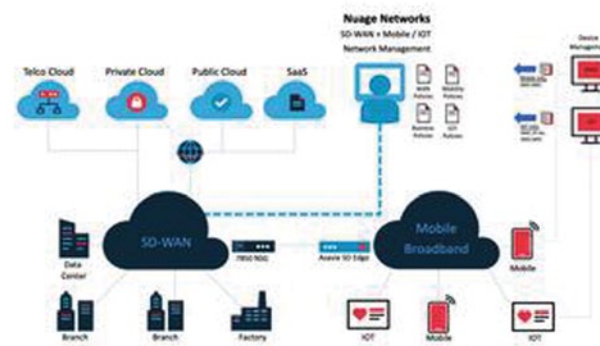


chip solution including modem baseband, application processor, memory, RF transceiver with fully integrated RF front end, and power management units, the modem enables LTE modules below 100 square millimeters in size. Its high level of integration with few external components not only results in a low-cost bill of materials but also facilitates quicker module design enabling faster commercialization time for OEMs," Qualcomm stated.

Nokia partners Asavie to strengthen SD-WAN solution

Nokia today announced a partnership with Asavie to use its SD Edge mobility solution to extend the reach of the Nuage Networks SD-WAN 2.0 solution to include enterprise mobile and IoT devices. Mobile users will be able to seamlessly and securely connect to enterprise clouds and applications without the hassle of using VPN clients on their devices. Enterprise IT teams will benefit greatly from using the same centralized policy and control for mobile access as the rest of the enterprise users and devices based in physical branch offices.

Nokia Nuage Networks SD-WAN 2.0 is a managed network connectivity solution for enterprises pursuing their digital transformation. According to the company, Nuage SD-WAN allows enterprise IT managers to quickly connect the physical branch, public/private cloud and SaaS services. "It provides IT with a single-pane-of-glass from which, using policies, they can manage security and access to applications and data across the enterprise network," said Nokia in its press release.



The solution will now integrate the Asavie SD Edge, ensuring that mobile users will be able to effortlessly connect with all enterprise applications, across private and public cloud and Software as a Service (SaaS). The combined solution will ensure that enterprise users have a consistent and secure connectivity experience using any device, whether in the office or on the move.

EnableX offers free VC solution for enterprises in Asia

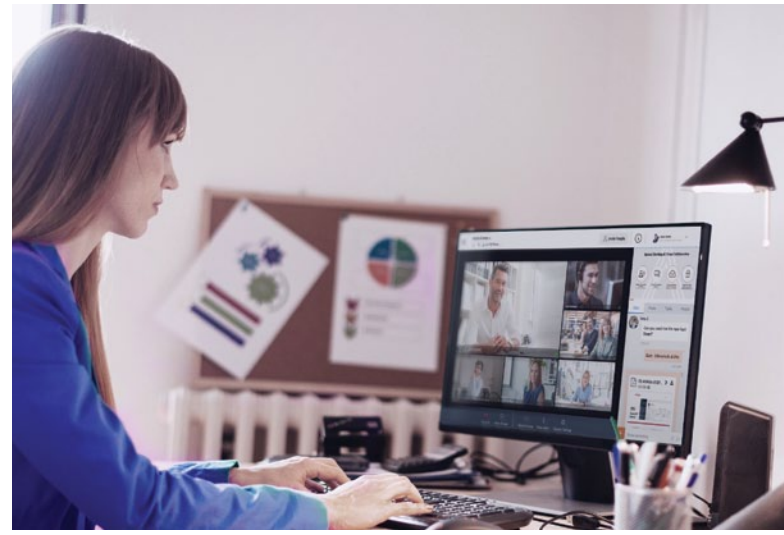
EnableX, a company that provides communication-platform-as-a-service (CPaaS), has decided to offer its video meeting and collaboration solution for free to help enterprises across Asia stay engaged with their employees. The initiative is part of the company's effort to support businesses during the COVID-19 pandemic.

"In this period, companies are looking to protect their employees' wellbeing, and ensure that the business operations run smoothly. In such scenarios, an enterprise-grade video meeting and collaboration solution will equip them quickly and cost-effectively transit to remote working in a way that is safe, smart and productive," it stated in its press release.

According to the company, its Enablex Video Meeting solution is easily accessible on any device and comes with collaborative features such as screen sharing, whiteboarding, and chat. Enterprises and individuals across Asia can sign up and get immediate access to Video Meeting with unlimited usage, it said.

"The COVID-19 pandemic is both a healthcare and an economic challenge. At a time when business-as-usual is not an option, we want to help ensure that companies and their employees can seamlessly, securely and effectively engage with one another despite being in different locations," said EnableX.io CEO & Founder Pankaj Gupta.

Now schools can join Avaya platform to conduct e-classes



Avaya has announced that it will provide its Avaya Spaces collaboration software for free to educational institutions, including colleges and universities along with non-profit organizations in India till August 2020.

