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# IT NEXT

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## THE NEW INDUSTRIAL **EDGE**

Why the manufacturing industry is definitively  
embracing edge computing...



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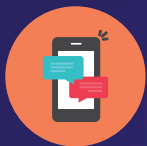
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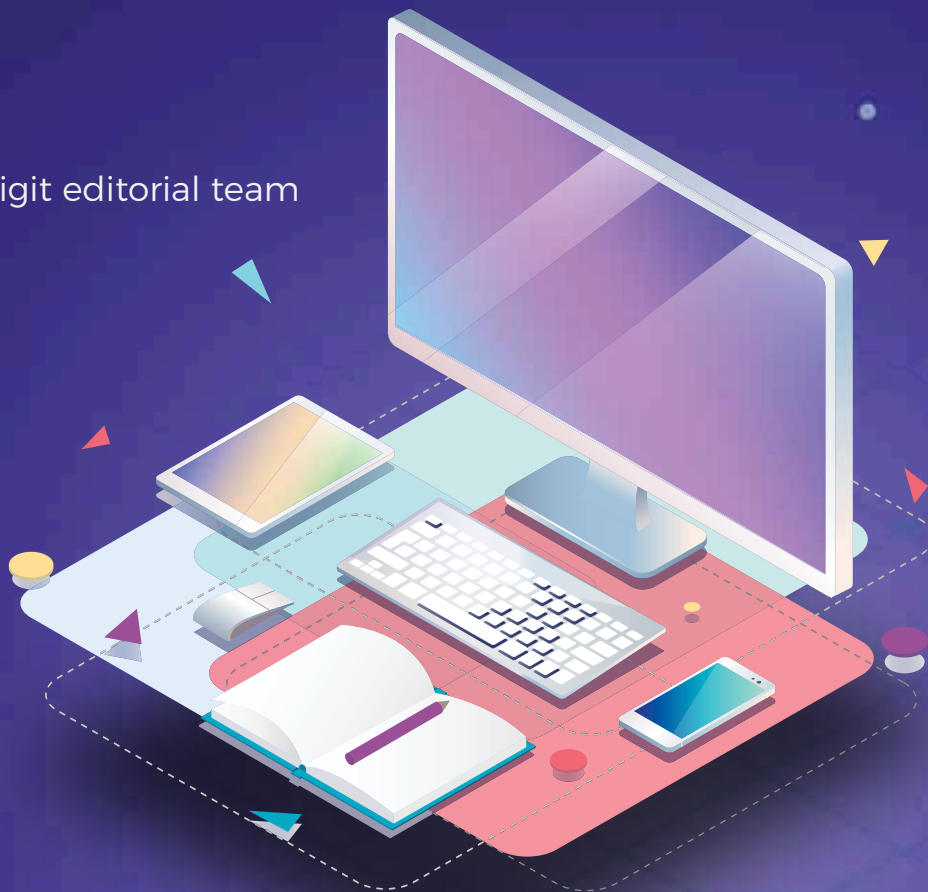


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# Why Industry 4.0 now seems an imminent possibility...



The pandemic has not just convinced the manufacturing industry to digitize faster, it has also made the manufacturing OEMs—whose slowness in changing has often been cited as a major roadblock for manufacturing digitization—realize that they have no other way but to change

**Shyamanuja Das**

Industry 4.0 has been a buzzword for the last 4-5 years. While the top management has been enthusiastic about the idea, there are stark ground realities that have prevented companies from transforming to what can be called true Industry 4.0 practices. There have been issues. And there have been gaps.

Finally, it seems things are falling in place. I think there are four foundational technology components that have come together to make the Industry 4.0 dream a reality.

The first pillar is sensor technologies—read IoT—which many erroneously consider as synonymous with Industry 4.0. Many organizations invested in IoT in a piecemeal manner and have managed to automate some operational sub-functions through that. But as many of them have realized, Industry 4.0 still remains a distant dream.

The second foundational component is Artificial Intelligence and Machine Learning. This could be called a truly transformational force. There are compelling use cases, from specific ones like quality improvements and plant safety to comprehensive applications like smart factories that have convinced the manufacturing system owners—not just top management and CIOs—to embrace digitization in a big way.

While the above two components—IoT and AI—have transformational potential, organizations have not been able to realize their true value because of the lack of underlying infrastructure—right computing and connectivity technologies.

