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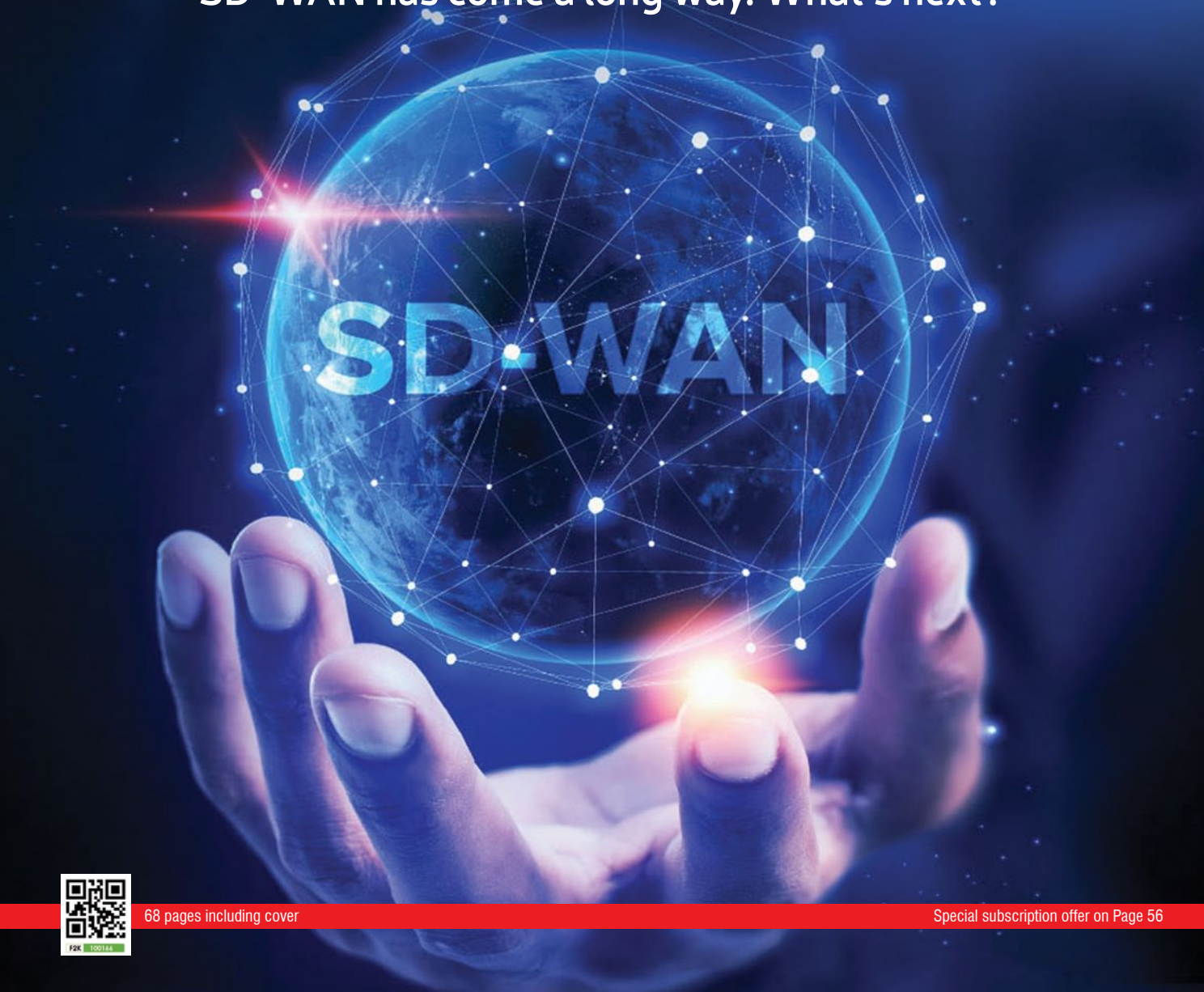
WIRES UNTANGLED

From link-virtualization to intent-based, SD-WAN has come a long way. What's next?



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KEY HIGHLIGHTS

- How did the telecom industry deal with the surge in demand?
- What are the lessons learned from the crisis?
- How can the telecom sector support in crisis management?
- What should India do to strengthen its digital infrastructure?
- Where are we headed: The "new normal"

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[OPENING NOTE]

Let's think digital dieting

I recently watched the 2019 video of award-winning Australian journalist Hugh Riminton's interaction with fashion journalist and sustainable activist Bandana Tewari on ABC Radio National. Highlighting that the world produces over 500 billion T-shirts every year even though it does not need as many clothes, she called upon the consumers to become more conscious and go on a fashion diet.

"Conscious consumption should be like the diets we go on to cleanse our bodies," she said, stressing that one should buy pieces that have value, a story, anything that would make the person hold the garment close to heart. "We need to give clothes that cultural context or narrative that makes us want to keep them longer." Tewari went on to emphasize that the breakthrough fashion designers of this millennium will be the ones narrowing the gap between the designer, the artisans who make the clothes and the consumer.

She certainly had a point. It was plain, simple and clear, kind of what the UN SDG talks about, and the ITU's Connect 2030 theme of this year's World Telecommunication and Information Society Day (WTISD)—sustainable inclusive growth through innovation and partnership.

Gadgets, particularly mobiles and wearables, are turning out to be the fashion accessories of the digital economy. It is not only driving consumerism, like in case of the T-shirt, but also creating a much bigger problem—increasing the heap of hazardous material on the earth. This is a far more difficult problem to deal with than handling fabric as a waste, not to talk about the amount of water consumed in the manufacturing of silicon chips that go into these devices.

For the record, according to Statista, 1.48 billion smartphones were produced globally in 2019 and the number is going to touch 1.52 billion by 2021. Assuming an average two-year life-span of a smartphone, by the end of 2020 we would have dumped over 7 billion of these devices manufactured since 2015. And that is just a fraction of the overall digital communication ecosystem that we cannot now live without.

While there is no denying that telecommunication and mobile broadband have emerged as the lifeline for the economy during the current global health crisis and the lockdown, enabling India and rest of the world to remain connected, communicate and collaborate to ensure business continuity, as also maintain sanity through a basket of entertainment and social applications, it is also the time to reflect on how we can achieve this through less.

We are releasing this issue of Voice&Data on 17 May 2020 to mark WTISD. This is to remind ourselves and the industry that there is an "S" before the "development goals" in SDG. While it is imperative that we use ICT-enabled solutions and emerging technologies to drive economic growth, accelerate human progress and to bridge the digital divide, it is vital that we do not forget the "sustainable" word in this long and never-ending journey.

It's time for some digital dieting as well.

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THE WIRES UNTANGLE SOME MORE

Cloud-centric workloads, application-led working styles; how long could WAN stay away from the software-ization switch? Let's see if all nails have come off or not

BY PRATIMA HARIGUNANI

Every enterprise wants to be as light and as easily afloat as a hot air balloon, especially the people who are inside this airborne vehicle. And why not? A lot of the tin has been replaced with soft fabric and wicker in the recent past thanks to cloud and virtualization. The result is that enterprises are moving closer to feather-light applications. They cannot be pinned down with ropes and cables of the yore, lest some other balloon will reach the sky, and faster.

So when alphabets like S and V started appearing and promising more and more abstraction, it was understandable to see the interest billowing around Software-Defined Networking (SDN), Network Function Virtualization (NFV), etc. With the addition of Software-Defined Wide Area Network (SD-WAN), another metal hook came loose. Now, the balloon could actually move away from the ground.

The hammers were gone

When we think of a traditional WAN, we have no choice but to imagine a lot of conventional routers, cloud-unfriendly hardware, linking-labyrinths, and endless backhauling of traffic from branch offices, to hubs and data centers and back. SD-WAN is simply a virtual WAN architecture that uses centralized control and intelligence for managing traffic across the WAN.

The erstwhile WAN used to mean delays, performance snags, productivity issues, crummy user experiences, and application bottlenecks. But with SD-WAN everything is slated to become leaner and lighter. So, just as SDN re-imagined the connectivity, management, and provisioning of a network by injecting abstraction SD-WAN decoupled the control plane from the data plane by using intelligence, prioritization, and virtualization.

This new landscape makes, or at least aims to make, WAN totally ready for the lean world of cloud, containers, digital workplaces, software-as-a-service (SaaS) usage, remote work, and applications. When intelligence and abstraction meet at a sweet spot, the upshots are clear—better application performance, better user experience, better form-factor flexibility (for virtual and physical points), better WAN remediation, better automation, better provisioning and better branch-geographical consistency.

HfS Research Senior Vice President Oliver O'Donoghue and his colleague Jamie Snowdon who

> "Over 90% of WAN edge infrastructure refresh initiatives will be based on vCPE or SD-WAN appliances versus traditional routers by 2023."
>
> GARTNER

track infrastructure and cloud, echo the same when they share their top-level view. "SD-WAN is increasingly becoming part of the cloud management fabric. The industry luminaries we speak emphasize agility, flexibility, and cost implications of managing traffic and workload at a software level. SD-WAN means that enterprises don't need to invest in expensive routing hardware and private connections, and can instead manage workloads directly on the cloud utilizing public internet connections. In mature IT infrastructure builds, it also offers the opportunity to more accurately manage provisioning, bringing costs down further," the duo stated.

But SD-WAN is not just about traffic and routing anymore.

O'Donoghue notes that, historically, this has been used for traffic management to increase application availability and performance—such as using software to more intelligently route workloads. However, he is now seeing SD-WAN being used more for infrastructure modernization engagements and to facilitate a broader level of agility and flexibility in core infrastructure.

"A few years ago, the industry definition of SD-WAN was link-virtualization or effectively dividing traffic between two links. But we believe that it can go far beyond this and provide standardization across the organization, because users exist in multiple forms and shapes, including on-campus, off-campus, remote workers, contractors, suppliers, etc," points out Cisco India & SAARC Director for Enterprise Networking Ritesh Doshi.

"It should also be able to perform data classification and routing on the basis of deep packet inspection techniques. The organization should be able to prioritize its traffic based on the user, the type of traffic the user can access, and multiple similar policies that the organization would want to define," he stated, adding that the concept of intent-based networking will soon come into play.

With SD-WAN on the table, the evasive idea of application-aware networking is also plausible and simple. And in a different way than Multi-Protocol Label Switching (MPLS) did.

Explains ESG (Enterprise Strategy Group) Global Senior Analyst Bob Laliberte: "The key driver for SD-WAN includes the shift to cloud-based applications—both IaaS and SaaS. As these applications become far more distributed across multiple public clouds, it is inefficient to connect to those applications via the legacy hub and spoke network model. These environments force all remote traffic through the data center before going to the cloud, generating latency and offering sub-optimal experiences," he said, adding that traditionally enterprises use MPLS links that have good performance but are costly and so typically bandwidth is lower and

"The key is for organizations to understand their application traffic and establish the priorities. Once done, they can effectively create centralized policies for SD-WAN."

Amit Bareket, Co-founder & CEO, Perimeter 81

"Organizations can quickly turn up new sites using Zero-Touch provisioning by leveraging SD-WAN and using centralized policies to enforce application prioritization."

Bob Laliberte, Senior Analyst, ESG Global

that meant running in an active/passive set up which increases the cost.

Ease and flexibility are big tick-boxes with SD-WAN. Interestingly, the security and stability sides of SD-WAN are also hinting at its rapid traction. Perimeter 81 Co-founder and CEO Amit Bareket notes that SD-WAN technology helps deliver an enterprise-level, secure, and simple cloud-enabled WAN connection for businesses. He also tells us what makes SD-WAN so attractive to organizations: "It is a more flexible architecture for networking and security in order to resolve the issues which are related to cloud adoption. An organization can easily deploy SD-WAN solutions across their company without any hiccups."

Helium anyone?

There's more to SD-WAN than just speed and agility. Some crucial network metrics get a make-over too when SD-WAN jumps in. The most game-changing advantage that floats straight up is the possibility of application-savvy networks. SD-WAN technologies enable organizations to prioritize applications, so sensitive voice and video applications or other mission-critical applications are prioritized.

"In the event of a link failure these prioritized apps would function as always, but the traffic of less importance, guest Wi-Fi for example, maybe throttled back until the problem is resolved. The key is for organizations to understand their application traffic and establish the appropriate priorities. Once that is done they can effectively create the centralized policies for the SD-WAN technology that will be rolled out to all locations," Bareket said.

One of the major benefits that we are seeing with SD-WAN is the improvement in network efficiency, Bareket adds. "A company's IT teams will be provided with better network visibility throughout their stack of resources, no matter where they reside—cloud, local, or elsewhere. Another attractive benefit of the current SD-WAN solution is its common pricing model. SD-WAN solutions tend to take after the subscription-based or the SaaS model. Most enterprises that experience timely-peaking in their networks will see this pricing model as an attractive option as it will correlate with their network budget."

According to Laliberte, organizations can quickly turn up new sites using Zero-Touch provisioning by leveraging SD-WAN and use the centralized policies to enforce application prioritization in all edge locations, ensuring all mission-critical applications are prioritized.

Tata Elxsi Deputy CTO & Head of Network Transformation Technologies Rajagopalan Rajappa agrees: "It is the first big leap in transforming static, rigid, multi-touch human-intensive, hardware-centric network to a Zero-Touch programmable software-

> "SD-WAN can grow at 30.8% CAGR to touch USD 5.25 bn by 2023."
>
> IDC

centric virtualized network. This network fluency and service delivery platform as vCPE at enterprise premises provides the pliability, flexibility, and agility for rolling out services."

According to him, the services could range from inter-branch connectivity solutions, branch office security, collaboration platforms, and other enterprise business operations. These services could be hosted either on enterprise data centers or on the public cloud. "SD-WAN, being an overlay technology with programmable virtualized routers at enterprises' end, eases the unprecedented demand and enables anywhere, secure collaborative work environment for large and small scale businesses," he added.

So what does SD-WAN actually represents?

Experts agree that it represents a big hop away from heavy infrastructure and touch-heavy networking. It can be the loosening of the last bit of metal that was holding SDN down because SD-WAN is more than the automation of routing and switching. It is about Application Delivery Controllers (ADCs), load balancing, and Transport Layer Security (TLS) encryption handling that frees up network teams from a lot of manual configuration and troubleshooting. It makes the network game less complex than what it used to be.

Cost control is the other factor driving investments in SD-WAN. According to Verizon Business Group Head of solutions South East Asia & India Prashant Gupta, "While SD-WAN automatically provides end-to-end encryption across the network, on the cost front, businesses can use premium connections when needed, and lower-cost routes when possible, for a lower cost of ownership. Low-cost internet connectivity can be used for noncritical applications, and for redundant bandwidth as needed."

But is it spared of its own challenges and knots?

Hindenburg crash

SD-WAN has seen, and often to its advantage, how the pricing and complicated nature of MPLS and NFV played party-poopers for these promising and well-entrenched concepts. If SD-WAN bumps into any of these trees, the flight could be interrupted mid-way.

Presence of heavy network legacy when mixed with the lack of adequate availability of APIs (Application Programming Interfaces) and CLI (Command Line Interface) device libraries can also add some spanner in the works. Plus, it needs to move faster from Layer3 (routing) to the next levels like Layers 8/9.

It is already witnessing speed-breakers in the form of a strong need for better initial set-up, faster cloud on-ramping, scalability, and security strengths. Cisco has recently unveiled some recent SD-WAN security vulnerabilities. And experts are already talking about AI-Ops for Networks where self-driven and self-healing networks could make today's network management

"SD-WAN is enabling businesses with mature setups to scale remote-access solutions to the core infrastructure with relative ease, compared to those running legacy set-ups."

Oliver O'Donoghue, Senior Vice President, HfS Research

"It should be able to perform data classification and routing on the basis of deep-packet inspection techniques, enabling prioritization of traffic based on the user."

Ritesh Doshi, Director—Enterprise Networking, Cisco India & SAARC

models go thousands of feet down as they draw the flight-path of the future.

SD-WAN could be replaced or left incomplete without a slew of new arrivals on the network table. AI-Ops aside, there is network-in-a-box with SD-Branch offering consolidated hardware instead of too many separate appliances. There is the Gartner-coined Secure Access Service Edge (SASE), which is being looked upon as the future of network security. The network automation trajectory could also veer towards UD-WAN or User-Defined WAN.

The wind blows new, after corona

As SD-WAN grapples and adapts to its own set of jolts, the time and breeze could not have been more right for SD-WAN. The biggest advantage that it can count upon has to be that of application-aware networking.

"While various industry reports claim that over 50% of enterprises are considering SD-WAN deployments in the next 12-24 months, the actual share of adoption has been low and deployment has been in small phases. This is because the industry is carefully assessing the impact of it on the application performance and evaluating the functionalities," Spectra Co-owner & CCO Rajat Arora stated.

He, however, points out that the early adoption is very encouraging. "With the recent developments forcing the remote management, higher level of security and reliability there is pressure to reduce the cost to manage the networks. This will enable faster deployment of SD-WAN across industries," he said.

"Yes, SD-WAN adoption can be truly seamless between backend infrastructure and applications, specifically when organizations are using a cloud networking backbone that is multi-tenant but also, a native network that does not alter basic networking spaces like IPv4 spaces," Bareket reasons.