"Making Avaya Spaces available for free to schools and universities will address the challenges around delivering education that arises in the event of school and business closures," the company said in a press release.

Avaya Spaces provides a cloud meeting and team collaboration solution that enables people and organizations to connect and collaborate remotely—and goes beyond integrating chat, voice, video, online meetings, and content sharing. "It gives users an extensive set of meetings and team collaboration features, including voice and video conferencing for up to 200 participants," the company stated, adding that as a mobile-enabled solution, it gives users a simple, secure and an effective way to track communications and manage tasks when traveling and connectivity is limited.

"We know there is an immediate need in the education sector as school and university administrators consider the safety of their students while ensuring continuity of their classes, engagement with their students and delivering on their educational objectives," said Avaya India & SAARC Managing Director Vishal Agrawal. The company also claimed that its platform can facilitate online parent-teacher meetings, where teachers can directly collaborate and communicate with parents to share the routine update, or privately communicate on the progress of individual children.

Avaya is also working with governmental health departments and continues to explore during this global pandemic virus ensuring communities and customers have relatively less impact on their work through work from home collaboration technologies.

Smartphone production likely to tumble by 38-40% in H1

The post COVID-19 mobile handset market in India is likely to continue with its downward slide with the smartphone production in the country falling by 38-40% during the first half of CY2020. However, the prospects for H2 2020 are brighter with shipments likely to rise 15% year-on-year, raising the industry spirits, a recent report by CyberMedia Research (CMR) stated.

With the coronavirus-induced shock hitting the Indian smartphone market, CMR has revised its market guidance for CY2020. "Our current India smartphone market assessment points to a bleak picture, with some promise in H2 2020. We anticipate a significant drop of around 20% year-on-year (YoY) in smartphone shipments in Q1 2020. There will be a full-blown impact in Q2 2020, with a sharp decline of around 28% YoY," the market research agency stated.

According to CMR Industry Intelligence Group's head Prabhu Ram, the smartphone market has suffered a dual hit, from both supply and demand side. "While the OEMs could tide over the initial wave of the Coronavirus crisis in January and February with adequate component supplies, the closure of smartphone factories in India has dented recovery prospects for H1 2020," he stated.

On the demand side, with the Coronavirus scare, offline channels are massively impacted with sales down by 55-60%. In the face of personal and economic uncertainty, consumer spending is likely to get moderated and remain muted for a major part of this year.

"If one where to go by China's experience, the online channels made-up for the deficit, incurred in offline channels. However, in the Indian context, with the lockdown in force, we are now looking at a rather uncertain future. That said, we believe online has the potential to pick-up in terms of sales during mid- to late- Q2 and beyond," said CMR Research Manager Amit Sharma.

From a larger industry-wide perspective, the supply chain disruptions induced by Coronavirus pandemic will now push smartphone brands to seriously ramp-up their India localization strategies, Prabhu said.

Movements

QUALCOMM GETS HEATHER ACE AS HR HEAD

Qualcomm Incorporated has appointed Heather Ace as Executive Vice President of Human Resources. She will join the company's executive committee and report to CEO Steven Mollenkopf. Ace takes over from Michelle Sterling who is slated to retire after serving for 25 years in the company.

Ace has over 20 years of human resources experience. She recently served as the Chief Human Resources Officer at Dexcom, a San Diego-based medical device company. She also worked closely with the board of directors and compensation committee and played a key role in aligning the executive leadership team on companywide strategic priorities and operational planning and execution.

ZAGGLE APPOINTS SIVA KUMAR AS CTO

Zaggle has announced the appointment of Siva Kumar as its new Chief Technology Officer. Kumar who will be based out of Hyderabad and head the technology reporting directly to the founder Raj N Phani, has over 23 years' engineering management and software development experience.

An engineer from Thiagarajar College of Engineering, Madurai he completed his executive program in business management from IIM, Calcutta. In his previous role of Group CTO at People Combine, Kumar led the technology initiative of the group. He has also been associated with brands like the University (an EdTech startup), Ibibo (eCommerce startup), and Quark (desktop publishing software).

OPTIVA BRINGS G. BALASUBRAMANIAN AS CRO

Optiva has announced that Ganesh Balasubramanian has joined its team as the Chief Revenue Officer (CRO). Balasubramanian has a proven track record of driving exponential revenue growth, managing complex business transformations and building and strengthening global leadership teams and product lines. He joins Optiva from Netcracker where he held various leadership roles across the globe.

Leveraging his experience, Balasubramanian will take responsibility for Optiva's revenue-generating functions, including its global, go-to-market strategy and execution with a focus on aggressive software as a service (SaaS) growth, the company stated.

TRAI raises international termination charges

The Telecom Regulatory Authority of India (TRAI) has decided to revise international call termination charges from the existing International Termination Charges (ITC) to forbearance regime but within a prescribed range of 35-65 paise per minute against a fixed rate of 30 paise per minute earlier.