One of those enabling technologies is edge computing—the topic for this issue's cover story—which has enthused the operational technology owners while presenting a feasible technology model to turn many of the possibilities presented by AI into reality. That is the third foundational component of the Industry 4.0 journey.

The fourth and final foundational technology pillar is 5G. 5G is a disrupting technology that completes the foundation needed to build Industry 4.0. Its ability to handle large volume of data at high speed and its reach—which is a major factor for manufacturing industries whose factories are often in remote locations—makes it an extremely useful component.

In addition to the four foundational technologies, one factor that has acted as catalyst for accelerating the Industry 4.0 journey is the pandemic. It has not just convinced the manufacturing industry to digitize faster, it has also made the manufacturing OEMs—whose slowness in changing has often been cited as a major roadblock for manufacturing digitization—realize that they have no other way but to change.

With all the blocks in place, it is now time to see how fast we can see Industry 4.0 practices being adopted in India. ■

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Why the manufacturing industry is definitively embracing edge computing...



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# IT NEXT

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*Travelling makes one modest and humble and changes the perception of the world*

saw me watching them and asked if I wanted to play with them. I immediately said yes and started playing with them and we left the ground after just playing few minutes. I don't remember how I played but I still remember the praise from my father. Even today, in this busy schedule, I take out time to play cricket and try to keep my passion alive. Playing cricket makes me healthy, fit and a stronger person. It makes me feel confident and teaches me balance, coordination and team skill.

Traveling is another passion for me. When I get stuck in a consistent routine, I get an itch to pack up my bags and go somewhere spontaneously. Whether it's by car or plane or bike, there isn't anything more exciting than traveling to make new experiences and memories that'll last forever.

Meeting people from all over the world is the most rewarding part about traveling. The conversations build knowledge and lead to bigger opportunities. Networking is becoming a powerful tool and communication is valuable for travellers craving new experiences.

The taste of an authentic dish from a different part of the world is both scary and exhilarating. For me, I enjoy tasting unique food and some of the best meals I've had have been from places I typically, would not consider. Traveling takes me out of my comfort zone and allows me to communicate to natives with different religious beliefs, cultures and ethnicities.

I've become a better person because of traveling. I've grown to appreciate where I come from because my home is what makes me who I am today. ■

**As told to Dipanjan Mitra, Team ITNEXT**

## Cricket Crazy And A Travel Freak

NEXT100 2019 Winner **Pankaj Mukne**, Manager - IT, Shree Cement shares his immense passion for cricket and traveling...

I have loved cricket since early childhood. There would be hardly any person in the world who doesn't know cricket. Generally, most kids grow parallelly while playing cricket. Same case is with me.

When I was 8 years old, my father used to bring me home from school by cycle. There was a ground on the way where kids older than me used to play cricket and I would see them every day. Papa



**Pankaj Mukne**

Pankaj Mukne is Manager - IT at Shree Cement. He has been a NEXT100 winner in 2019. Earlier, he was associated with Wipro. Mukne completed his BE in Electrical,

### Snapshot

Electronics & Communications Engineering from Anuraddha Engineering College. He is also an Oracle Certified Professional (OCP).



# The Beauty Of Cycling

NEXT100 Winner 2019 **Swaand Dhekane**, Project Manager, TietoEVRY, Cloud Infra, India shares his immense passion for cycling and how it helps him both professionally and personally in Life...

*"A bicycle ride around the world begins with a single pedal stroke"*  
– **Scott Stoll**

*"It is by riding a bicycle that you learn the contours of a country best, since you have to sweat up the hills and coast down them"*  
– **Ernest Hemingway**



## Swaand Dhekane

Swaand Dhekane is Project Manager at TietoEVRY, Cloud Infra, India. He has been a NEXT100 winner in 2019. Earlier, he was associated with IBM India, Mphasis, Tata Communications, etc. Dhekane

*Cycling is not rocket science but it gives the cyclist immense pleasure and satisfaction*

For a human being, quality of life he lived is majored by the passion he/she has lived for & died for. This is besides earning his/her daily livelihood. It can be reading a book, playing music, planting a tree or cooking with your son/daughter on a lazy afternoon. This is, of course away from gadgets & social media.