SD-WAN's relevance is going to get even more pronounced as the world moves to a new normal after the current pandemic-shakedown. The Corona aftermath has reconfigured the workplace in a massive way. In the current environment—with more working-from-home and remote-access—SD-WAN is going to be all the more relevant and critical. As O'Donoghue reckons, it is enabling businesses with mature setups to scale remote access solutions to core infrastructure with relative ease, compared to those running legacy set-ups where VPNs, tunneling, and other more complex accessibility solutions are required.

"Our expectation, alongside an overall rush-to-the-cloud as enterprises try to keep remote decentralized teams productive, is that SD-WAN will likely become a larger component of core enterprise IT infrastructure as businesses rush to implement it now and recognize the value that a more flexible and agile IT platform brings. The conversations we're having with executives right now are

"By 2022 Global network automation market will touch USD 16.9 bn."

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The SD-WAN advantage

1. Centralized orchestration
2. Zero-Touch Provisioning
3. Easy programming of configurations and policies
4. Cloud-orientation of traffic and applications
5. Ability to manage multiple connections like MPLS, broadband, LTE
6. Simple segmentation, partitioning and management of traffic
7. Reduced complexity
8. Smooth automation

about upgrading and modernizing the IT estate – this is something they have a multi-year roadmap for. However, reacting to the Coronavirus is forcing them to condense this down to ensure key teams have access when central locations are inaccessible," O'Donoghue said.

Laliberte seconds that as he underlines how SD-WAN enables organizations remote locations to connect directly to the public cloud leveraging broadband, MPLS or Long Term Evolution (LTE) connections. "Because they run in active/active mode all the bandwidth is utilized. Broadband links are much less expensive for a lot more bandwidth. So organizations have found it possible to leverage the extra bandwidth to deliver innovative services," he stated.

Adds Nokia's Head of IP & Optical India Regional Business Center Mahesh Srinivas: "Just as many enterprises are using WAN architectures and solutions that are 10+ years old, the remote access and teleworking VPN solutions have been around for even longer; dating back to dial-up connections even before the broadband. It is clear that SD-WAN-based remote access and teleworking solutions are better suited to enterprises using hybrid cloud, and COVID-19 has made these solutions more attractive as they need to rapidly expand capacity and improve control and visibility of network and application usage beyond the branch."

It could have easily ended as another blast of hot air, another buzzword. But so far, the aerodynamics for SD-WAN is working quite well. Until someone else reminds of another forgotten nail on the ground, the balloon looks pretty and aloft.

With inputs from Shubhendu Parth

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CASE STUDY

Riding a tension-free, resilient, flexible network

For the joint-venture insurance company, establishing centralized and secure connectivity for branches was a challenge. The solution it adopted was software-defined wide area network

BY SHUBHENDU PARTH

Set up in 2008 as a joint venture by Canara Bank, HSBC Insurance (Asia Pacific) Holdings Limited and Oriental Bank of Commerce (now merged with Punjab National Bank), the Gurugram-based Canara HSBC Oriental Bank of Commerce Life Insurance has over 40 branch offices across India.

While planning for expansion—new, smaller branches—it became evident that the traditional setup could prove a challenge in terms of management and control, particularly since the organization intended to establish central and secure connectivity using the available low-cost public network with an enterprise-level security component.

"This was also well-timed for us as we were also planning to do away with the old network infrastructure and wanted to leapfrog to adopt the latest in networking technology,"

"The company started its journey of redefining and incorporating network architecture redesign to bring in agility and support business growth."

Sachin Dutta, COO, Canara HSBC Oriental Bank of Commerce Life Insurance

Sachin Dutta, Chief Operating Officer of Canara HSBC Oriental Bank of Commerce Life Insurance said.

With their rigor to drive quicker delivery of secure, scalable, stable network environment at new locations, the company planned to migrate to the next-generation network by implementing SD-WAN and SD-LAN in the working environment.

"As we embarked on our journey to refresh the old network devices, we evaluated the market, measured business growth plans and consulted various partners in this space. We reviewed the challenges of setting these branches in a traditional way and found that the cost incurred and time required on setting up these branches was very high," he explained.

According to Dutta, while traditional MPLS setups guaranteed uptime and limited packet drop, it required more time for setup and there was a clear disadvantage in terms of cost and flexibility. Maintenance and change management also acted as a roadblock at times.

"We had the option of continuing and refreshing the traditional network with the set of new devices, but we dropped the idea and decided to actively pursue SD-WAN because of its flexibility, scalability and activation," he stated.

Canara HSBC Oriental Bank of Commerce Life Insurance initiated the project in November 2019 and completed it in over five months, by March 2020.

Rolling it out

The process began with the partner selection process—review of solution design, implementation timelines, and post-production management of the environment. This also included a review of industry-leading solution with a strong implementation experience. The team also consulted partners and industry counterparts who had already adopted SD-WAN and had been reaping the benefits.

"We initiated the deployment with the network design and planning phase, under which we reviewed the existing WAN and LAN setup and deployment of the central environment. This was followed by the deployment at the branches," Dutta stated.

"The deployment of our SD-LAN built on Software-Defined Access provided automated end-to-end segmentation for separate users, devices and application traffic without the need to redesign the network," he added.

The setup automates user access policy so that organizations can make sure the right policies are established for users and device for all application across the network and this was accomplished with a single network fabric across LAN and WLAN. "This has helped create a consistent user experience anywhere without compromising on security."

Interestingly, the company has a hybrid structure at present as it continues to retain MPLS for certain applications. However, it has chalked out a phase-wise plan to do away with the old network system and components one by one.

"Clearly, the objective is to build the experience, gain more confidence, and then expand. An SD-WAN edge router provides this capability to route the traffic dynamically over various channels and data services which include MPLS, broadband, and LTE," Dutta said, adding that while moving away completely from MPLS will take time. "We will continue to apply the security architecture to both. We are also evaluating its capability to integrate over the cloud solutions."

> One of the key reasons for the smooth rollout was the company's clear focus on the business ask. It also evaluated how technology can enable business growth while making it resilient, keeping it flexible, and secure.

Key learning

- Be clear on the business ask
- Evaluate how technology can enable the growth of business while making it resilient, flexible and secure
- Do proper sizing, review cloud readiness, and dependency on existing architecture
- Explain the requirements and business objectives to the vendor and solution partner in clear terms
- Conduct an internal assessment to bridge the gap between the current and the "go-to" state
- Do not follow what others are doing

One of the key reasons for the smooth rollout was the company's clear focus on the business ask. The implementation team also evaluated how technology can enable the growth of the business while making it resilient, keeping it flexible and secure. The team also focused on proper sizing of requirements and conducted an audit of its cloud readiness and dependency on existing architecture.

Another factor that made a difference was its ability to clearly explain the requirements and business objectives to the vendor and solution partner. "The deployment partner with its prior experience ensured that we don't face any challenges. The transition has been quite smooth with no disruptions, thanks to a comprehensive environment and design review that we initiated for the deployment," he said.

How did it change the network?

The company started its journey of redefining and incorporating network architecture redesign to bring in agility and support business growth. It also strongly believes that backend infrastructure provides necessary resilience, flexibility, cost optimization, agility, and user experience required for the businesses with aggressive growth plans.

"Resilient, flexible, agile, and secure network design is critical to the success of any enterprise," the COO said. He further added: "The setup is relatively new and we are also adjusting to this internally. The solution will be adopted in any new branch that we open up in the future and we will measure the agility and security. At the same time, the existing solution for the current set of branches has also been upgraded where we see better resilience and uptime."

He also explained that the maintenance of the new setup is easy, while another big advantage is the ability it provides for real-time monitoring since the solution is powered by software-defined capabilities as compared to hard and rigid routing found in the older setup.

However, with the COVID-19 and the lockdown that has forced its employees to operate from home, the company has not been able to evaluate the real benefit of the deployment. "It will be seen once we start to operate out of these branches in full force," Dutta said

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"SD-WAN AT BRANCH NEEDS TO DETECT AND RESPOND TO THREATS IN REAL-TIME"

MAHESH SRINIVAS
Head of IP & Optical India Regional Business Center, Nokia

Shubhendu Parth (SP): COVID has suddenly created multiple branch offices for even the otherwise single building organization with WFH being the new normal. Will this drive the demand for SD-WAN?

Mahesh Srinivas (MS): Just as many enterprises are using WAN architectures and solutions that are 10+ years old, the remote access and teleworking VPN solutions have been around for even longer; dating back to dial-up connections even before the broadband. It is clear that SD-WAN-based remote access and teleworking solutions are better suited to enterprises using hybrid cloud, and COVID-19 has made these solutions more attractive as they need to rapidly expand capacity and improve control and visibility of network and application usage beyond the branch.

Nokia's SD-WAN 2.0 solution includes a true end-to-end SDN architecture that spans public and private cloud, HQ, regional and branch offices, teleworking, and even mobile and IoT devices. The demand is growing for all applications of SD-WAN in 2020, and especially for connecting home and mobile users. We have many examples of home-based SD-WAN, including an interesting telemedicine example with UPMC in the USA.

SP: Vendors often project that SD-WAN will change the way organizations manage their networks. How? What is the impact on data security?

MS: The main change is from device-centric configuration and management to centralized policy-based configuration and management. That means instead of technical staff logging into boxes and changing things, they use a web portal to centrally control configurations across the network, then those changes get applied across all relevant devices at all affected locations. Monitoring, reporting, and troubleshooting is similar—done through dashboards with application-level reports and performance monitoring tools that provide insight into SLA compliance instead of just seeing whether a device or application can be reached across the network.

Security is changing as well. The old model was to secure the perimeter and trust what's inside, using centralized firewalls to control access to the internet. Now, with applications moving to public cloud and SaaS, performance is better if each branch connects directly to the outside. But this means the 'threat surface' is much bigger for the enterprise since now there could be hundreds of branches instead of a few regional HQs with internet access. So SD-WAN at the branch needs to prevent, detect and respond to threats in real-time, through some combination of embedded firewall, hosted VNF-based security or automated connection to a cloud-based security 'broker' service.

SP: While SD-WAN has its own set of advantages, experts point out that it is more complicated to set-up, manage, and tweak as compared to traditional WANs. What is your stance on this?

MS: DIY SD-WAN was popular amongst early adopters in North America, but many of these enterprises were large and had extensive in-house resources. But for most enterprises, trying to design, implement, and manage a DIY approach to SD-WAN is beyond their in-house capabilities or will distract resources from other critical activities or projects. For this reason, SD-WANaaS is increasingly becoming popular. Enterprises are partnering with an NSP so they can outsource some elements where they don't have resources or expertise but retain self-service through a web portal. This way they can make changes and monitor network and application performance.

While Nokia has many DIY large enterprise SD-WAN customers, since 2018 our go-to-market strategy has focused on enabling NSPs to deliver SD-WAN as a managed service and today we have 1,400+ enterprise customers using SD-WANaaS from 70+ service providers.

SD-WAN-based remote access and teleworking solutions are better suited to enterprises using hybrid cloud, and COVID-19 has made these solutions more attractive.

SP: Nokia recently announced that Nuage Networks will partner with Asavie to develop SD-WAN solutions for desktop, mobile, and IoT devices. How does it work and how will it benefit?

MS: Today, enterprises manage their mobile devices separately from the rest of the network. This limits CIO visibility, requires VPN clients on mobile devices for security, while specific capacity has to be provisioned to handle the connections. At the same time, much of the traffic is actually going to public cloud or SaaS so using a VPN is also inefficient.

The combination of Nuage SD-WAN 2.0 and Asavie SD Edge enables mobile devices and users, as well as IoT devices, to be brought 'inside' the SD-WAN architecture and managed the same way branches and desktop users are, while also moving to a clientless, zero trust model. Distributed internet breakout also improves efficiency and performance for public cloud and SaaS. It works by bringing all mobile traffic back to the Asavie SD Edge and then connecting to a Nuage Network Services Gateway (NSG) that makes all the mobile devices appear to the rest of the SD-WAN as a single 'mobile branch' where policies can be applied and enforced just the same as they would be for a 'fixed branch' and its users.

SP: Many enterprises that V&D spoke with highlighted that interoperability with multi-vendor vCPEs and assessment of performance KPIs were the two challenges they have faced during their SD-WAN deployment. What has been the Nokia experience?

MS: Although universal (u)CPE was seen as an early potential benefit of SD-WAN, most enterprises don't want to deal with the supply chain complexity of separating hardware and software purchases for their branches. However, they want the openness and flexibility of industry-standard platforms that they can run additional (non-proprietary) software on.

The Nuage solution uses an x86 based NSG for the branch which runs the Nuage OS but can also run whatever 3rd party software the enterprise requires as a VNF. This could be 3rd party security or some other application. We even have a retail customer running an inventory management application for their stores on the Nuage NSG, eliminating the need for a separate server in each store. The Nuage SD-WAN 2.0 enterprise portal provides simple application performance dashboards as well as SLA compliance tools to measure and report performance KPIs for specific branches, branch to branch communications, a region, or the entire network. Although it would be ideal if multi-vendor SD-WAN was possible and enterprises could mix and match SDN controllers and branch gateways from different vendors, the industry hasn't played out this way and the standards don't exist to make this a reality. But there are some useful standards emerging, such as MEF3.0.

SP: From implementation perspective is there a difference between operator-oriented SD-WAN solutions and enterprise-oriented SD-WAN solutions?

MS: The biggest difference is multi-tenancy. Most SD-WAN solutions designed for DIY enterprise deployment are 'single tenant' designed for one enterprise user. The Nuage solution is multi-tenant, so operators can support hundreds of enterprise customers on a single instance of the Nuage platform while maintaining separate configuration and operation environments for each customer.

The other major difference is scale—a multi-tenant operator-oriented solution has to scale to support hundreds of enterprises, each with hundreds or thousands of branches, an order of magnitude more than a single-tenant enterprise DIY solution. This applies to networking scale, but also to security, data collection, and reporting, troubleshooting, etc. It's a much more complex problem to solve and requires a solid SDN foundation and architecture, which is why solutions that have been adapted from legacy branch routers, firewalls, or WAN optimization appliances don't do well in multi-tenant environments.

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"SDN AND SD-WAN SHOULD NOT BE SEEN AS ALTERNATIVES TO MPLS"

PRASHANT GUPTA
Head of Solutions South East Asia & India, Verizon Business Group

Shubhendu Parth (SP): SD-WAN is listed as one of the hottest technologies in 2020. Where are the enterprises placed on the adoption curve? Who are the early adopters?

Prashant Gupta (PG): In India, we have seen customers across verticals adopting Software-defined Wide Area Network (SD-WAN)—from BFSI, IT, BPO, and manufacturing. The IT and BPO sectors were the early adopters and SD-WAN gave them greater flexibility for managing larger global delivery centers with voice and data capabilities.

SP: So, how exactly is SD-WAN changing the way networks are managed?

PG: Let us take an example of one of the world's biggest power transmission and distribution equipment companies, CG Power and Industrial Solutions Limited. As its business continued to grow, the company's network needed to keep pace with the demands of the business. Specifically, CG Power realized the necessity of deploying a natural extension to the company's existing Multiprotocol Label Switching (MPLS) network.

When CG Power chose to go with a managed SD-WAN solution, Verizon's engineers worked through a multitude of stakeholders across three continents to quickly transform their MPLS-based network to an SD-WAN solution with intelligent routing control in a span of 12-weeks. Since then, the team has access to real-time views of the company's network performance. The solution also gives the team access to a convenient dashboard to manage endpoints centrally, deploy policies on-demand and modify configurations at endpoints deployed across the globe in a matter of minutes. This is, in addition, to automatically routing traffic across different network paths based on demands, application needs, and network quality. Crucially, since the deployment, CG Power has seen a 27% savings in cost.

Increasingly, businesses are looking to software-defined networking (SDN) technologies to streamline networking and optimize bandwidth when traditional networks are blended with cloud-based wide area networks or WANs. SD-WAN, a type of SDN, may provide businesses with evolving networks and alternative to MPLS circuits that are used to bridge legacy and contemporary protocols and data types. With SD-WAN, lower priority traffic can be sent over less expensive internet circuits. While there are other benefits, this functionality is particularly valuable to businesses with branch offices because it simplifies bandwidth maximization while also helping cutting IT costs.

SP: Using the CG Power case study you mentioned, can we identify some key factors that are driving investments in SD-WAN?

PG: Using the CG Power case study as an example, there are a number of key benefits that we can list as compelling reasons for organizations to invest in SD-WAN. One, it reduces complexity since centralized policy management enables unified standards for quality of service (QoS) and security across the network. Two, in helps increase efficiency as data is routed based on each application's requirements and current network conditions. Three, it maintains availability. Near real-time decisions can be made to redirect traffic to the service that is most suitable at any given time. Secondary network connectivity and inexpensive broadband allow for a cost-effective way to keep the network up and running.

Security and cost control are the other two reasons. While SD-WAN automatically provides end-to-end encryption across the network, on the cost front, businesses can use premium connections when needed, and lower-cost routes when possible, for a lower cost of ownership. Low-cost internet connectivity can be used for noncritical applications, and for redundant bandwidth as needed.

SP: Vendors have always been projecting SD-WAN as the ultimate solution for all network woes. However, we still see many organizations retaining MPLS

> Without a robust connection to work with, SD-WAN may not be able to provide the uptime and reliability you need to run critical enterprise applications.

despite deploying SD-WAN. Why?