The move allows service providers to increase international call termination charges to a maximum of 65 paise per minute and comes after two years of the IUC regulation that had slashed the termination charges for international incoming calls to a fixed 30 paise per minute.

However, to ensure a level playing field between the standalone and integrated international long-distance operators (ILDOs), TRAI has mandated that the Access Service Provider shall offer the non-discriminatory rate of ITC to everyone.

The ITC is a charge payable by an Indian ILDO for carrying the calls originating from outside the country to the access providers in India whose network the call terminates.

Welcoming the TRAI decision as the right step to protect the interest of Indian telecom operators, COAI Director-General Rajan S Mathews said, "Responding to the consultation paper, we had submitted that

the regulator should prescribe a higher rate of ILD termination charge to ensure parity with other countries that terminate calls to India. With this revision, ILDOs are expected to adjust their charges accordingly and regain parity with international countries."

He further pointed out that the new regime will ensure the country does not lose precious foreign exchange in paying higher international termination rates to other countries. "The Indian telecom sector needs more such measures to ensure robust telecom infrastructure and financial health," Mathews said.

TRAI also said that it will closely monitor the trends and patterns of international long distance voice traffic in the country, the implementation of the new regime, and will review the ITC from time to time, if required.

SonicWall launches new cybersecurity platform for remote workers

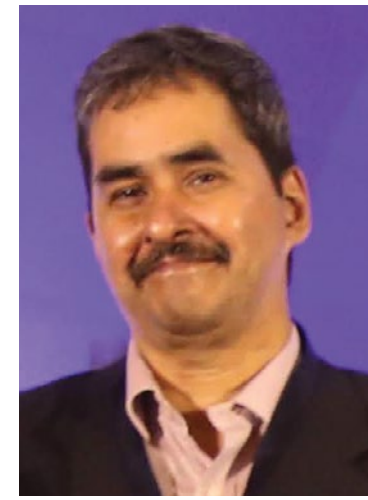
SonicWall has unveiled its Boundless Cybersecurity model designed to protect and mobilize organizations, large enterprises, government agencies and small- and medium-sized businesses (SMBs) operating in a 'new business normal.' According to the company release, the new platform delivers seamless protection that stops the most evasive cyberattacks across endless exposure points and increasingly remote, mobile and cloud-enabled workforces.

"This profound business change will result in increased pressure to execute and deliver proactive, data-centric security protection that is always on, always learning and applies new methods of protection against today's most pervasive cyberattacks," SonicWall President and CEO Bill Conner said.

The company also announced that it has increased the capacity of Secure Mobile Access (SMA) 100 series to support hundreds of concurrent remote users. "Enterprises and MSSPs can scale upward of hundreds of thousands of users with the proven SMA 1000 series. Dynamic and short-term spike licensing options address any unforeseen events and disaster scenarios. SMA also enables users to leverage the economic and operational advantages of cloud platforms by launching their own virtual instances in private clouds based on VMWare or Microsoft Hyper-V, or in AWS or Microsoft Azure public cloud environments," the press release stated.

Telecom in times of Covid-19

While the telcos are working towards ensuring uninterrupted service amidst sudden surge in demand, there is a need for responsible consumption by users as well



Pradeep Chakraborty

The nation is now under mandatory COVID-19 lockdown, as per the Indian government guidelines.

The impact of COVID-19 on businesses has been huge. Now that work from home is prevalent, questions are being asked around whether the internet can handle the network traffic? There are reports from operators asking customers to not mess up the network.

As per the Cellular Operators Association of India, the industry, with the Department of Telecommunications, has seen a flattening of the traffic demand on member's networks. Some of these actions relate to streaming services reducing their content from HD to SD, local municipalities working with operators to bring sealed towers back online, some redistribution of traffic on the network, etc.

This situation also brings to light just how important are network connectivity and its ubiquitousness. Imagine, such a pandemic a decade or two ago, or even in the 1990s. There is news like the TOMIA offering free roaming services to the operators. Slovakia approved a law that allows the government to monitor the movements of those infected by COVID-19. It follows Singapore, South Korea and Taiwan, where such tracking measures have slowed the spread of the virus.

The International Telecommunication Union has urged telecom operators to consider contractual relief to their customers. With video gaming and other such apps seeing a surge, there may be need to consider traffic shaping to manage the network load. Perhaps, there is also a need to have the emergency telecom plans to be put in place, if not, already done so.

The International Telecommunication Union has urged telecom operators to consider contractual relief to their customers.

Telecom is at the epicenter of all these challenges that we are now facing. One hopes that people all over the world will become more tolerant, from now on, as to how they are using their mobile phones. It is important to ensure how well are we delivering and managing the outcomes for the industries and societies.

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Posting Date: 4&5 of every month. Posted at Lodi Road HPO.

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