My passion starts by getting away from the crowd early morning and getting inside inner space. It is cycling across the places solo or in a group. Cycling is not a rocket science but I like it as many others. My passion for cycling started in 2012 when I started paddling with couple of my friends in and around Pune. I shifted to Bengaluru for a short 6-month assignment in HP. I packed my luggage and my favorite companion, that is, my cycle, as well.

I rode and still ride my cycle across Bengaluru, daily to office to avoid traffic police and even on weekends to explore the nature.

Now this passion is roped into my DNA and did many rides in and around Pune. Cycling involves countless moments of achievements, joy, and fear & I passionately experience every bit of it.

Currently, I'm part of a core group of 10+ cyclists and connected with more than 100 cyclists in Pune city itself. The COVID-19 pandemic gave us the opportunity to connect with people over virtual platforms via Zoom/Teams/Meet calls for fitness, nutrition, children's health and guess what, cycling maintenance sessions too!

I believe cycle is the machine where a passenger himself/herself becomes the engine. This passion of mine has truly helped me both professionally and personally. It provides just the kind of positive energy I need to kickstart my day and even close out a tiring day/week. It truly pumps the right adrenaline and provides the perfect boost that you need in Life. So, my advice and wish for you all will be: Let us meet on the roads on bicycles! ■

**As told to Dipanjan Mitra, Team ITNEXT**

## Snapshot

completed his BE in Electronics & Telecommunication from Sinhgad College of Engineering. He is also a Project Management Professional (PMP) from Project Management Institute (PMI).



# THE NEW INDUSTRIAL **EDGE**

Why the manufacturing industry is definitively embracing edge computing...

By Shyamanuja Das





It was in 2011 that the term, Industry 4.0, was first used in Germany. A year after, Germany—a global leader in manufacturing—created a working group, which presented a set of recommendations to the federal government on Industry 4.0.

However, the idea became popular worldwide, when, in 2016, the World Economic Forum (WEF), chose Mastering the Fourth Industrial Revolution the theme for its annual meeting. It was not just another annual theme for the organization. WEF Chairman and Founder, Klaus Schwab, actively evangelized the idea and has since written a book on it, explaining its concept and impact.

In essence, Industry 4.0, as a concept aims for seamless fusion of the digital and physical—and is very often explicitly identified with the use of sensory technologies like IoT in industrial operations.

Many describe it as the digital transformation of the industrial sector—which includes manufacturing, mining, oil & gas, heavy construction among others—which not long back lagged the services industry in terms of digitization. Though point automations existed, use of IoT and the (desired) coming together of Information Technology (IT) and Operational Technology (OT) promised a whole new paradigm—of smart, self-maintaining manufacturing operations.

## The beginning

After the WEF evangelized it, Industry 4.0 became a buzzword for manufacturing CEOs globally. The interest led to small experimentations. But the ground conditions were not yet conducive. As always with such cases, the term was abused, with any automation exercise being labeled Industry 4.0 initiatives.

It was still a promised land.

Yet, all that hype had its positive effects.

One, a few companies took it seriously and

started experimenting. Some of those worked and some did not. The few that worked created more hype.

Two, many manufacturing, oil & gas, construction companies started deploying IoT sensors, if not for anything else, just to show the top bosses that something was happening (well, that is a bit harsh view, but not entirely untrue). But even those limited deployment showed tremendous impact in some cases, creating a positive halo around the concept in an otherwise skeptical and conservative sector.

The biggest thing it did was that it converted the CEOs from digital-open to digital-converts. It was no more the CIOs who were talking of digitization—and were being rebuffed by the manufacturing operations people. It was the CEO who dreamt digital.

That was quite a change. It was the same change cloud brought in enterprise IT—CFOs (and in a few cases CEOs) were asking for it.

Technology companies, with their allies, the CIOs, grabbed the opportunity to turn the conversation into a use-case conversation. Once it became use-case conversation, talking to the business users—read manufacturing operations managers—became much easier. While the conversation with the CEO was still the topline, bottom line and digital transformation, the discussion with the plant managers was around their challenges and how Industry 4.0 would solve those problems comprehensively.

Be in no doubt. We are talking about the conversation. The real implementation was still some time away, thanks to the proprietary OEM equipment being used in manufacturing. These OEMs were slow to change. And suddenly, security—as manifested by the now famous IT-OT integration issue—became the central talking point.