PG: MPLS was originally proposed to allow high-performance traffic forwarding and engineering in IP networks, specifically the public internet. It's a scalable, protocol-independent transport in which data packets are assigned labels. Packet-forwarding decisions are made solely on the contents of this label, without any need to examine the packet itself.

Beginning in 2014, two new terms began to make their way into the network management lexicon: SDN and SD-WAN. The firms offering these services weren't network operators but rather hardware- and software-based companies selling that combination so enterprises could manage their data communication networks using the public internet instead of MPLS VPNs. While there is a role for SD-WANs in the enterprise space, it along with SDN should not be seen as alternatives to MPLS; they're enhancements.

Some network vendors have been positioning SD-WAN vs. MPLS as the ultimate solution to any network issue. They're selling SD-WAN as a revolutionary box that allows you to throw away your traditional MPLS network promising a dramatic reduction of operating expenses. Instead, SD-WAN works on top of your MPLS and broadband connections to improve performance and control costs. Without a robust connection to work with, SD-WAN may not be able to provide the uptime and reliability you need to run critical enterprise applications.

So, whether you're part of a large financial institution, a media company that delivers video, or in the manufacturing sector, you need to deliver a high quality of service along with top-notch security. Doing all that over broadband isn't going to cut it. You'll need a robust and resilient network. So which is better: MPLS or SD-WAN? The answer is both. And you need to have the right mix of MPLS connections for high-bandwidth priority applications and broadband for lower-priority applications, and even 4G (and eventually 5G) wireless connections along with a smart way to direct your traffic.

That's what SD-WAN does. And that is why it's not a replacement for MPLS. A hybrid WAN made up of a variety of connectivity types, based on location needs and SD-WAN to intelligently manage the flow of traffic is the way to go. That means you shouldn't compare the cost or security of MPLS vs. SD-WAN. You need to compare the mix of access types of SD-WAN against the needs of your business and determine the network infrastructure combination that can help you achieve your goals.

SP: Agreed that SD-WAN has its own set of advantages, but isn't it more complicated to set-up, manage, and tweak as compared to traditional WANs? How do you look at it?

PG: SD-WANs rely on point-to-point connections between devices at the customer's locations and the service provider. Essentially SD-WAN is a management tool and the vendors do not own or manage the connections, they just manage the traffic based on the networks they are able to access.

As I had mentioned earlier, SDN and SD-WAN should not be seen as alternatives to MPLS but as an enhancement. Both technologies can be carried over an MPLS network as an alternative to the public internet. This might be especially beneficial for accessing non-critical business applications on a cloud service provider while maintaining the level of security offered by MPLS.

SP: How is Verizon handling this market and where does it stand in India?

PG: In India, Verizon offers the full suite of managed SD-WAN and virtual network services (VNS), private IP, internet dedicated, and Ethernet services for businesses. Verizon was first to the market with SD-WAN in 2015 and VNS in 2016. We were also the first to market with Zero Touch Provisioning, Orchestration, and Closed Loop Assurance. These services are deployed either via uCPE, Public Cloud or HNS (39 Global Nodes) supporting 130 countries. Our secret sauce is the "top layer" which is composed of Service Chains that attach and orchestrate networks to functions and apps tied together in a lifecycle via closed-loop service assurance—25 complex Service Chains across 10 vendors. In addition, Verizon has one of the largest and most reliable wireless networks and an IP network that spans six continents, has hundreds of thousands route miles with offerings at speeds up to 100G.

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"SECURE SD-WAN LAYS A STRONG FOUNDATION FOR DIGITAL TRANSFORMATION"

RAJAGOPALAN RAJAPPA
Deputy CTO & Head of Network Transformation Technologies, Tata Elxsi

Shubhendu Parth (SP): We hear a lot about software-defined technologies changing the network and driving digital transformation. What has been the impact of SD-WAN and vCPE?

Rajagopalan Rajappa (RR): SD-WAN is the first big leap in transforming static, rigid, multi-touch human-intensive, hardware-centric network to a Zero-Touch programmable software-centric virtualized network. This network fluency and service delivery platform as vCPE at enterprise premises provides the pliability, flexibility, and agility for rolling out services. The services could range from inter-branch connectivity solutions, branch office security, collaboration platforms, and other enterprise business operations. These services could be hosted either on enterprise data centers or on the public cloud. In fact, SD-WAN being an overlay technology with programmable virtualized routers at enterprises end eases the unprecedented demand and enables anywhere, secure collaborative work environment for large and small scale businesses.

SP: Does this mean that SD-WAN will change the way enterprises are managing their networks?

RR: Over 80-90 % of SD-WAN fulfillment and assurance processes are automated and orchestratable by design. SD-WAN service enablement, right from customer on-boarding to product and service order management are cast in e-commerce and the app store model. This enables the seamless addition of new products and services to the existing catalogues. The self-service and monitoring combined with probing capabilities enhance the customer experience and reduces the customer trouble tickets.

SD-WAN solutions can bring in better control and management to the real-time network traffic and can help prioritize traffic and improve service reliability for enterprises. This could enable enterprises to segment and prioritize the critical business applications traffic over non-critical ones.

SP: Will the pandemic-driven WFH lead to an increase in SD-WAN adoption?

RR: The pandemic had a huge impact on enterprises of all size and shapes and their working and operational models. The marginal WFH thus far followed in smaller scale in industries had suddenly had become mainstream. This had given birth to Singleton branch if we can call it as Zepto branches and to peering transactions and large scale collaborative functions.

Suddenly, the scale of provisioning, monitoring, securing had soured to millions, if not billions worldwide. Without software-centric programmability, automation and orchestration capabilities that are inbuilt into SD-WAN, it will be impossible to meet and sustain the operational demands that were at planet scale. We anticipate the current model may continue to stay albeit in lesser scale and so the requirement of such an agile system continues.

SP: What are some of the key reasons for organizations to invest in SD-WAN?

RR: We have to keep in mind that the secure SD-WAN lays the strong foundation for Digital Transformation by enabling seamless connectivity to partner, supplier eco-systems through open APIs and identity and access management solutions. In that sense, the investment that gets in SD-WAN accelerates the digitizing of internal and external business processes and operations, enabling significant value creation of all the stakeholders. The transformed network, thanks to SD-WAN can have lower opex, better security and improved application performance, lower network complexity and ease of branch interconnect.

SP: Please share some of the challenges experienced by your customers during their SD-WAN deployment? What were the lessons learned?

RR: The key challenges are interoperability with multi-

> SD-WAN is a big leap in transforming static, rigid, human-intensive, hardware-centric network to a Zero-Touch programmable software-centric virtualized network.

vendor vCPEs, assessment of performance KPIs, Scalability, geo-redundancy and isolating the respective problems in the production network. The learning prompted us to build test solution and enablers for scalability, vCPE Soft simulators for inter-ops and KPI assessment tests, pre-fabricated test strategy and test cases for high availability, redundancy, and end to end service continuity.

SP: So how plausible is the idea of application-aware networking?

RR: Effective application-aware networking SD-WAN products are possible only through adequate point of presence, efficient monitoring, probing, path selection algorithms and dynamic orchestrated peering with other providers as the solution needs to span across multiple geographies and national boundaries in some cases. In our view, this requires further maturation time.

SP: How is Tata Elxsi handling the SD-WAN market and where does it stand in India?

RR: Tata Elxsi helps align network technology to customer business needs. We work with CSPs, large and medium enterprises customers in India and worldwide as system integration and certification partner. Our vendor-neutral approach enables us to recommend an SD-WAN vendor solution after objectively evaluating cost vs. capabilities, maturity, and roadmap. The customer-specific contextual use cases and services are then certified for features, scale, and resilience in pre-production labs. This is followed by the support to make them operational and managing them.

For most of our customers, we enable digital transformation by completing the tech stack integration to IT stack/BSS and align with the digital services and e-Commerce paradigm.

SP: Where does it fit in Tata Elxsi's overall digital strategy?

RR: Tata Elxsi is strategically invested in for more than five years in digitization and transformational automation services through platforms, solutions, partnerships, and technology enablers. In our perspective, SD-WAN is the first big step towards the digital network transformation. With this backdrop, we have conceived and built several accelerators for customers starting from an Orchestrator, SD-WAN scalability test solutions, vendor agnostic pre-fabricated test strategy, and suites complemented by SD-WAN security reference solution. This would accelerate the digital platforms and services-based value creation strategy for Tata Elxsi customers.

SP: What parameters should an enterprise use to evaluate its SD-WAN needs and decide on which solution suits its need?

RR: We use a set of parameters from orchestrator to monitoring for remediation and recommend the same for our customers. There are additional critical requirements for making it operational, including the support; roadmap and agile delivery process also need to be critically evaluated alongside.

For ease of orchestration, the solution should be model-driven and highly scalable. It should allow inter-operability with third-party vCPEs, dynamic path selection, dynamic peering capabilities, management, and security. It should also have rich capabilities for effective end-to-end monitoring of infrastructure, virtualized functions, active probing capabilities across layers, remediation and adaptive capabilities for SLA, QoS and QoE. Besides, strong data governance, open API's for integration into BSS/OSS, third party tool integration like SIEM, integration into big-data system for advanced closed loop remediation, the total cost of ownership, regulatory compliance and certification are the other parameters that one should consider while evaluating an SD-WAN solution.

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"THE RISE OF INTERNET AND SD-WAN DOESN'T MEAN THE DEATH OF MPLS"

RAJAT ARORA
Co-owner & CCO, Spectra

Shubhendu Parth (SP): Reports indicate that SD-WAN and virtualized customer premises equipment (vCPE) will help enterprises transform their networks from "fragile to agile." What is your take on this?

Rajat Arora (RA): Let us first look at the changing needs of networks. With increasing footprints of branch, the availability of networks and centralized security architectures has become a priority for enterprises. However, swift digitization and modernizing of applications is driving the need for higher capacities at the branches. With enterprises moving to hybrid cloud infrastructure and the solutions to deal with complexities evolve, the branch networks are required to be secured, support multiple transport types and be agile.

Besides, the network managers are also expected to have agility on all forms in the network to enable centralized management of the branch networks, enhanced security, high availability and all of this while reducing the overall cost of network management.

The need of an agile framework for networks is clear and the solution is being designed with a combination of SD-WAN, uCPE and NFV, which are being developed in collaboration by many OEMs to enable this transformation. The SD-WAN terminals and uCPE will replace the traditional routers and provide enterprises an agile network framework with Secure SD-WAN and growing virtual network functions (VNF). It will allow the networks to have better compatibility and management across multiple vendors and have better control across the transport, security and application layers.

SP: Is it a big shift from MPLS and NFV? What is different this time?

RA: The development of the uCPE framework driven by multiple players working together and evolving the VNFs to support the deployment of white-boxes as uCPE will lead the significant shift from the traditional routers and offer capability to use the best of various platforms with simplified management using centralized controllers.

For enterprises, the trend is to implement the SD-WAN as the management and integrating solution with existing MPLS followed by replacement of traditional MPLS networks completely with secured SD-WAN networks offering advantages like integrated security stack, 'one-click' installation and remote network management.

This rise of the internet and SD-WAN doesn't necessarily mean the death of MPLS and other private WAN services. As per the research conducted by EMA only 15% of users of internet-based WANs are retiring MPLS connectivity. While 21% are reducing MPLS bandwidth in favour of the internet, but not retiring it, 52% will simply supplement their MPLS connectivity with the internet.

SP: And how plausible is the idea of application-aware networking?

RA: The final event is the user experience of the application and the networks need to gain enough information to ensure that the experience of the applications is seamless and dynamic. The changing quality of connectivity, increasing use of SaaS and public cloud infrastructure requires that the networks use various methods like on-the-go routing changes, bandwidth optimization or forward path correction and finding the most optimal path.

The application-awareness networking helps deliver automation and intelligence to resolve specific issues, especially in complex architectures using multiple applications across geographies and users.

SP: Experts also point out that with the decoupling of hardware and software, companies that have been focusing on virtualization will begin to tap the SD-WAN market. How do you look at this?

RA: The development of the uCPE framework supporting

> SD-WAN technology developers are swiftly working towards developing and launching specialized work-from-home solutions.

multiple vendor platforms with VNFs and various hardware manufacturers creating white boxes to be used as uCPE will extend the adoption and deployment of SD-WAN. The market is already quite busy with most of the 60 plus SD-WAN vendors working to create cost effective solutions for specific issues using virtualization. They are building software-based solutions that can work across wide variety of hardware.

SP: Looking at things from in the present context, will the current pandemic-driven WFH lead to an increase in SD-WAN adoption?

RA: Yes, the SD-WAN technology developers are swiftly working towards developing and launching specialized WFH solutions, which can support varying user devices connecting to different central security and network architectures enabled by multiple OEMs. We shall see many specialized solutions coming with larger and faster deployment of SDN across industries. Spectra has designed Network-as-a-Service (NaaS) solutions with Versa Networks, which provides end-to-end network management across India on a pay as you grow model and also offers specialized WFH solution.

SP: You mentioned about the NaaS offering earlier. Can you share more information on it and where Spectra stand in India?

RA: Spectra evolved from being an internet and broadband service provider to a full scale manage network service provider. Our Network-as-a-Service (NaaS) offers end-to-end network solutions from WAN connectivity, SD-WAN, SD-LAN and network security, where Spectra designs, deploys, monitors, manages an integrates the entire solution for enterprise. We offer the same as a service. To offer this service, we work with multiple technology developers. For example, we work with Versa Networks to deliver SD-WAN to enterprise and SMBs across India.

SP: Please share some of the challenges experienced by your customers during their SD-WAN deployment? What were the lessons learned?

RA: Overall the deployment and even the test deployments for SD-WAN are simple to implement. However, like any new technology deployment, understanding the impact of implementation of SD-WAN alongside the legacy networks is crucial for enterprise. But a good pilot or proof-of-concept process with a neutral partner can help to test the solution completely.

Quality of connectivity still plays a critical impediment in the experience; however, the better visibility of the network performance with SD-WAN can help to decide the most optimum connectivity solution and provider.

While, interoperability with various securities, authentication and LAN deployments are done extensively, each enterprise network is different. Since, implementation of SD-WAN is like a transformation, it is important to look at each component with great planning at design stage for smooth deployment.

SP: How ready are the enterprises to adopt SD-WAN? Who are the early adopters?

RA: While various industry reports claim that over 50% of enterprises are considering SD-WAN deployments in next 12 to 24 months, the actual share of adoption has been low and deployment has been in small phases. This is because the industry is carefully assessing the impact of it on the application performance and evaluating the functionalities.

However, the early adoption is very encouraging and the feedback is positive. With the recent developments forcing the remote management, higher level of security and reliability there is a pressure to reduce the cost to manage the networks. This will enable faster deployment of SD-WAN across industries in next 12 to 24 months.

The enterprise with cloud or hybrid cloud deployments or enterprises driven by security, cloud adoption, business growth, and digital transformation are the early adopters of SD-WAN. According to studies done by OEMs like Versa-Networks, 85% of the companies are considering SD-WAN to increase security and reduce network complexity.

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"THE CONCEPT OF INTENT-BASED NETWORKING WILL COME INTO PLAY"

RITESH DOSHI
Director – Enterprise Networking, Cisco India & SAARC

Shubhendu Parth (SP): From being a tool that can help better manage traffic SD-WAN is now being projected as the driver of digital transformation. What does it actually mean for Cisco?

Ritesh Doshi (RD): A few years ago, the industry definition of SD-WAN was link virtualization or effectively dividing traffic between two links. But with the acquisition of Viptela, we believe that SD-WAN can go far beyond this. It means that SD-WAN should provide standardization across the organization, because users exist in multiple forms and shapes, including on-campus, off-campus, remote workers, contractors, suppliers, etc. This would further need extensive standardization of policies. Secondly, it would need centralized management, given that the infrastructure is quite large, and spread across a variety of places.

Thirdly, it should be able to perform data classification and routing on the basis of deep packet inspection techniques. The organization should be able to prioritize their traffic based on the user, the type of traffic the user can access, and multiple similar policies that the organization would want to define. This will need some deep packet inspection, i.e., the network itself should be able to understand what kind of traffic is flowing. Fourthly, segmentation is very important, right from where the user is connected, whether in the data center or public cloud or wherever the workload is. User access to any of these sites should be secure.

Finally, an overarching layer to all of this is a centralized policy management dashboard. It is impractical for an organization to manage so many devices and users at the same time manually. There has to be a centralized dashboard where you configure once and apply it to many. That's how SD-WAN's definition can change. Don't look at SD-WAN as what was defined five years ago, which was just about link virtualization and, to some extent, centralized monitoring. In reality, it goes far beyond.

SP: How do you see this changing enterprise network management? How different will it be two years down the line?

RD: I believe that the concept of intent-based networking will come into play. Today, IT infrastructure is meant for specific purposes. In a data center, for example, we will need infrastructure to connect its workloads and LAN infrastructure. On the other hand, there is the campus or LAN and then there are users connecting from a work-from-home setup. Managing such massive installed base across multiple facets requires inbuilt intelligence which helps in detecting whether the overall infrastructure is performing at the right level. Based on triggers, the infrastructure should be able to self-heal, because, with so many elements in the infrastructure, it is virtually impossible for all this to be done manually.