But at least, the conversation had moved from concept to implementation stage—no matter how challenging the situation was.



**While the issue before the IT and information security professionals are vulnerabilities in the older OEM equipment, the concerns of manufacturing professionals has been around their protected, 'safe' closed manufacturing systems being exposed to external threat that is so common in the IT world.**

## Pandemic as the game changer

Last one and half years changed everything. The pandemic struck at a scale never seen before. And as widely acknowledged now, it has had a positive impact on digitization all across – in our personal lives, governance, public services and businesses.

Manufacturing industry was no exception. Unlike services industries, it was not possible to shift lock, stock, barrel to remote working. So, some quick, tactical digitization happened. Supply chain in general and approvals in particular saw quick digitization in many organizations.

But the more important—though subtle—impact was somewhere else. The pandemic forced the senior executives in manufacturing businesses, some of whom depended on their secre-

taries to check their e-mails, to use collaborative tools, if nothing else, to keep the business running. And soon they discovered, digital was not such a tough thing, after all.

While the now common joke—neither CIO nor CEO but COVID was the biggest driver of digital transformation—has a real basis, some CXOs became 'digital savvy' (a senior CFO's own word) overnight.

In India, many top executives in the manufacturing industry looked at China with awe when many plants started operating in an almost unmanned fashion, thanks to years of automation. These workerless factories forced many CXOs in manufacturing companies to realize—and guess what admit—that there is no alternative to Industry 4.0.

Another interesting parallel development happened. Industrial equipment suppliers—Original Equipment Manufacturers or OEMs, as they are commonly called—too realized that they can no longer lag behind. Some of them launched new initiatives and even acquired companies to provide digital solutions for their clients, the industrial sector.

## The technology conundrum

Before we get into what is happening—and why and how it is happening—we have to have a little flashback.

The effort to make IT and OT talk to each other is not new. Businesses, in order to collect data from manufacturing systems for analysis for long-term business decisions, have been trying to make the data flow smoother. But despite all efforts, the effort did not make much headway and the issue is still, to a great extent, unresolved. Ask any manufacturing CIO anything about digital transformation and the discussion will invariably get into IT-OT integration. Security professionals are even more vocal about it, citing the vulnerabilities that these proprietary OEM equipment have.

Interestingly, the concern about security is also echoed by the manufacturing professionals. As Santayana famously said, when men and women agree, it is only in the conclusions. Their reasons are always different.

While the issue before the IT and information security professionals are vulnerabilities in the older OEM equipment—some of them still running on Windows XP—the concerns of manufacturing professionals has been around their protected, 'safe' closed manufacturing systems being

exposed to external threat that is so common in the IT world, or as security experts would put it, widening the attack surface. Many industries that are marked as critical infrastructure by the government are even more cautious.

Ironically, both the camps are right. But the time is more on IT's side, as a decision not to make IT-OT talk, means no change to status quo. That is not the preferred path in a competitive business environment.

But all through, these arguments to change were always put forward from the business side, with the CIO being seen as the champion. There was very little for the manufacturing professionals, those managing OT. All they were hearing is to go after their OEMs pushing the latter to change and adapt faster.

To some extent, the pandemic had some impact on that, as the vendors accelerated their digital strategies.

Also, the low hanging fruits – digitization of warehouse/inventory, logistics, security – which were taken up convinced them (the OT owners) the definite advantages.

The IT suppliers too figured out that they have to address the needs and concerns of the manufacturing systems owners and show them the benefits of digitization—in a manner that would appeal to them.

## Enter the edge

It is then that the IT industry turned to the new

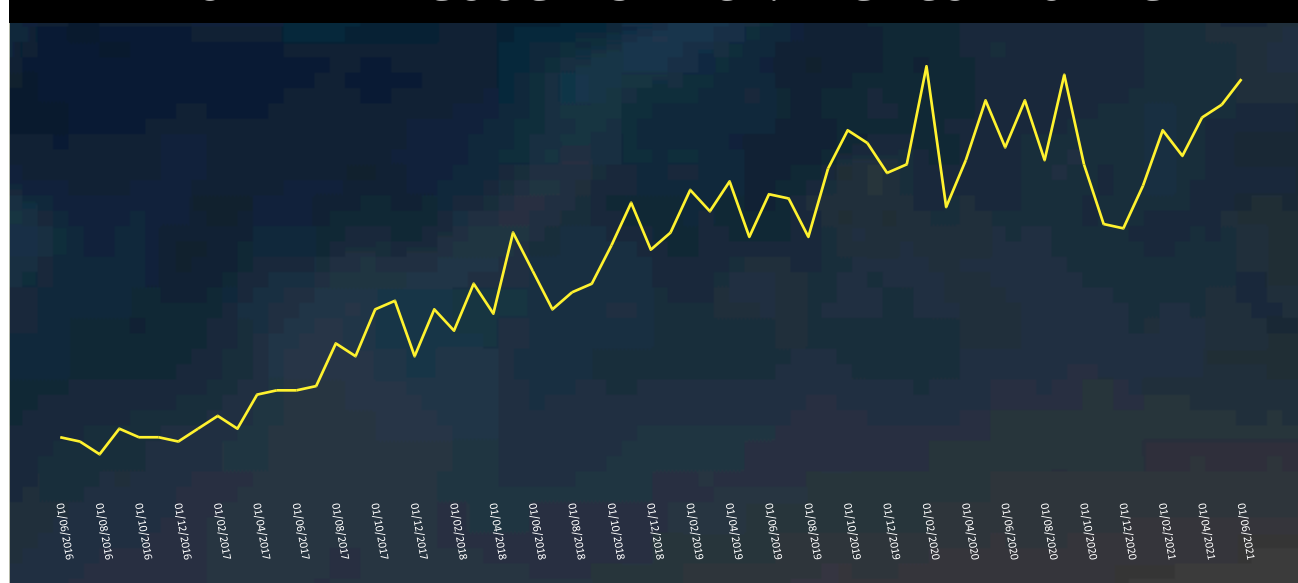
mantra in technology deployment—find use cases. This search for use cases—many of which we will discuss here—threw up a technology that was there, but not yet 'there'— meaning it is nothing new as a concept but quite overshadowed by the dominant cloud model which has been ruling the enterprise tech zeitgeist.

That technology is edge computing—a term used for use of computing and storage in close geographic proximity to the place where data is generated, so as to enable the processing faster, especially if the processed data has to be used in that location itself for taking an operational decision. It can enable fast data processing and reduces the need to transfer large amounts of data across the network.

It is called edge, because in terms of traditional network where centralization of data storage and processing is the norm, this computing resource is located at the periphery or edge of the network. While telecom operators, data center service providers, cloud providers and enterprises all have their definition of the edge, from their operation's perspectives, in this article, we will refer to 'edge' as the enterprise edge—that is wherever the computing resources are located close to where data is generated within the enterprise. Wherever there would be any reference to service providers' edge, we will explicitly mention that.

In manufacturing industries, which is the focus of the current discussion, the data capture devices such as IoT sensors are also often called edge devices. But by saying only 'edge', we will

## WORLDWIDE GOOGLE SEARCH: EDGE COMPUTING







**The new automation model consists of data collection by sensors often with an aim to use (of course, after processing and analyzing) that data in near real-time. This necessitates the need for analyzing the data geographically close to the place where it is generated. This is fundamentally because of two reasons – large volume of that data and the need to quickly analyze that data.**

refer to edge computing - that is distributed computing and storage resources in the premises of the enterprise (in this case mostly, manufacturing) campuses.

According to Gartner, by 2025, 75% of all enterprise-generated data will be created and processed outside a traditional centralized data center or cloud—up from just 10% in 2018. Gartner defines edge computing as solutions that facilitate data processing at or near the source of data generation. In the manufacturing with IoT sensors, the sources of data generation are usually things with sensors or embedded devices. It further says by 2023, 50% of large enterprises will have a documented edge computing strategy, compared to less than 5% in 2020.

## Why edge matters in manufacturing

Edge computing is not a new concept. It is geographically distributed computing by another name. The renewed interest in edge computing in the last few years is because of the new automated model that is the foundation of Industry 4.0, though its application in other areas—especially in public services as in smart cities—too is significant.

This new automation model consists of data collection by sensors often with an aim to use (of course, after processing and analyzing) that data in near real-time.

This necessitates the need for analyzing the data geographically close to the place where it is generated. This is fundamentally because of two reasons – large volume of that data (much higher than any human generated data) and the need to quickly analyze that data. Both these compel technology managers look for a model that minimizes bringing data back and forth.