We have AIOps and artificial intelligence built into many of our solutions. In terms of SD-WAN, the deep packet inspection techniques that we have can make intelligent decisions based on trigger points. For example, if a user is facing an issue on the primary link, based on a combination of parameters, the solution can decide whether it is the right path for primary traffic to flow and whether it needs to fall back onto the secondary path. It will keep monitoring the traffic without human intervention. This is the outcome that businesses want. The intent is to run the business, to run applications in a certain way.

SP: You mentioned AI, AIOps, and intent-based management. Do we see SD-WAN evolving into AI-WAN soon?

RD: To a certain extent SD-WAN today is a kind of AI-WAN. We are using AI to make intelligent decisions

> In terms of SD-WAN, the deep packet inspection techniques that we have can make intelligent decisions based on trigger points.

so that the network can be optimized to deliver the performance that the user wants. What remains is integrating these AI functionalities into a self-healing functionality for the overall infrastructure. I believe we are already moving in that direction and whether you call it specifically AI-WAN or SD-WAN today, it's more or less the same thing.

SP: Considering how the trend is changing and how SD-WAN is becoming more intelligent, where are the enterprises on the adoption curve?

RD: Most enterprises, large and small are talking about moving towards SD-WAN. This is because of the digital transformation taking place currently, which brings complexities in management, the spread of workload, etc. Therefore, it is inevitable for them to switch to SD-WAN. Hence, many enterprises are trying to see how SD-WAN can be integrated into their IT journey over the next few years. There are several mature organizations that are taking a leap of faith, utilizing their window around refreshes, any kind of expansion, etc. and moving straight to SD-WAN. In the last year or so, many of our customers have reached out to us to help them in their journey towards SD-WAN.

SP: Can you share some interesting use cases?

RD: Some of our banking customers are utilizing our segmentation and deep packet inspection-based data routing capabilities very effectively. A branch itself may be the source of multiple kinds of traffic--the core banking traffic, applications like the token system working on IT, IP-based surveillance systems, and branch-attached ATMs. The first use case in the banking segment was the segmentation of this traffic so that the core banking traffic would not interject with or talk to ATM traffic. In fact, none of these different kinds of traffic originating from the branches should be able to interlink or interject with each other and talk to each other.

We don't just start this segmentation at the WAN level, which is what fundamentally SD-WAN delivers, but we extend it to their LAN where all of these systems are connected. This will make it completely secure. So, if one segment is compromised, traffic on different segments will still be safe. This is one of the use cases in banking.

SP: What about the telecom sector?

RD: We have a few early deployments in the telecom sector. One of the deployments focuses on how they can effectively utilize SD-WAN for the management of their sub-stations that are in dispersed locations. This traffic was on traditional MPLS links. Telcos have equipment from different OEMs, which needs to be remotely managed. Sometimes, this equipment is managed by the respective OEMs remotely from across the globe. By leveraging segmentation as a capability, we are enabling an SD-WAN overlay, thereby doing away with the need for the underlying MPLS links. We are also enabling a secure tunnel for each OEM to manage its equipment in these sub-stations.

SP: Talking about Cisco, how can one decide whether they need Viptela or Meraki?

RD: Cisco covers a wide spectrum of customers, from small businesses to enterprises. For customers with a lean IT infrastructure and with minimal requirements of segmentation and management, we offer our Meraki solution, which is practical and does not compromise on any of the functionality. Then there are customers who need a variety of integrations with enterprise systems and may have their own OSS/BSS layers and extensive integration with their SOC. They may need the highest degree of customized traffic flow management and a very deep level of segmentation across their various solutions. Here, we suggest that they opt for Viptela. These are, what I would say, some of the broad parameters based on which we recommend different solutions

Shubhendu Parth
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Communicate, collaborate, celebrate

Harness ICT for sustainable growth

"Information technology can be a beacon of hope, allowing billions of people around the world to connect. During the COVID-19 pandemic, these connections... are more important than ever," UN Secretary-General António Guterres said, talking about how ICT or digital technologies can help achieve Sustainable Development Goals (SDG).

While the priorities might have changed for the world that is presently struggling to deal with the pandemic, the telecom sector has emerged as the lifeline and the critical infrastructure in the fight against the deadly Cororavirus, in India and elsewhere.

The year 2020 celebration assumes more significance in this backdrop and the Voice&Data Team spoke to a few leaders from the sector to get their views on the role played by the sector in driving the growth of the "new economy" and enabling the digital platforms that have helped the world communicate, collaborate and continue to work during the ongoing crisis.

For the records ITU has been celebrating 17 May as the World Telecommunication Day since 1969 to mark its foundation day and the signing of the first International Telegraph Convention in 1865. In November 2005, the World Summit on the Information Society called upon the UN General Assembly to also declare the day as World Information Society Day to focus on the importance of ICT, which was adopted in March 2006. Following this, the ITU in November 2006 decided to celebrate both events on 17 May as World Telecommunication and Information Society Day (WTISD).

HOULIN ZHAO
Secretary-General, ITU

Every year on May 17, people around the world join the ITU family to celebrate World Telecommunication and Information Society Day. This year, I call on all of you to join me in advancing ITU's Connect 2030 Agenda, a shared global vision to bridge the digital divide and use the power of information and communication technology in support of the 2030 Agenda for Sustainable Development.

I invite you to show the world what new technologies like 5G and Intelligent Transport, the Internet of Things, AI and blockchain can do to improve people's lives and facilitate social and economic development. These technologies and new innovations hold great potential for human progress; they are a powerful tool to achieve each and every one of the Sustainable Development Goals.

Almost half the world's population is still not using the internet and overall growth in ICT connectivity is slowing. Time is pressing. We need to coordinate and redouble our efforts to connect everyone to the global digital economy, and that for those connected more must be done to ensure that connected life is safe and trustworthy.

On World Telecommunication and Information Society Day and for this new decade, let's harness information and communication technology to accelerate social, economic and environmentally sustainable growth and inclusive development for everyone, everywhere.

Source: ITU Website

Telecom for "new normal"

ANAND BHASKAR
Managing Director, Service Provider Business,
Cisco India & SAARC

Over the last few weeks, telecommunication has taken on a new meaning for all of us, allowing communities to remain connected, businesses to stay operational, and the economy to keep running. It has also fueled new business models and processes that have been critical to battling the current crisis – remote governance, online medical consultations, virtual training of healthcare workers, remotely connecting gram panchayats and wholesale outlets, and much more.

Now, with social distancing becoming a norm, the preference for digital alternatives for everything, from grocery shopping and social gatherings to business meetings and virtual concerts, is growing quickly and steadily. This is shaping a "new normal", where the home will become the central hub for most activities. Telecommunications, and by extension, telecom service providers, will be at the heart of this new normal, enabling everyone to work, learn, shop, transact and connect from the safety of their homes.

Enabling "digical" world

DR. JAI MENON
Former Director & Global CIO,
Bharti Airtel

Telecom is a lifeline in these VUCA times. It provides a convenient confluence of communication, content, commerce and context to not only handle emergencies but also redefine how life moves on. Whether it be enabling video collaboration for work from home or online education or even entertainment, the world would have been entirely different were it not for this critical infrastructure. It has helped bring the globe together on a digital platform during this crisis. Importantly, it is a defining vector for the future to fuel growth of a new digital economy blending into the "digical" (digital + physical) world.

As we all prepare to enter the new normal, extended reality (VR, AR, MR) backed by AI/ML will become a new way of life – riding on top of the data strengths of the telecom industry. While this infrastructure has been focusing on scale and performance, the next two challenges are going to be around quality (of service) and security. Telecom clearly has worked its way down to become a basic essential utility right at the bottom of Maslow's need hierarchy across all segments.

ICT for economic revival

PAWAN GARG
Former Wireless Adviser to the Government of India

The theme of this World Telecom & Information Society Day this year is "Connect 2030: ICTs for the Sustainable Development Goals (SDGs), which can be summarized in five strategic goals—growth, inclusiveness, sustainability, innovation, and partnership. On this day, we try to review the national and global efforts for achieving these objectives.

Countries have been making all out efforts to achieve SDGs. The COVID-19 pandemic has dealt a severe blow to these efforts. However, it has also taken the global community towards greater dependence on ICTs for education, health, governance, digital economy, working from home, etc. Hopefully, these would help revive the economy quickly, besides taking care of environment through the 'new norm' for the day-to-day life.

Driving digital economy

R CHANDRASHEKHAR
Former President of NASSCOM,
Secretary of IT & DoT, Government of India

For some time now, the nation has been on an accelerating path of digitization riding on the mobile-led telecom revolution. Social media, digital entertainment, UPI, Aadhaar, DBT, mobile payments, e-commerce, etc. have become integral to our daily life. The digital economy contributes a disproportionate share of our economic growth. The recent and continuing CoVID crisis has fast-forwarded this transformation.

Digital avenues clearly determine our ability to adapt to the new conditions that nature has thrust on us now and to pursue SDG goals in healthcare, education, skilling, livelihoods and other social sectors in the future. The entire digital economy rides on the telecom sector and these trends and events have underlined its criticality to both the economic future and security of the country. The national imperative is now to ensure continued investment in the sector, draw up a clear road map for adoption of 5G and increase indigenous capability.

Shaping digital future

SANJAY MALIK
Senior VP & Head,
India Market, Nokia

With Covid-19 pandemic bringing all economic activities to a halt, the telecom infrastructure is powering critical functions that ensure business and life continuity. Despite the challenges, the industry has stepped up to ensure seamless connectivity, demonstrating resilience and dynamism. As individuals and businesses continue to leverage digital capabilities, digitalization is expected to re-shape the future and help society to operate in this new normal.

The 'post-COVID' era will see increase in remote access and operations, deeper traffic monitoring and analysis, flexible capacity management, increased bandwidth at home, enhanced network security and many more. Nokia's end-to-end portfolio can help scale and secure the networks, and stimulate innovative use cases across network technologies.

Undoubtedly, telecommunications will be critical for socio-economic recovery and the industry will provide the infrastructure necessary to stimulate digital growth. The governments will also have to enable investment towards this sector—to prepare the world for a digital future.

5G: The new enabler

RAJEN VAGADIA
VP & President,
Qualcomm India

India and its citizens are navigating challenging times. Telecommunications has helped us cope with several facets of life under this situation of lockdown, starting from broadband connectivity, through digital wallets and payments, online shopping and delivery of essentials, online education and digital entertainment. It has made 'work from home' possible for millions and helped us stay in touch with family & friends, who suddenly are remote. As a vital pillar of the economy, it has played a crucial role in keeping businesses, public services and utilities running.

The impact of COVID-19 has only reiterated the need to further enhance telecom infrastructure in urban as well as rural India. While technologies such as Massive MIMO, Small Cells, VoLTE, VoWiFi have proven to be very useful, this moment is validating the need for 5G as an enabler. With high data speed and superior network reliability, 5G will have a tremendous impact on businesses and the evolution of industries like telemedicine, education and entertainment.

Catalyst of growth

RAGHU REDDY
Chief Business Officer,
Xiaomi India.

The lockdown has pushed the country towards becoming a digital society which reflects a strong trend in rising digital consumption patterns. A surge in 90% data being consumed via mobile devices also indicates that this essential commodity will enable more communication and collaboration in coming times.

The Indian Telecommunications infrastructure is the backbone that is driving growth for smartphone brands in the country. At Xiaomi, we are enabling our consumers with developments across next gen technologies, connected devices and innovations with 5G. We are certain that these developments will help push India to establish its telecom sector as a major catalyst driving cross-sector growth.

Broadband for all is the key

AIR COMMODORE (RTD)
SS MOTIAL
Former CMD, ITI

Imagine world under lockdown without communication. A large number of people would have died of depression. Today broadband communication, video-conferencing, multimedia is ensuring sanity of individuals and sustainability of business. Government's help to the most deprived is reaching in a jiffy, thanks to deep roots communication has made in villages.

India has been in the forefront to develop all its growth plans on availability of vast broadband network and its capability of developing innovative applications to accelerate implementation. Post COVID-19, speed of return to normalcy of a nation will totally depend upon spread of reliable broadband network across the country. Any sustainable growth goal of a nation can't be achieved unless it is inclusive. Work-from-home is going to a new norm. Therefore, role of efficient communication is going to grow manyfold.

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Rise of SD-WAN services in India

BY NIHAR PANDA

SD-WAN has never been so relevant for India as it is today. The stage is all set for SD-WAN services to compete with mainstream connectivity options such as traditional MPLS-based VPNs at a time when enterprises are struggling to keep up their organizational productivity for an ultra-mobile workforce and control costs.

Service providers and SD-WAN vendors have been promoting the technology vigorously over the last few years, albeit with limited success, particularly in India. Some of the reasons as cited by customers and service providers for the limited uptake of SDWAN were:

- Lack of significant business benefits over traditional connectivity methods;
- Solution complexity;
- Compatibility issues with existing WAN deployments; application requirements, and backward integration with legacy technologies.

The business benefit models in India have been consistently evolving in the last couple of years, and more and more enterprises are switching to cloud-first strategy. This will surely accelerate the adoption rate of SD-WAN services considerably in India.

However, the complexities and compatibility aspects of the existing SD-WAN solutions points to one thing and that is "No one size fits all". From a service provider point of view this poses a unique challenge and that is to source and manage more than one SD-WAN solution that could meet specific customer requirements. This is by no means an easy feat to achieve.

Challenges for managed SD-WAN service providers

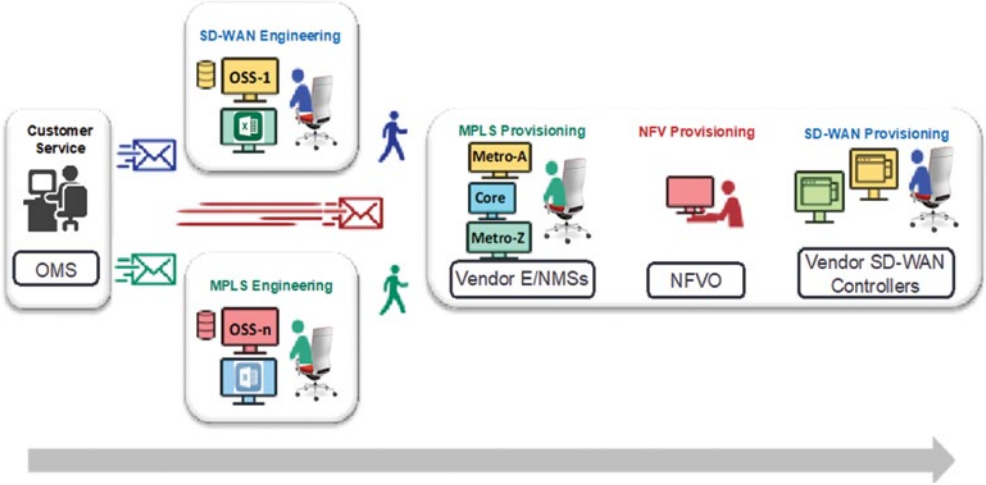
Various aspects decide the suitability of a SD-WAN solution to enterprises including sectoral relevance such as finance, IT, manufacturing etc., cost, manageability, feature and functions.

Managed service providers (MSP) have a unique challenge here i.e. to address these varied solution aspects either through one or more cookie cut solutions and be able to flexibly customize a given solution to suit a customer specific requirement. Also, every SD-WAN solution out there in the market uses proprietary implementations, making it even more difficult for MSPs to create one common service platform to control and manage SD-WAN services.

In a nutshell, for the MSPs to be able to successfully commission and operate managed SD-WAN services, they need to overcome two dominant challenges:

- Be able to control and manage one or more SD-WAN solutions suiting to variety of customer requirements. This has direct implications on cost, integration and skillset availability
- Ensuring the SD-WAN service layer is aligned with the underlay infrastructure it is dependent on.

The challenges for a MSP offering SD-WAN services are depicted in the following diagram:



As shown above, the end to end workflow which starts with receiving a customer service order (CSR) to commission a SD-

WAN service goes through the following key steps:

- Decomposition of the service order template received from an order management platform into pre-defined executable tasks.
- Delegating the tasks to individual teams or systems for execution.
- Provisioning the underlay network through respective network vendor NMS/EMSs.
- Commissioning the enterprise edge, e.g., the CPE that is either a SD-WAN appliance or combination of multiple appliance both physical and virtual (Virtual Network Functions).
- Provisioning the SD-WAN overlay services through respective SD-WAN controllers in case of a multi SD-WAN solution provider.

Today, most of these tasks are executed through a semi-automatic approach that requires human intervention, making the process error prone, time consuming, and ultimately leading to compromise of key performance indicators including quality, cost and time.

Creating a common service abstraction and orchestration layer

Service orchestration enables a MSP to create an abstraction layer that can hide the underlying technical complexities of SD-WAN from the business operations layer. In addition, orchestration enables automation of the end to end workflow from order decomposition, to provisioning the service across both the underlay and overlay. The benefits of service orchestration are outlined below:

- Abstracts the business operations from underlying infrastructure complexities through an easy to operate the GUI.
- Provides intent-driven service orchestration in an automated fashion that alleviates much of the technical complexities and human interventions required.
- Allows service provisioning across multiple domains e.g. Physical and Virtual infrastructures.
- Agnostic to underlying SD-WAN controller technologies; through a resource adaptation layer the orchestrator interacts with multiple SD-WAN controllers irrespective of any proprietary technologies they use.
- The orchestrator can be further expanded to host other use cases apart from SD-WAN services, acting as an umbrella abstraction and automation layer.