That model is edge computing.

Why edge computing has become such an important technology for transformation to Industry 4.0 becomes clearer when one looks at the fundamental components of Industry 4.0.

There are five broad areas of Industry 4.0 application:

- Sensor technologies for data collection
- Higher levels of automation such as deployment of robots
- Analytics, AI/ML for operational decision making
- New ways of human-machine interaction such as augmented reality and virtual reality
- Advanced engineering such as 3D printing, better material testing, quality improvement, energy efficiency and optimization of engineering design such as cost analysis and planning

Edge computing facilitates all these. It makes it possible to do near real-time analysis effectively by minimizing on the time and volume of data transmitted in long distances and doing most, if not all analysis, at the plant site.

In more specific terms, the drivers of edge computing in manufacturing include:

- **Need for real-time analysis.** Very often operational decisions such as those on production and maintenance have to be taken for efficiency, productivity, better production quality and even plant safety. Time is of essence and transferring large amount of data to distant centralized data centers or the cloud may not be the best way to do it.
- **Need for low latency applications.** While most

operational decisions do have some time sensitivity, some of them are really critical. A little delay may result in huge downside. Such applications like, say visual analytics for safety and security, may not even be feasible by relying on a distant computing and storage infrastructure, considering the physical limitations of the currently available transmission speed.

- **Better security.** Sending data over long distance potentially exposes it to security threats. But more than that, what manufacturing system owners are worried about is direct connectivity of manufacturing systems to the outside world. It is especially true in sectors having critical infrastructure, such as oil & gas, ports, and power. More connectivity with the outside world—especially for core manufacturing systems—increases the threat surface significantly.
- **Lack of connectivity.** A peculiar problem for manufacturing, especially in India, is the location of manufacturing plants in remote areas – places close to availability of raw materials, coal and cheaper labor. Many of these places lack basic connectivity. So, sending data in near real-time may not even be possible, let alone other issues like time sensitivity and security.
- **Reduction in volume of data transmission.** Even if some places have basic data connectivity available, the large volume of data that need to be generated to be able to analyze that in near real-time may not be feasible considering the quality and cost of connectivity.

It is no surprise that experts see manufacturing sector being a big user of edge (in conjunction with 5G, more about that later) technology. According to KPMG, by 2023, five industries will spend more than USD 500 billion on what it calls 5G+Edge ecosystem. Out of that, USD 206.4 billion or some 40% will be spent by industrial manufacturing sector.

## Why now?

We have discussed what prevented the manufacturing companies from going all out for digitization. The crux of the problem—if it can be said so—was the force of digitization, despite the CEOs' digital conversion was not strong enough to defy the force of gravity. It was not enough to address the challenges perceived by the people who own manufacturing system and thus in charge of operational technology.

So, what changed in the last couple of years that now makes it seem the Industry 4.0 dream is for real?

## AI as the driver

Well, the German computer scientist, Wolfgang Wahlster, who is credited with coining the term Industry 4.0, is actually an AI expert. But AI itself was never mature enough to be put into application in areas that require analysis of a lot of critical, real-time dynamic data, in various areas like visual analytics. That has changed.

And the technology industry did good enough to create compelling use cases to show the manufacturing system owners what is possible. Look at the use cases listed in the box. Most of them would not be possible without advanced analytics and AI.

While the promise of better security may have lured manufacturing professionals to edge computing, what has made it possible is the promise—and demonstration—of what is possible using AI.



**A peculiar problem for manufacturing, especially in India, is the location of manufacturing plants in remote areas – places close to availability of raw materials, coal and cheaper labor. Many of these places lack basic connectivity. So, sending data in near real-time may not even be possible, let alone other issues like time sensitivity and security.**

# USE CASES OF EDGE COMPUTING IN MANUFACTURING PLANTS

## Predictive maintenance

Manufacturers can rely on predictive maintenance techniques to detect anomalous behavior in plant equipment before those problems turn into system-critical failures, thus allowing maintenance to be scheduled before the equipment actually breaks down. This dramatically increases equipment uptime and reduces maintenance costs. This also helps in optimizing inventory of spare part. For predictive maintenance, data has to be collected continuously and processed using computing infrastructure. The volume of data is so huge that it is not just uneconomical to carry it over a long-distance, it may also choke the central servers, thus impacting overall performance. They are hence a better candidate for edge processing.