The below diagram depicts a SD-WAN service that is automatically managed and controlled through orchestration. As shown above, this solution includes:

- The use of multi-domain service orchestration (MDSO) for automated end to end SD-WAN service life cycle management.
- The use of network function virtualization orchestration (NFVO) as an optional component for provisioning virtualized/universal CPE (uCPE) and virtual network function (VNF) life cycle management.
- The use of a specialized API gateway to interface with north bound order management systems (OMS) using open Tele-management Forum (TMF) APIs e.g., TMF 640 service characteristics between the order management system and the orchestration layer.
- A resource adaptation layers to interface variety of underlying domain controllers including SD-WAN controllers, the WAN EMS/NMS and virtual infrastructure managers.

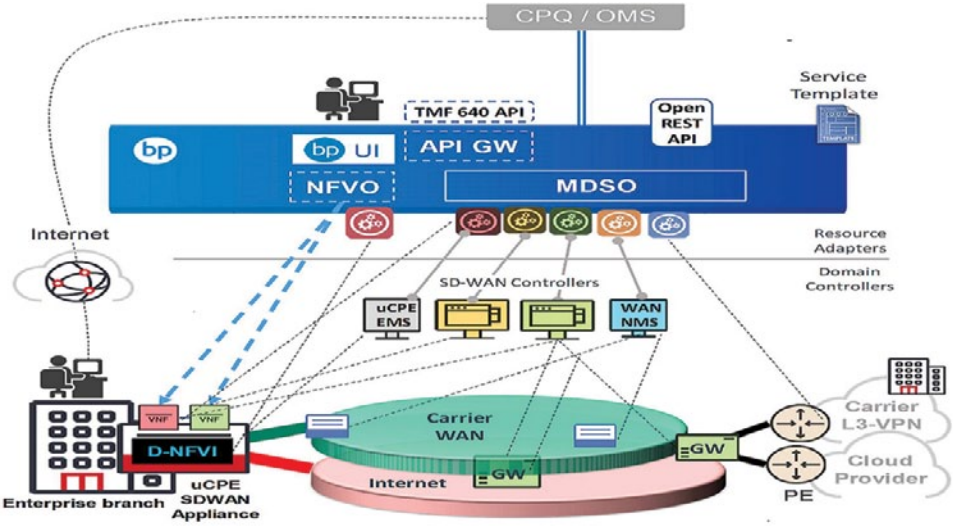
The automated workflow for SD-WAN service activation is executed following the steps described in the previous section including service order decomposition, underlay and overlay provisioning, (u/v) CPE provisioning and interacting with other OSS components for complete life cycle management.

As can be seen in the diagram, the orchestrator can effectively automate the activation of services through multiple SD-WAN controllers, gateways, and NMS/EMS tools used for underlying network management, irrespective of any vendor and technology implications.

Conclusion

As enterprises in India are gearing up to adopting SD-WAN services to alienate the prohibitive costs, complexities, accelerate cloud adoption. To accommodate an ever increasing mobile work force, there is an impending need arising from the MSPs to automate and manage SD-WAN service life cycle across multiple SD-WAN solutions and underlay networks.

The abstraction models enabled by a service orchestration platform such as Ciena's Blue Planet MDSO, allows the MSPs to achieve their ultimate goal of being able to seamlessly manage end to end service lifecycle automation across multi-domain and multi-vendor scenarios. Blue Planet MDSO does so through a vendor and technology agnostic resource adaptation layer and a cloud friendly service abstraction framework.



The author is the Head of Solutions Architect & Business Development, Network Automation, Ciena-Blue Planet

For Digital India, kick-start 5G rollout after COVID

The government should overcome revenue loss arguments and provide 100 MHz of 5G spectrum to all existing operators at no cost, with clear rollout conditions and targets

BY AKHIL GUPTA

I believe there is unanimity in recognizing that the telecommunication industry by providing necessary connectivity to every nook and corner of India proved to be a lifeline of the country during lockdown where almost all non-field workers were forced to work from home (WFH).

It is quite natural for the Indian telecom industry, which is facing an unprecedented financial crunch due to the AGR ruling (practically equivalent of what COVID-19 is doing to other industries), to expect the government to appreciate and recognize the critical role of this vital industry by announcing various relief measures like reduction in GST rate, license fee, and spectrum charge, etc.

The purpose of this article is not to reiterate the need for those concessions. Even if the government is favourably inclined towards the industry's demands, it will find it difficult to agree since those concessions will directly impact revenue; the fiscal deficit in the current year will go well beyond 5% at the least. And that is with the somewhat modest stimulus package of only 1.75 lakh crore announced so far, which translates to a mere 0.8% of the GDP.

India needs much more. Even if we are not able to be as generous as the USA at 10% of GDP and most other developed countries in between10-20% of GDP, the country will have to, and must, allocate 4-5% of GDP for kick-starting the economy post-COVID-19 and for the survival of a large section of rural workers, daily wage earners and a very large number of MSMEs.

So, what else should the government do? It needs to recognize that the objective of developing India as a digital economy can be achieved only if the country can ensure the availability of decent broadband connectivity at every touchpoint and for every citizen—be it at residences, places of work, or public areas. The reason is the consensus that is fast emerging. Based on the experience during the lockdown, a fairly large percentage of organizations are likely to ask their employees to work from their new offices—HOMES—permanently. This will necessarily require reasonably high-speed broadband for uninterrupted workflow.

I would like to highlight two facts that need attention here.

One, there is not even a remote possibility of providing the "real broadband", that is the wireline with Optic Fiber connectivity to each such touchpoints. It will be too expensive, economically unviable, time-consuming, and a logistic nightmare, particularly with all the digging and the permission for Right of Way. Accordingly, any solution to meet this requirement has to necessarily be 'wireless'.

Two, 4G with its constraint of the spectrum and, thereby, capacity will be great for coverage and 'low speed' broadband, which would barely suffice for mobile use. However, as mentioned above, the speed required for uninterrupted work from home cannot be provided with 4G networks with current capacity constraints.

Club these facts with the need for India to strategically keep pace with the rest of the world on 5G and, thereby, keep pace with rapidly developing and evolving digital world and the answer is the introduction of 5G NOW and not after a few years.

To make this happen, the government will need to step in since under the current proposition more than INR 40,000 crore will be required per operator to take 100 MHz of 3500 MHz spectrum which is considered an absolute must for a decent 5G network. Going by the current financial health of the sector, it looks unlikely, and in fact almost impossible, that any operator will be able to buy such spectrum.

> The revenue expected from auction of 5G spectrum is unlikely to come at the specified rate, at least for the next few years, by when the reserve prices would have to fall to a fraction of it.

> The government should immediately provide 100 MHz of 5G spectrum to existing operators free of any one-time charge with clear rollout conditions of coverage and capital investment in 5G networks.

The National Digital Communication Policy 2018 (NDCP 2018) clearly states that the aim of policy and thereby the government is to spread broadband across the country as soon as possible and not the maximization of revenue. In keeping with this policy and the existing dire need for wireless broadband as discussed above, I suggest a few steps that can help the country achieve both the objectives.

The government should immediately provide 100 MHz of 5G spectrum to all the existing operators free of any one-time charge with clear rollout conditions and targets with respect to coverage and capital investment in 5G networks. To begin with, say for the next two years, the minimum rollout requirement should be the provision of 'Fixed Wireless Broadband' at least in specified cities and towns or districts where the immediate need for such broadband is higher.

The operators accordingly would not have to incur very large capex that would be required for a ubiquitous mobile network on 5G—especially when on a mobile network there neither are too many use cases as yet nor are inexpensive handsets available. Instead, the operators would be able to 'selectively' choose clusters with a higher concentration of demand for 'Fixed Wireless Broadband'. The 5G network so rolled out would be supplemented with 'outdoor antenna device' and in-building WIFI to ensure very good quality indoor reception of the signal and high broadband speeds. Accordingly, the overall capex and opex per customer will be much more economically feasible.

So what will be the outcome? The approach will help us achieve six objectives.

- India will enter the 5G era virtually at the same time as the rest of the world;
- It will help bridge the availability big gap of decent speed broadband at a very large number of touchpoints;
- The country will become absolutely ready to deploy fully mobile 5G networks in a few years as more use cases emerge;
- The government will immediately start earning additional returns from the increased revenue of operators;
- The telecom industry will get the much-needed additional revenue; and
- The scarce capital will get spent on networks rather than spectrum—something that should have been done as a policy right from the beginning.

It is however, important to understand that to get this done, the government will need to overcome arguments from naysayers about "foregoing a large one-time spectrum charge". The reason is simple: such imaginary revenue by way of the auction of 5G spectrum is unlikely to come to the government at rates specified any time soon—at least for the next few years, by when the reserve prices would have to fall to a fraction anyway.

On balance, there cannot be a better win-win situation for the Indian consumer, the Digital India dream, and the country's telecom industry, corporate sector, and the economy.

The author Akhil Gupta is the Vice-Chairman of Bharti Enterprises and Executive Chairman of Bharti Infratel

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STAY HOME, STAY SAFE & STAY CONNECTED WITH DATAQUEST

Sameer Rajee
India Head, Zoom Video Communications

"Meeting bombing is an end-user behaviour pattern"

COVID-19 crisis has turned out to be a game-changer for many companies. While some companies have seen their business model tumble, few others, including the collaboration and communication solution and service providers have seen their numbers swelling. The one that leads the pack is Zoom, whose number of average per day users grew from 10 million in December 2019 to 300 million by April 2020. This, despite some major security gaps and concern about some Zoom calls being routed through data centers in China. In a video-call with ***Shubhendu Parth****, Zoom Video Communications India head* ***Sameer Rajee*** *talks about the security issues, its 90-day plans to plug these, Keybase acquisition, and the Version 5.0.*

Shubhendu Parth (SP): Eric Yuan had earlier stated that Zoom was not geared to handle such a massive surge in user volume. What steps has the company since then taken to augment its capacity?

Sameer Raje (SR): I think it would be fair to say that nobody had really imagined that all of us would be working and socializing from home. So yes, it is absolutely true that we had not imagined that every second or third person in the world would start using Zoom or a virtual platform to socialize, or to meet and collaborate.

During this period, we have seen different kind of users coming on board—young kids and schools, and users who had never used collaboration platforms. These first-time users are bringing in our new use cases. I read an article that some marriages in India were happening on Zoom. We had not anticipated that Zoom would be a platform for people to get married. And then there are people hosting a get-together with family and friends. We did not anticipate this either.

So there are a few things to be done. One, we need to be absolutely sure that users coming on our collaboration platform are using it in the right way. For young, under 16 years' users, it is important to enforce certain discipline and parental control. Hence, under-16 kids cannot sign up for a Zoom account without permission from the school or parents. Next, is the technical aspect to deal with where we need to ensure that there is no downtime in service.

While all new users are coming and the entire traffic is piling on and we're scaling up, we want to ensure that not only our services remain up 24x7, but we are also able to enhance the security and privacy level of our platform.

SP: And what is Zoom doing on this front?

SR: We have embarked on coaching, guiding, and training the individual users and also mandating certain rules. For example, while starting a meeting one needs to initiate it with a password. We have set up a CISO counsel and a 90-day plan where we've decided to freeze all our future feature roadmap, but focusing purely on security and privacy aspects where we are

enhancing our platform from what it was to make it even more robust, secure and private.

While these things will keep happening, the external third party agencies and CISOs are advising us and conducting the requisite tests to ensure that everything is safe and sound. Whatever the gaps they report will be actively bridged. That is our focus during this period.

SP: Is the acquisition of Keybase part of the 90-day plan to fix security issues? How will it help Zoom strengthen the security of the platform?

SR: Keybase, with over two dozen world-class security and encryption engineers, will hit the ground running, continuing the development and implementation of features and standards that will make Zoom the industry leader in security and privacy. This will help us build end-to-end encryption into the Zoom platform. Our goal is to build Zoom's security and encryption capabilities with help from Keybase's world-class engineers. While we will also own the Keybase product, we expect that it will remain separate from Zoom's offerings.

SP: The company recently released its version 5.0 which includes encryption and new privacy controls. What makes the new version safer?

SR: The most important feature of the new version is the enhanced level of encryption. We have now migrated to the AES 256-bit GCM encryption, which is probably the latest, most secure, and used by very few players in the industry. So that's one of the key developments that we have brought in. Besides, there are other features and functionality. For example, the enhancement of the security tab for the host to lock the room or deal with the security aspects of the meeting.

We have also introduced functionalities that help control how the chat functions, including saving or recording the meeting. We have introduced a very critical "report a user" feature. The functionality allows users to report unwanted intrusions in the meeting by just clicking a button. Once reported, it will automatically take a screen capture and report it back to Zoom. Our security and privacy team will validate complain and if it is found that inappropriate content has been used or there has been an intrusion, there is a provision to disable or suspend, and even terminate the respected zoom account. If required, we can report it to the relevant authorities for further action. This is an extremely important feature and I think this will give the confidence to those teachers or tutors and schools which probably stopped using Zoom for whatever reasons.

SP: Is the AES 256-bit GCM encryption being used for end-to-end encryption?

SR: We need to understand what an end-to-end-encryption actually means in case of a collaboration platform. When participants are using Zoom clients to connect it effectively means that the meeting is encrypted. It was so even before and the AES 256-bit encryption in Zoom 5.0 means this encryption level has gone even higher.

What we need to understand is that Zoom is a collaboration platform and hence, by default, we need to allow other devices and other means of communication to connect into Zoom for collaboration purposes. For example, a person might choose to join the Zoom platform via PSTN or the mobile voice without using the client on the Zoom. Similarly, one might want to dial a number and get into a conference call on the zoom platform. Besides, a company might have some video conferencing endpoints that it wants to connect into the Zoom platform for collaboration.

Now, each of these devices will have their own different levels of encryption, or some of them may not have encryption at all. So when the meeting data leaves the Zoom cloud that's where the encryption format changes to meet the requisite end-client needs. One may communicate through a phone or a video-conferencing device or anything else, but till the time it is on the Zoom cloud the data is encrypted.

The moment we bring in different tools and varied devices on a collaboration platform, the format of encryption changes. But we have the Zoom Cloud Connectors which encrypts and decrypts at the entering and exit level and hence the entire meeting data is encrypted. Zoom always encrypted the call data and with version 5.0 we have further enhanced the level of encryption.

SP: Talking about encryption, we have seen cases where some platforms have refused to share the keys with the government agencies. What is Zoom's stand on this?

SR: On the Zoom platform, when the data is encrypted,

> When we started to scale up, there were some human errors and we took corrective steps in some of the critical issues in less than 24 hours.

we don't have the keys unless the user is recording it on the cloud. It is only then that we need the keys to decrypt and transcribe it. Otherwise, we don't have any means of decrypting or intercepting the information or even accessing it. So, it is completely encrypted and if the government says they want to access, we will have to go into the details of it. We will be glad to engage with the government to understand their requirements and come to a conclusion as to what best we can do.

SP: When did Zoom first notice the security gaps? Or did Zoombombing trigger the 90-day security plan?

SR: Meeting bombing itself is not a security gap, but it's an end-user behaviour pattern. It is like going out of the house without locking it. Similarly, if you're hosting an online meeting and posting it on social media and do not have a password for it, you're inviting trouble. What happens when someone walks into the conference room you are using in the office? You don't call it "bombing" as we know that it happened because the room was not locked.

If you don't want anybody to pop in we need to lock the room. People need to understand that it is the same while using online meeting rooms. So, it is actually not a security issue, but an end-user behaviour issue. However, there were certain other aspects and some mistakes on our part. It will be wrong to deny this.

When we started to scale up, there were some human errors and we took corrective steps in some of the critical issues in less than 24 hours. We also released some new patches and upgrades. In fact, we released the fourth version of patches in the 15 days, which is quick turnaround time.

SP: Amongst other issues, there were two major security and privacy concerns: a bug that allowed hackers to take control over the user's computer, and call data being routed through China. How is the company addressing these?

SR: The UNC link was something we missed and we disabled it in less than 24 hours after it was brought to the notice. However, it was really not a bug on our platform. It is a well-known issue on a well-known platform and it has been there ever since and for someone to click it, the users had to give permission. Having said that, we accept that having it as a clickable link was a mistake and we fixed it.

Same as the case with the issue related to the China data center. Any organization would understand that data servers in China are geo-fenced because of the local requirements. We have them there because the participants or the hosts in China need to go through these servers when they join or initiate a meeting. Since those servers are always geo-fenced the global traffic doesn't ever go there. However, again, when we were scaling up we made a mistake and some of the servers carried the global traffic.

I will like to add that our architecture is such that the calls are always sent to the nearest data center and so most of the global users would have automatically gone to their respective data centers and a minuscule number, those who wouldn't have found space on a particular day in their nearest data center, would have gone to China. This number is in single digits. But it was a mistake on our part that we did allow this to happen for a short period of time while we were scaling the server. It was a human error and we have dealt with it.

SP: Zoom has two data centers in India—in Mumbai and Hyderabad. Are all calls from India being handled only through these?

SR: Absolutely. Data of all paid Zoom users go to Mumbai or Hyderabad. Mumbai is the primary server

> Keybase, with over two dozen world-class security and encryption engineers, will help us build end-to-end encryption into the Zoom platform.

while Hyderabad is the secondary one and both these data centers are operated and hosted through Indian ISP. The second aspect of this is the way we handle data for free users. This data goes to the US and from there it is sent to the respective data centers that connect the calls. That's how we function.

SP: So the Indian data centers are primarily meant to handle the enterprise customers?

SR: Not only enterprise but all paid customers, irrespective of the number of licenses they have. We also have an additional feature for our paid customers, which is an industry first, that allows users to select geography and the data center. This also means that one can actually opt-out of certain geographies.

SP: Please elaborate on your enterprise offering for India.

SR: May people perhaps think that Zoom is a video conferencing tool, but we are not that. We are a "video first collaboration platform". What it effectively means is that we have different forms of collaboration. First is the video, then the audio which plugs into it, and then we also have the screen sharing facility. The platform also has digital signage, video conferencing rooms, and huddle rooms. We are also the only collaboration platform that allows one to plug the old legacy video conferencing devices into the cloud-based service. So, one does not need to buy new hardware and can continue using existing devices.

Zoom is more like a real estate. If you have a video conferencing rooms, or the lobby, we take care of that through digital signage. We also provide you with scheduling software outside your conference rooms to help you schedule a meeting, select a meeting room, and to the extent that it can actually guide you to the next available conference room. It is like standing outside the conference room which is occupied and finding a room on the same floor.

So our enterprise-level platform is very different and we also offer a host of API's and SDK integration enabling organizations to integrate Zoom into their own applications, including the software which might be proprietary. It could be embedded within the application and hence gives more insight and flexibility. It not just allows Zoom to be used from anywhere and any device, but also in all format for integration. The platform also allows one to put up a digital signage in the virtual lobby to welcome your guest. That's how we help you stitch your story together.

SP: Has the advisory from MHA changed the equation? Is there a change in the way the customers are now looking at the platform?

SR: Well, the MHA advisory focuses more on the Government of India employees. For the private sectors, they have released an advisory of the best practices. But yes, there have been customers who reached out to us, asked questions about the government advisory. Obviously, any individual or organization would seek answers since it's a respectable government document. So we have gone back to them and have responded to the advisory.

We have also replied to all the customers. We explained to them what's happening and responded to each and every query, including the questions related to encryption or other security and privacy issues. As far as the government is concerned, we are engaging with them—from the MHA to the other ministries, including the Ministry of Electronics and Information Technology. We want to share all the requisite documents in terms of technical features and the privacy and security features of users so that they are able to make the right informed decisions and communicate it to their own employees.

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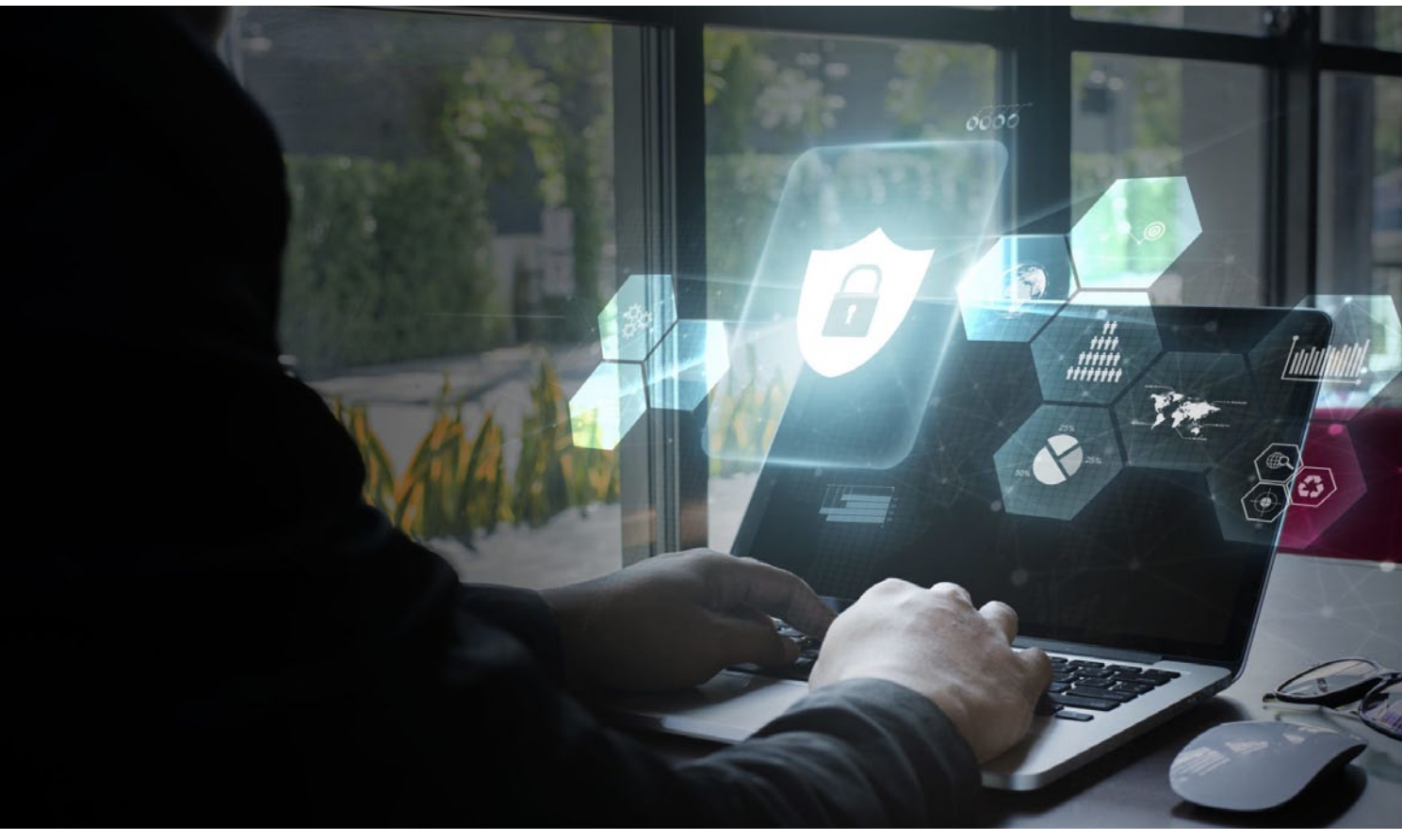
Extending security infrastructure to work-from-home

Existing security tools may serve well to protect the remote-working environment, but they need to be configured to deal with the new realities and threats. Read to find out how



BY ANAND PATIL

I read an interesting forward recently. It painted the scenario for those born in the year 1900, and how, by the time they turned 50, they would have lived through World War I, the Spanish Flu, The Great Depression, and World War II—four major events that had a permanent, global impact.

Comparatively, the current pandemic seems to be the first incident since 1950 to have such a widespread global reach—and although medical science has made tremendous progress since the Spanish Flu of 100 years ago, we are learning how to better cope with the situation every day.

> Businesses now need to prepare for a new environment—one where their endpoints are highly distributed and dispersed all over the internet.

While the medical community is working hard to find a permanent solution to this global health crisis, the only intermediate recourse available at the moment is social distancing; many countries have implemented lockdown to ensure the safety of their people.

Another area that has seen rapid advances since the 1950s is communication technology, and the internet, specifically. Although one might argue that global economics and the proverbial "flattening" of the earth has resulted in the rapid spread of the disease, it is also true that the internet has helped in speedy information dissemination and the quick response of governments and medical bodies around the world to the malady.

With a majority of the world's population staying at home, the internet has become the platform for all kinds of activities—entertainment, education, training, social get-togethers, collaboration, and of course, work.

Securing the new borderless enterprise

Companies and organizations have had a varied set of responses to the situation. Certain industries, such as manufacturing, had to shut down operations since employees were not being able to attend work. On the other hand, many other companies, especially the knowledge industry, have embraced this opportunity to stay productive throughout the lockdown by enabling remote work for their employees. Having experienced strategic business benefits during this period, some organizations have even announced an accelerated pace of digitization.

Work is an activity rather than a specific place. And while physical presence is important in certain critical roles, an increasingly large number of the global workforce has been working from home over the past few weeks. This scenario is not without its own set of challenges. An all-laptop policy is just the first step—other prerequisites include the technical ability to access all applications remotely and, above all, a culture that embraces remote work, supported by a robust, cloud-based collaboration platform.

A typical home broadband connection has rudimentary protection, at best and as employees start to use these networks to access work applications, the attack surface starts to explode. Needless to say, hackers have stepped up their efforts to exploit this scenario in recent months, leading to a dramatic spurt in attacks.

According to Cisco Talos, attackers are trying to take advantage of the Coronavirus situation to lure unsuspecting users into various pitfalls such as malware, spam, phishing, fraud, and disinformation campaigns. Given this context, a robust security infrastructure becomes a crucial prerequisite for organizations to stay protected in the new, borderless enterprise. Businesses now need to prepare for a new environment—one where their endpoints are highly distributed and dispersed all over the internet. A manageable way to think about this is to use the "Zero Trust" approach.

Zero trust for the remote workforce

Let's now look at how companies and organizations can protect themselves in the new normal and the pre-requisites for it includes awareness training of the users, secure data management and the right processes. As with every good security implementation, this starts with the people and the process.

- **Awareness training:** Organizations need to educate users regarding spam, phishing, SMS fraud, social engineering, and internal security engagement processes. A comprehensive employee awareness program will help ensure that employees are informed with regards to the proper use of corporate resources, even when working from remote locations.

- **Data management:** It is important that one knows where critical data lives, who has access to it, and how that data moves within (and now potentially without) the organization's environment? Companies must ensure that their remote workforce is enabled to share data securely and as per the policy. Organizations also need to monitor critical data moving outside of policy requirements. Lastly, it is important to make

> The current pandemic has created a perfect storm for attackers to exploit. They will continue to target users with a variety of vectors and existing attack methods.

sure that the backup strategy considers how to backup off-premise data.

- **Processes:** One needs to review response plans to identify any single-person points of failure and plan for what happens if that person is no longer available. Additionally, identify operational functions that currently require physical presence like forensics and data acquisition, and endpoint re-imaging, and implement remote-capable workarounds.

Tools to arm the workforce

Protecting an organization from threats in this new environment depends on the same strong security infrastructure foundation that an organization, hopefully, already has. However, security organizations must ensure that existing protections and capabilities function in a newly remote environment, users are aware of the threats and how to identify them, and organizations have implemented security best practices for remote work. Here are few steps that the organizations must take.

- **Remote access:** Secure all remote access using a client-based VPN, ideally with cloud-based, multi-factor authentication (MFA). It is imperative that NAC solutions also be leveraged to ensure that systems attempting to remotely connect to the corporate environment meet a minimum set of security standards such as anti-malware protection, patch levels, etc. prior to granting them access to corporate resources. Organizations should also continually identify and remediate access policy violations.

- **Multi-factor authentication:** Protect critical and public-facing applications with multi-factor authentication and supporting corporate policies. This reduces the likelihood that someone else can log in since they would need both the password and their second factor to pose as the original user. Verify that remote account and access termination capabilities work as intended in a remote environment.

- **DNS-based security:** Monitoring DNS requests, as well as subsequent IP connections to improve accuracy and detection of compromised systems, security visibility, and network protection is important. Block requests to malicious destinations before a connection is even established—stopping threats before they reach your network or endpoints.

- **Secure web gateway:** Organizations also need to deploy a cloud-based full (or selective) proxy that can log and inspect the web traffic, including uploaded and downloaded files, for greater transparency, control, and protection against malware and other hidden threats.

- **Endpoint control and visibility:** Endpoint visibility, protection, and mitigation are now more critical than ever. It is imperative to protect endpoints with EDR (End-point Detection and Response) and Data Leak Prevention. It will help organizations to consider whether remediation and reimaging capabilities will work as intended in a remote environment. One may also encrypt devices, where possible, and add this check to NAC solution as a gate for connectivity.

The endgame

Unfortunately, the current pandemic has created a perfect storm for attackers to exploit. They will continue to target users with a variety of vectors and existing attack methods. For effective defense, we can leverage the same tools we had in place before the pandemic started. However, they now have to be configured keeping in mind the increased attack surface created by the new remote work environment.

A reliable and layered defense with a strong security awareness program is critical to help protect your organization from present and future threats.

The author Anand Patil is a Director of Systems Engineering with Cisco India and SAARC

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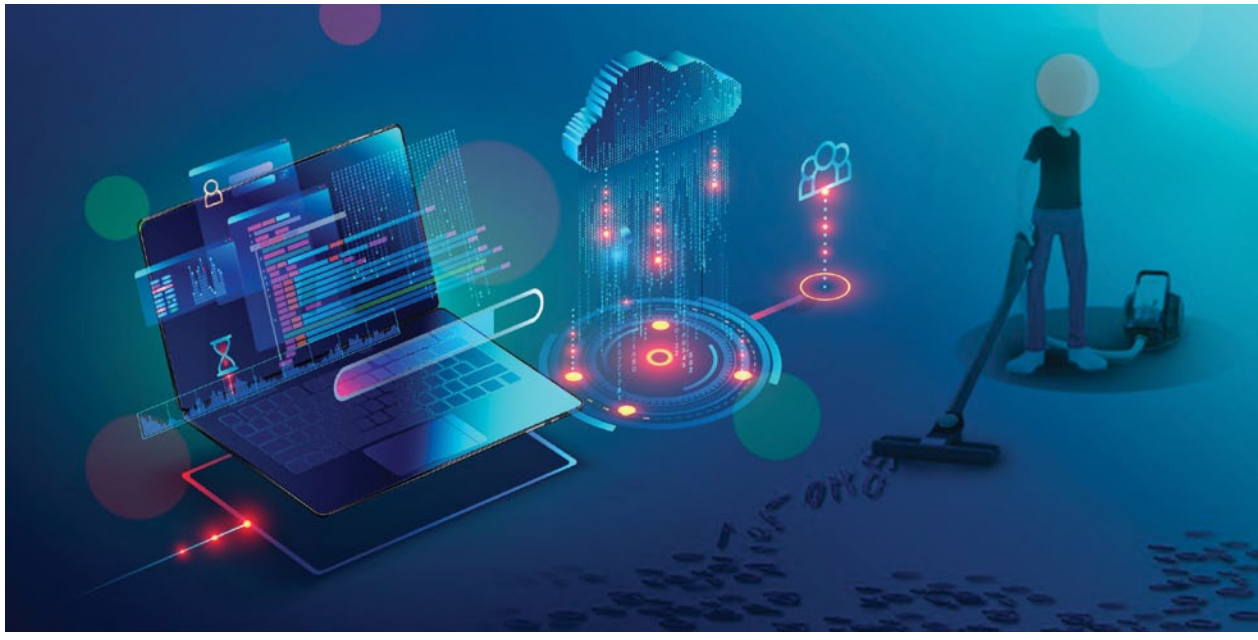
Building democratized networks

The lockdown has led to a surge in data usage. Here is what TSPs can do to improve their legacy networks so that it can better cope up with the ever-increasing demand



BY PRAVIN S BHANDARKAR

The networking industry is going through an evolution leading to desegregation—hardware can be bought from one location and software from another, much like the Android ecosystem where one can buy hardware and software separately.

So what have we done? We have developed a new way of building networks, using cloud and internet native principles in networking and focusing on access, the network piece that is used to connect from the internet to home and small office users.

In this digital era, we see a lot of traffic being generated by OTTs and the likes of AWS for business applications. The networks are engineered in a way that they can scale up horizontally as the content increases. On the other side, we have the service providers that are becoming big pipes. They don't have their top-line growth, but then they have to invest in the customer experience and to grow their networks.

This growth is asymmetric as they use incumbent or integrated systems. Instead, they should build a small grid at every location. This is like taking cloud in infrastructure down to central offices, and one can build as many of such small grids as they want. One just needs to buy a rack unit and put our software on top of it. This helps because our price point presents a viable business option.

Let's say you're servicing 300 customers and the customer base increases to 5,000 and then to 10,000. You just need to keep adding units while the software takes care of managing all these units, connecting it, and provisioning for redundancy since all these capabilities are integrated as the services unit. This also means that an organization's price point goes down drastically from a

> On the Edge, there is a pressure to deliver the services and enhance user experience. This is where we start to see the disruption.

capex perspective. Then, because of software automation, we use tools like DevOps. We leverage the Linux toolchain and bring in the internet native technology to the telcos.

This is, what we call, a distributed SDN.

While the SDN still has a centralized controller, we firmly believe that networks have to be distributed, because data networks were built to overcome nuclear attacks. It's a packet-based network. So we think it's going to be hybrid. At a certain point, one needs distribution elements like redundancy, resiliency and grid-like behaviour. But when one has to deliver services, it can be done from a centralized location.

Sitting on the access layer

A network has the core where traffic is carried from point "A" to point "B". Then there's the Edge, where the services are deployed. Finally there's the access, where they connect to users. So we are in the access network and one can connect to public, private, or hybrid clouds. We reduce costs for the providers of this access services. One of the drivers is that networks are moving from older copper-based systems to optic fibre, which is coming to the home. We simply build software on top of the new systems.

The biggest advantage is that one can turn on the services really fast. If they don't work turn it off. We want to democratize the network and give control of what one is doing. It is also important that the user should know how to use it in the best way, and we provide tools that enable them.

Moving disruption to the core

On the Edge, there is a pressure to deliver the services and enhance user experience. This is where we start to see the disruption. When we started off, we just went with the place where we were going to earn revenue. We said if we are doing something of value someone is paying us, which means we are doing it right, rather than looking at what is the coolest problem to solve. We think it will start from access/Edge and eventually move to the core. That's how the network will change. We are probably the slowest 4G network in the world and one of the reasons is that managing the congestion, as well as user experience, is a challenge. Our solution from day one has been to build Hierarchical Quality of Service (HQoS) which can help prioritize.

Optimised composable software

From a networking standpoint, the monolithic software built on integrated systems worked from 1999 to 2010. After that we have the cloud and software-defined networking. A lot of components are now available in the market, either in open source or through GitHub communities. But there is a limited readiness, at least in the networking world to adopt since there is some cost associated with maintaining businesses. So we built it from ground up.

We factored in a million transactions per second. We have composable software. If one has a particular protocol, one can just run that particular protocol. It is just plug and play. An organization can use two protocols or stick with a "keep-alive protocol". That reduces the memory footprint, execution footprint, and the size of the package. So it is really optimized.

The Internet of Things

There is an explosion of the Internet of Things (IoT) devices. So, one, how do we address those devices? Two, there are a lot of proprietary technologies with which this has started off. Right now worldwide it is all getting unified on IP, and we think it will be IPv6-enabled because it allows addressability.

IPv6 has a huge space so they can address trillions of devices. It depends on what kind of services one wants. Let's say there is a windmill farm with IoT devices to measure certain parameters. They will generate a lot of data, which will eventually become Big Data. Hence, some pre-compute is needed at an intermediate point, which is the IoT-Edge compute. This is where one can go back to the back-end, process this data and use business analytics.

The author Pravin S Bhandarkar is the Founder and CEO of RtBricks

As told to Sunil Rajguru

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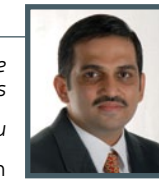

Scaling up network in post-COVID world

A vendor-neutral hardware and software-defined, open-interface technology is what the industry needs to meet the growing demand for broadband in the lockdown times

BY RAJESH MISHRA

The outbreak of the Coronavirus pandemic has put the telcos, across the world, in an unprecedented situation. The networks are choking with almost the entire humanity holed up in homes, and remote-working and -studying becoming the norm. The COVID-19 situation has disrupted social life and economic activities. It promises to bring a paradigm shift in our functioning and will lead to several long-term changes in our lives.

The service providers are hard-pressed to address the growing demand for broadband, while ensuring that the quality of services is not impacted. What adds to the challenge is the fact that it is tough to increase capacity when it is virtually impossible to get new cell sites to strengthen the existing networks or to deploy 5G.

The service providers who had already deployed OpenRAN would have found it comparatively easier to efficiently handle the sudden surge in traffic and in ensuring the quality of services in these challenging situations. Several telcos are deploying OpenRAN to benefit from a self-optimized, interoperable, and a more automated network. Global industry leaders, including MTN, Etisalat, Vodafone, and Telefonica, have already deployed and are benefitting from this disruptive technology.

Leveraging OpenRAN

Enabled by virtualization, OpenRAN uses software to add flexibility and agility to the network. The technology allows service providers to move away from proprietary, hardware-centric networks to automated, cloud-native, and programmable networks. The software approach also allows the service providers to scale quickly in case of unanticipated demand.

As the networks are being stretched to the limit, OpenRAN technology helps in the effective management of the additional traffic by adopting a more flexible approach to network resources from the RAN site to the core.

> The most significant aspect of OpenRAN is its ability to open up innovation and free up the service provider from vendor lock-in.

Possibly the most significant aspect of OpenRAN is its ability to open up innovation and free up the service provider from vendor lock-in. It does so by disaggregating the hardware and software components of the infrastructure. This means that more efficient equipment from several vendors can be deployed, enabling the service providers to bring down their total cost of ownership (TCO). This is one of the key reasons why the deployment of OpenRAN technologies will increase in the post-COVID-19 world.

Further, OpenRAN helps in bringing down the cost of managing networks by making it possible to manage different technology networks on the same platform. Typically, the telcos add a new layer in the network every time they need to offer new technology. This adds to network complexity and also increases the cost.

Automation is going to be the norm in the post-Coronavirus world. OpenRAN allows service providers to orchestrate and automate several elements of their network infrastructure from multiple vendors. It brings down both capital as well as operational expenditure.

Traditional network architecture is incapable of enabling the service providers to deal with the surge in data demands and to meet the requirements of the new-age customer, including Industry 4.0, Internet of Things (IoT), smart cities, 4K broadcasting, mobile gaming, augmented reality, and virtual reality, among others.

On the other hand, OpenRAN is programmable and software-enabled and is easily able to scale when required. It facilitates automation making it easier for the telcos to set up new sites and upgrade to new technologies like 5G with just a simple software upgrade. So, a service provider will be able to benefit from the deployment today even as it prepares the network for the upcoming technologies.

The technology also promotes self-healing, self-configuration, and openness, which helps the service providers in future-proofing their investments. Further, it makes it easy to deploy, maintain, and upgrade without having to send the workforce in the field. With this, the service providers will be able to speed up deployments, which are on hold because of the Coronavirus pandemic.

What is OpenRAN?

OpenRAN is a movement to define and build 2G, 3G, 4G and 5G RAN solutions based on general-purpose vendor-neutral hardware and software-defined technology. It is the disaggregation of hardware and software: the Remote Radio Unit (RRU) and Remote Radio Head (RRH) hardware becomes a GPP based cots hardware that can be purchased from any ODM, OEM or RAN hardware vendor.

The Base Band Unit (BBU) is the same as in the case of vRAN, COTS Server, in addition to the vendor's proprietary software with virtualized functions.

Since the interface between the BBU and RRU / RRH in OpenRAN is software agnostic and has an open interface, the software can work on any open RRU / RRH. With Open RAN and the "virtualization" it brings, operators can run software-based network functions on standard servers.

The open interfaces also let the operators mix and match radio's from one supplier with processors from other vendors, something that is not currently possible.

It can be said that the post-COVID-19 world is going to be vastly different from what we are accustomed to. "You never let a serious crisis go to waste. And what I mean by that it's an opportunity to do things you thought could not be done," says Rahm Emanuel, an American politician and former Mayor of Chicago.

Coronavirus is a massive opportunity for the telcos to re-imagine their networks, bring down the cost of managing the networks, and upgrade them in keeping with their future vision.

The author Rajesh Mishra is the co-founder, President, and CTO of Parallel Wireless

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Getting ready for a digital identity era

The 5G rollout will enable world to harness mobile-based security and authentication in a big way, paving way for elimination of paper-based processes

BY NAVEEN CHAVA

India has the world's highest data usage per smart phone at an average of 9.8 GB per month, a new report by Swedish telecom equipment maker Ericsson said, adding that this will double to 18 GB by 2024. Globally, the 4G service is expected to peak in 2023 and start declining, and the 5G subscriber base is expected to touch 1.9 Billion by 2024.

The mobile phones today are the smartest devices with not just connectivity, but also biometrics for verification like facial and voice recognition and fingerprint authentication, pin pad for payments, OTP verification etc., giving seamless, reduced cycle times and digital access from anywhere. Mobile phones are also the easiest device available for Video KYC that is needed for digital on-boarding, irrespective of the geographic limitations.

Coverage of geographic boundaries is required for travel mostly, and requires detailed traveler information like his current address, emergency contacts etc., which is always outdated and needs to be dynamically updated. In a way, the mobile phone of today is the device for verifiable identity as well as a payment terminal. The user base is the standard of valuation for businesses now and the growth user base is mostly coming from mobile phones whose count will be same as the world population soon.

Efficiency of business is measured by the user experience and retention which happens not just from the presentation but also from faster response, throughput, and capacity management. All of this will be even more possible with 5G which will improve the bandwidth by 10X and ultimately deliver the user experience on mobile phones.

With the advent of 5G, the payments, eRetail and eCommerce will continue to grow along with the mobile usage and growth. With 5G coming, we will have data speeds much faster than most of us see on our desktops and laptops or using broadband, and deliver higher multi-Gbps peak data speeds. It will also allow massive network capacity, with a more uniform and higher performance and reliability. Improved efficiency will empower new user experiences across existing and new industries.

> Emerging industries with IoT devices, drones for emergency services, remote surgeries, autonomous driving and many others will connect everything and everyone.

NarrowBand-Internet of Things (NB-IoT) and Cat-M technologies will account for close to 45% of cellular IoT connections in 2024. Emerging industries with new additional devices like IoT devices, drones for emergency services, remote surgeries, autonomous driving and many others will connect everything and everyone. The 5G will expand mobile ecosystem to new industries and cutting-edge user experiences such as boundless extreme reality (XR), seamless IoT capabilities, new enterprise applications, local interactive content and instant cloud access.

We also live in a mobile world where people are always moving around with the need for access to things happening dynamically around us and the instant need for being on top of things and getting things done instantly keeping the concept of anywhere and anytime. Digital identity management will be the key to protect online usage whether it is for shopping or mission critical communication or any transaction. Authentication should be seamless to the user and at the same time, digital verification should happen instantly. The users should have the ability to choose as many levels of authentication whether it is biometric, pin-based or OTP-based verification. All of this will be possible with seamless apps which are able to utilize ultra-low latency, more reliability and increased availability of network enabled by 5G cellular network which was not possible in the past due to low data rates.

Considering the current worldwide situation, where we are all confined to home and everything is mostly happening online, the digital identity management and verification has become even more important and this can be implemented with the current lesser bandwidth of LTE. However, the user experience can be improved enormously with 5G.

The future of security

Key of the future for an individual will be their digital signature, which will eliminate all paper-based transactions with higher level of authentication since it can be easily done over uninterrupted and robust 5G network instantly with data security and identity protection, including verifiable consent to access and share data.

Today, the need for digital signatures exists in all verticals—travel, banking, financial transactions, land transactions, employee verification, welfare scheme disbursements, healthcare, insurance claims, employee remote on-boarding and corporate transactions. The next step will be to enable digital verification and on-boarding of customers, agents, vendors where KYC of any stakeholder is needed with real-time authentication and on-boarding possible on mobile and done instantly with a network and data bandwidths available over 5G.

Imagine ID verification needed for not just eCommerce or cab companies, it is needed for every corporate for employees, their agents, their customers who are buying, selling and delivering. This requires a lot of cellular airtime that is possible with 5G. Digitally-signed, authenticated documents from doctor, diagnostic labs or government might become a basic document for people to cross borders or go to work at their office in the future and this is what is possible with 5G network coverage.

We will also need to also explore the idea of having healthcare bands and devices capturing data that will have identity management, ADAS cars with verified identity before using the data to upload. All of this will be a reality in the near future.

These could be regularly happening transactions like legally binding contracts or agreements, financial submissions or one time Instant e-Consent or e-Sign for additional product selling within bank, NBFC or platforms can also be done. The vision of bank on-boarding and instant bank account access will be possible with 5G without the need of a physical visit.

The leap to an all-digital world of e-signed contracts, digital identity, truly digital banking, digital vehicle identity will be cut short by a at least a few years and instead of 2030 a lot more adoption will happen in 2021 itself because of the pandemic.

The author Naveen Chava is the CEO of IDSign, a identity management and verification solutions company

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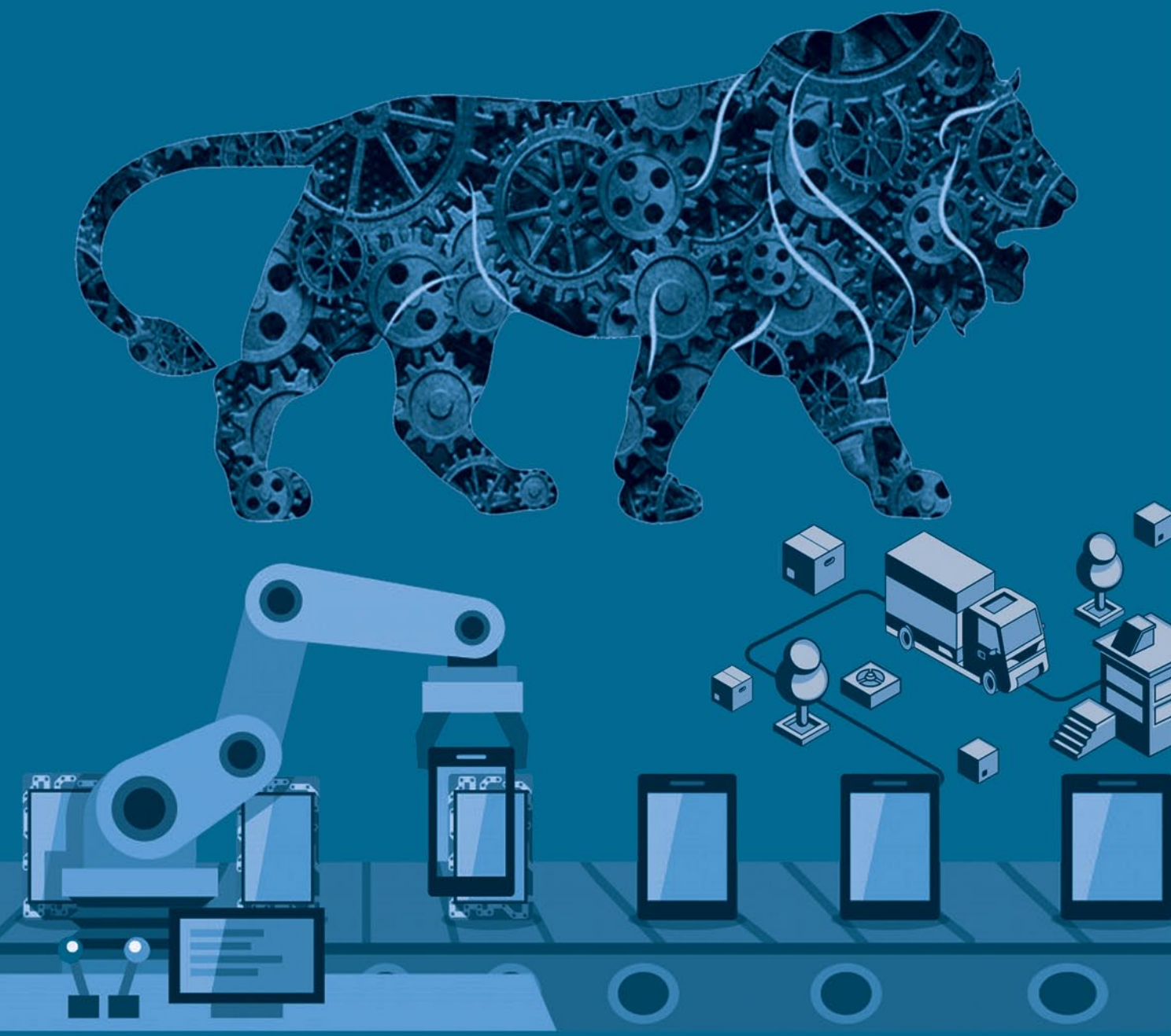
Time for 'Make in India' to go stronger



The lockdown is a challenge, but it is also an opportunity to strengthen mobile phone manufacturing and making the country a global supply chain hub for electronics

BY BHUPESH RASEEN

Coronavirus (COVID-19) spread is the biggest threat to the world and the global economy in nearly a century. The virus that originated in China has infected people globally, with several countries and major cities going under lockdown, imposing quarantine measures on the entire population. This has confined citizens to their homes except for essentials and effectively brought normal life to a halt in India as well.

While organizations have rolled out mandatory work-from-home policies to prevent the spread of COVID-19, malls, shopping centres, movie theatres and all public places are temporarily shut in an effort to prevent community transmission of the disease. These limitations are leading to a slowdown in business across all major industries (with the exception of healthcare services) and small business owners are struggling to deal with the situation.

Like most of the sectors, including manufacturing, the mobile phone industry has also been severely impacted by the pandemic and the lockdown that has followed it. With the consumption of such products and services going down, revenues of the companies will soon start to dry up, placing the jobs of millions of workers at a huge risk.

The mobile phone industry in India is also facing the heat and has a rough ride ahead due to the COVID-19 outbreak. India's share in global smartphone production is set to fall to the levels seen four years back, as factories have halted manufacturing activities due to the lockdown and demand is likely to stay weak till at least July 2020.

It is important to understand that the mobile manufacturing in India was more of an assembly-line scenario rather than full-scale manufacturing, largely dependent on imports of displays, components and semi-knocked down (SKD) kits from China. Only around 10% of the components were indigenous. The business situation can become unfavourable for the mobile phone manufacturing, trading and service ecosystem in India if the current situation persists.

The import and transportation of various components for assembling mobile phones, tools and dies, machinery and robotic equipment are badly affected and there is no certainty for how long this situation might prevail. Electronic component supply chains that were heavily dependent on China and other South-East Asian nations have been severely impacted. The most important

resource required for building technologically advanced products—qualified and trained manpower—are scared to even step out of their homes.

The COVID-19 outbreak has presented new and unmapped roadblocks for the India mobile phone and ESDM industry, causing a disruptive impact on players both large and small. There is an urgent need to take firm steps to address the pain areas of industry, channel partners and service establishments. To support the industry the government needs to ensure ease of doing business, provide support to small business for maintaining cash flow and announce relief measures for corporate taxes to enable liquidity management.

Improve ease of doing business, resolve regulatory bottlenecks

Many mobile phone parts and electronic components are imported without payment of customs duty on submission of a bond to the appropriate Indian Customs authorities. Due to sudden announcement of lockdown and suspension of operations, submission of bonds by the importer to Customs may get delayed.

Considering the situation, the government should allow clearance of such consignments on the provisional basis to be regularized by submission of bonds, subsequently. Similarly, the bond limit available with the Customs authorities of one port should be allowed to be utilized for import of consignment at some other port as the importers are facing difficulties in submission of fresh bonds due to the lockdown.

While the EXIM 2015-20 Policy was extended there is a need for clarity on whether this would also mean that the provisions of the Merchandise Exports from India Scheme (MEIS) have been extended as well.

In spite of the MHA allowing operation of courier services, there would still be practical problems in sending copies of physical documents for export-import cargo clearance. Hence, it will be helpful if the CBIC allows submission of scanned and attested copies of documents, instead of originals during the lockdown period. The companies may be allowed to submit the original document later, within a specified time frame. Easing of operations at ports is also needed for faster turnaround and clearance of cargo.

It will also help if the due date for filing appeals for matters under litigation is extended by 60 days post lifting of lockdown. Delay in filing an appeal against an order beyond statutory timelines should be automatically condoned. Similarly, provision should be made for automatic renewal of pollution control approvals for one year.

It is important for government agencies and industry to work together and iron out the details of restoring the mobile and electronic component supply chains after the lockdown is lifted. The government should clarify the industries and sectors that are deemed essential goods. To encourage smooth logistics operations and return of labour in the post lockdown scenario, it should engage with the industry and trade unions and reach out to the workers, encouraging them to join back. Beyond the statutory lockdown period, wages should be paid to only those workers who re-join work, while others should be considered on leave.

Support SMBs to maintain cash flow

Most channel partners and retail businesses are stressed due to the sudden freezing of operations. Although the Reserve Bank of India has provided relief on loan EMIs for three months, an amendment needs to be brought to the necessary provisions to stop the clock on every possible payment to government and financial institutions as well. Medium and small enterprises will especially need at least three months to get back on the track after the lockdown is lifted.

Since 10% extra limit on cash credit is discretionary on banks, it would be best to reduce the margin on working capital loans from 25% to 10% for the current year (at least up to 30th September 2020).

Since banks are allowing the transfer of only Rs. 25,000, stockists and traders of mobile phones and electronic goods are unable to receive payments for the consignments they have sent to customers in other cities. The allowed limit on the transaction is insufficient for a buyer during this time of crisis and is causing trade channels to freeze up due to artificial credit squeeze. Hence, the government may support the SMBs by urgently releasing the GST refunds and personal income tax refunds to improve liquidity and encourage payment of wages and discretionary spending that will help revive overall economic activity.

Provide tax relief for better liquidity management

The government should provide relief to corporate taxpayers in view of the severe liquidity crunch being

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faced by them, as also incentivize contributions towards combating the COVID-19 pandemic. Industry requires short term, temporary relief from payment of taxes to address severe liquidity issues faced by businesses and deferment of all tax payments until 30 June 2020.

It should expedite refunds and allow the deduction for contributions made or expenditure incurred towards combating COVID-19 in India. Besides, the limitation on interest deduction should be relaxed for debts raised or guaranteed by non-resident (NR) associated enterprise (AE) from April 2020 to March 2021 period.

By making it not applicable for the period, the government can help ease the liquidity pressure in this time of need and help taxpayers to use the amount released for business purposes.

As per Rule 85 of the CGST Rule, 2017, the amount payable on reverse charge basis under the GST Act shall be paid by debiting electronic cash ledger maintained. Thus, the entity making payment of GST liability cannot utilize input tax credit balance to pay the said liability. This provision is causing hardship to all taxpayers during such a difficult time when the world is facing a liquidity shortage due to economic recession and COVID-19 pandemic. A relaxation of six months may be provided to utilize input tax credit balance to pay the Reverse Charge Mechanism (RCM) liability through the necessary amendment in GST rules.

To directly support the mobile phone industry, the government needs to extend waiver or relaxation in interest payment; facilitate quick disposal of refund claims; relax restriction to claim ITC under Rule 36 (4) of the CGST Rules, 2017; relax rules to offset GST credit balance; and the provision mandating reversal of input tax credit on account of non-payment to the supplier within 180 days and extend the time-frame to one year.

It may also help if the time limit for filing of GST Annual Return in form GSTR-9 and reconciliation statement in form GSTR-9C is extended and the payment of GST liability is deferred. The government should also immediately issue Service Exports from India Scheme (SEIS) licences to exporters through Ministry of Commerce, and provide relief to e-commerce operators and extend the validity of the expired e-Way Bills for a minimum period of three months.

Further, the government may consider relaxation in levy of taxes on supply of essential goods to hospitals and government or private medical facilities, for example, exemption from levy of customs duty and IGST on import of goods such as ventilators, testing kits, masks, sanitizers, medicines and other equipment which are essential in prevention or treatment of COVID-19 disease.

While the Government is monitoring the prevailing situation closely and working to mitigate the pain experienced by the common citizen, the industry in India is also looking forward to some quick action and policy interventions that can help minimize the impact of the lockdown on the country's economy and viability of industries and small businesses.

As the COVID-19 pandemic is brought under a reasonable degree of control, India needs to seize the opportunity to further Make in India initiative to attract global investments. Many companies that have been using China as a manufacturing base are likely to be happy to move to India after the Coronavirus fiasco, provided that the government does its homework well. These measures suggested above may well usher in a new 'golden age' for mobile manufacturing in the country and help establish India as an important hub for a robust, pandemic-proof global electronics supply chain.

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Manufacturing sector keen on communication upgrade

Over 74% decision-makers in the manufacturing sector are considering an upgrade of their communications and control networks by the end of 2022, with more than 90% investigating the use of either 4G and/or 5G in their operations. According to a survey by ABI Research for Nokia, around 52% of the respondents believe that the latest generation of 4G/LTE and 5G will be necessary to meet their transformational goals.

The research also identified key business use cases that would drive investment in 4G or 5G. Respondents reflected the need to digitalize and improve existing infrastructure (63%), automation with robotics (51%) and achieve new levels of employee productivity (42%).

"We have reached an inflection point in Industry 4.0 transformation as the fast, secure, low latency connectivity underpinning its implementation now becomes available," Nokia Enterprise Vice President for Marketing Manish Gulyani said, adding that the research indicates the strong marketplace appetite for industrial-grade wireless networking to capture the transformational benefits of digitalization and automation. "We believe that demand, combined with easy-to-deploy private wireless solutions will drive adoption."

The research examined near-term drivers influencing buying decisions for new industrial systems across IT and OT. According to the report, while IT drivers primarily focus on reducing downtime (53%), improving operations efficiency (42%), and enhancing security (36%), OT drivers reflect a desire to replace aging infrastructure (43%), improve efficiency (40%) and increase capacity (38%).

Gartner features Infor as a leader in Magic Quadrant

Business cloud software company Infor has been placed as a Leader in Gartner's Magic Quadrant for Multienterprise Supply Chain Business Networks (MESCBNs) for the second consecutive time. The company was positioned in the leader's quadrant for its ability to execute and completeness of vision, the company stated in a press release.

According to Gartner, MESCBNs are an essential technology component to a successful high-maturity, digital transformation, and executives must understand that companies need to operate within such networks to stay competitive. "In other words, minimize risk, increase efficiency, reduce cost and capitalize on opportunities," Gartner stated, adding that the biggest challenge to the effective operation of MEBAs is the integration—connectivity, interoperability and data quality—and collaboration among all the various partners.

"We believe this is where Infor separates from other network providers. Organically developed for complex multi-party, real-time collaboration and process automation, companies on our Infor Nexus platform can overcome typical business network challenges across the physical and financial supply chain," Heidi Benko, VP of solutions strategy for Infor Supply Chain Management, said.

MoveInSync launches free office commute app

Bengaluru-based MoveInSync has launched ETS lite to enable automation for employees, drivers, and the entire transport team. The solution is aimed at supporting companies with the necessary technology backing that can help them navigate their employee transportation operations during these unprecedented times.

The product includes a transport console that allows enhanced data management where data bulk upload can be scheduled and manual data sync for employees can be managed. "Transport managers will be able to manage routes, create shifts, and manage shift cut-offs. It also incorporates a tracking tool and a security dashboard that allows managing key safety alerts," the company stated.

The solution which is free to use will enable employees to seamlessly track cabs in real-time, receive pickup/drop and other safety notifications, and use an SOS alarm from the app for emergency situations. "The solution will make the entire transportation process easier for drivers with automated navigation and routing. On entering office premises, auto sign off will be enabled. Trip history will be available on the device, simplifying reconciliation for drivers," the press release said.

Movements

APAC ROLE FOR KIRAN BHAGWANANI

NTT Ltd has announced the appointment of Kiran Bhagwanani as the Senior Vice President of the Go-to-Market (GTM) business for the Asia Pacific. Bhagwanani, who presently serves as the company's India CEO, will be responsible for driving sales performance, solution practices, and alliance partnerships across the Asia Pacific, the company stated. He will continue to lead the India business during the current financial year, with support of a new India CEO reporting to him.

JAMIE MILLER IN QUALCOMM BOARD

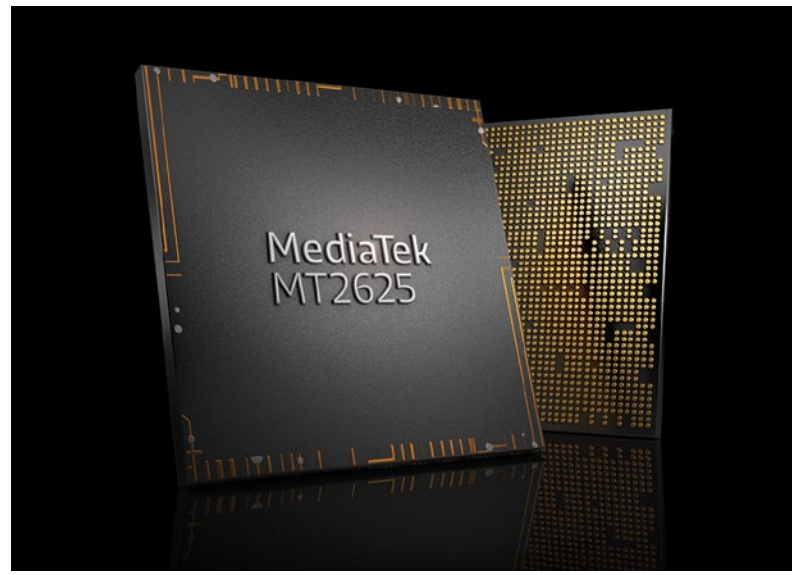
The Board of Directors of Qualcomm Incorporated has appointed Jamie S Miller to the company Board. Miller will serve on the audit committee and her term as a member will continues until Qualcomm's annual meeting of stockholders in 2021. Miller served as Senior Vice President and Chief Financial Officer of GE from November 2017 to February 2020 and was responsible for leading its overall financial activities and the global finance organization.

NOKIA ELEVATES RAGHAV SAHGAL

Finland-based Nokia has appointed Raghav Sahgal as the president of its Nokia Enterprise and a member of the Nokia Group Leadership Team. He will take over from Kathrin Buvac who has decided to leave the company at the end of May. Sahgal, who is presently serving as the Senior Vice President of Nokia Software responsible for global sales and market services, will assume his new position on 1 June 2020. He had joined Nokia in April 2017 from NICE Systems, where he served as the president of the Asia Pacific and the Middle East regions.

MediaTek's NB-IoT chip validated for LwM2M over NIDD

Taiwan-based MediaTek has announced that its MT2625 Narrowband IoT (NB-IoT) chip has been validated for LwM2M over NIDD on SoftBankCorp's cellular network across Japan. This achievement marks the first global commercial readiness of LwM2M over NIDD; a secure, ultra-efficient IoT communications technique that is being adopted by operators worldwide. The benefits of LwM2M over NIDD include security improvements, cost-efficient scalability and reduced power consumption.



LwM2M standard is widely used in Asia, Europe and the United States by major operators, with NIDD (Non-IP Data Delivery) providing a highly data- and power-efficient communications protocol and an additional layer of security through pre-defined routing.

IoT (mMTC) is driving over 50% of 5G use cases through devices such as smart meters, smoke detectors, logistics trackers, home appliances, smart city applications and much more. NB-IoT plays an important role in the IoT ecosystem, by connecting a wide range of data-efficient IoT devices. "MediaTek is enabling the 5G IoT revolution that will connect billions of devices with its MT2625 chip, which offers leading NB-IoT capabilities and global operator support," the company stated in a press release.

Qualcomm, Fujitsu complete data call with 5G carrier aggregation

Qualcomm Technologies and Fujitsu Limited have achieved 5G NR data call with multi-gigabit connection using 5G sub-6 GHz carrier aggregation. The connection was established using non-standalone architecture, aggregating non-contiguous spectrum on 3.5 GHz (n78) and 4.9 GHz (n79) bands. The companies achieved this milestone utilizing a Fujitsu 5G New Radio (NR) base station and a 5G smartphone form factor test device powered by a Qualcomm Snapdragon X55 5G Modem-RF System.

"Achieving more than 3 Gbps speeds using sub-6 GHz spectrum, this connection is the companies' first demonstration of 5G carrier aggregation, which builds upon our history of technical successes like the first 5G data connection on a modem chipset, 5G mmWave over-the-air call, 5G data call over-the-air using spectrum sharing and the recent Voice-over-NR call," a Qualcomm press release stated.

As more operators enable support for 5G carrier aggregation, they will be able to rely on the Snapdragon 5G Modem-RF Systems and Fujitsu's network infrastructure solutions to improve network capacity and performance by taking advantage of non-contiguous spectrum assets. Carrier aggregation is an important feature in the evolution of 5G networks to enhance system capacity, boost reliability in weak signal conditions, and deliver higher peak speeds - improving user experiences in existing applications and enabling new use cases in the future. Commercial devices featuring carrier aggregation capabilities and powered by the Snapdragon X55 5G Modem-RF System are expected to be available later this year, the company said.

Mobile-first today!

The pandemic has demonstrated the role of telecommunication in an economy and going ahead "mobile first" will dominate organization's growth strategy

Pradeep Chakraborty

We are now in the third month of the lockdown. Things are changing every day, and will probably continue to do so in the months ahead.

However, that has not stopped telecom from growing, has it? All the telecom networks across the world have literally become the lifeline of enterprises and industries.

As Börje Ekholm, CEO, Ericsson, recently said: the Coronavirus crisis clearly demonstrates how important our technology is. Information and communication are the vital ingredients when handling a crisis. These need connectivity. Today, many technologies are being developed as 'mobile first'. We are right in the middle of a technological switch between 4G and 5G, which will have a huge impact.

Manufacturing will get automated and logistics optimized. Health services will be altered as they gain access to sensors, and so on. In fact, COVID-19 seems to have accelerated the Industry 4.0 adoption elsewhere. Perhaps, there will be greater use of AI and ML to re-assess and re-plan activities. Mobile, AR/VR will help workers to perform tasks better. There could be more use of AGVs, drones and autonomous electric vehicles. Many new applications will also emerge in the future. Most of them will be in areas still unimaginable to us today.

COVID-19 has accelerated digitalization of many businesses and services, access to healthcare, education and essential goods and services.

The International Telecommunication Union (ITU), states that the unprecedented COVID-19 crisis has accelerated the digitalization of many businesses and services, including teleworking and video conferencing systems in and out of the workplace, access to healthcare, education and essential goods and services. The resilience of the networks and the people has been extraordinary.

On May 8, the ITU and the Broadband Foundation jointly launched a project to assist countries in South Eastern

Europe to map broadband infrastructure and services to help countries advance their digital transformation.

The project will help advance the digital transition of the Western Balkans into a digital economy to bring the benefits of digital transformation to all. Beneficiary countries of the project are Serbia, Montenegro, North Macedonia, Albania, Bosnia and Herzegovina, Moldova, Georgia and Ukraine.

All of this is great news!

In India, Airtel, Jio, and Vodafone, the COAI and several others, are favouring a floor on data tariffs, to TRAI. However, Niti Aayog and the Competition Commission of India (CCI) have opposed a floor price. They feel that the price control should be a last resort. Now, this is not great news!

It will certainly be good for everyone to remember that telecom has been the one industry sector that bailed out literally, everyone, in these tough times. Imagine, what would it have been like, had the pandemic struck 15-20 years ago? Some have mentioned even 1990s. In today's times, everyone is so much reliant on data, and well, voice!

We have all moved to a new world of mobile-first today. Even the not-so-able people have been literally forced to move on to the mobile! One example: these small kirana shops spread across the various localities in India—many have now placed their app on the mobile, with a simple message: please order from us. We will come and deliver.

Telecom has been the one industry that bailed out literally, everyone, in these tough times. Imagine, what would it have been like, had the pandemic struck 15-20 years ago?

Lastly, I was passing by the metro station on the way to the market, the other day. I overheard a conversation where a couple of men were discussing what they can do with their mobile phones. Brilliant! We will need much stronger and resilient telecom networks in the future, as we all move toward the future!

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