## Condition monitoring

Condition monitoring is the first step to predictive maintenance. It facilitates insights into the actual state of devices, with help of sensors. Since plants have disparate proprietary infrastructure, just extracting data from them is a challenge. And since only a small percentage of this data would be used by, say a particular OEM supplier, for a particular purpose, carrying it all the way to a centralized data center or cloud may not be a very feasible idea. Edge computing best fits this requirement.

## Smart manufacturing

Smart factories which China has invested heavily in not just increases the efficiency of the operations, the processes are more accurate, and it can be run continuously. This requires each and every data point from the manufacturing system is continuously captured, analyzed and operational decisions are taken in real-time. This is almost unviable without computing resources close to the plant, this requires both high volume data handling and also needs low latency.

## Plant safety/Worker safety

Continuously monitoring physical safety of plants and workers require a lot of continuous video capturing and near real-time analysis. This requires highly

low latency IT computing and storage infrastructure which edge computing can provide.

## On-demand manufacturing/ manufacturing flexibility

While plants look for economy of scale, in today's fluctuating demand situations, they need flexibility to manufacture on demand. It can be both in terms of a plant set-up time (as we saw the demand in case of COVID vaccines) or even building flexibility in existing plants.

This requires cloud like availability and flexibility of IT infrastructure but with low latency. Edge computing and 5G, when combined, can give this, as connectivity does not take time. This may be an area the existing cloud provider will target with large manufacturing customers giving them the desired and flexible mix of central cloud servers and managed edge servers in partnership with telcos.

## AR/VR in the manufacturing plant

Augmented reality and virtual reality can be very effective in training workers by simulating, providing help on manual repair and maintenance processes, as well as ensuring their safety by providing them real time safety information. These are highly low-latency applications and edge will play a significant role.

## Product quality

One of the hottest applications of AI in certain industries like chemical, pharma and many other discreet manufacturing industries is to predict batch quality and analyzing golden batches to continuously improve quality of output. This too requires huge volumes of data being analyzed, which can best be done through edge computing.

## Asset tracking

Asset tracking also requires continuous data collection and analysis. Edge computing and 5G can be effectively used to improve asset tracking and asset utilization dramatically, including that of mobile assets.



## 5G as the enabler

5G is not here yet. And manufacturing organizations have started testing newer Industry 4.0 application using edge computing and storage. But most of these have been point applications are often glorified pilots.

But any large manufacturing company—typically conglomerates in India—that is seriously formulating an edge computing strategy has 5G built into that.

A word of caution, though. Though ultimately, they will figure out what works best for them and what works, today, there is a confusion regarding what edge is among many technology managers in manufacturing company. The enterprise definition of edge, the telco's definition of edge and the data center/cloud service providers' promise of edge are all different ideas.

As clarified above, throughout the story, we have taken edge as enterprise edge – where the computing and storage is located close to, typically inside the manufacturing campuses. Telcos and technology vendors play a significant role in it. And one will not be surprised if smart data center service providers get into that game too. But the 'edge' should always be relative to the enterprise's core – or central IT infrastructure, be it on-premises/collocated data centers or public cloud.

How does 5G help? Simply speaking, being an end-to-end IP network with high-speed radio at the core, it helps a manufacturing enterprise connect its plant machinery, especially the moving assets, to the computing and storage resources in the campus. This 5G network could be owned and operated by large manufacturing companies themselves or by external operators in a virtual captive mode or using public telco's 5G. 5G will also make it possible to take high speed long haul to manufacturing sites, where taking fiber was not feasible, both in terms of cost of laying and maintenance.

Being a wireless technology, some of the assets which are movable and which are forced to be static but can provide more flexibility as movable assets could be connected using it.

We may see a huge uptake in edge computing once 5G becomes available. The telcos will surely play a major role.

## Pandemic as the accelerator

As discussed in the beginning, the pandemic demonstrated the value of digital to all in the

organizations, across sectors. So, some inhibitions are diluted. But the most visible change is that if forced the manufacturing OEMs to change finally. Many large OEMs have already undertaken branded programs to accelerate digitization and modernization of their equipment. This change in mindset, accompanied by some efforts towards standardization and interoperability, will accelerate the move.

## Technology companies as the facilitator

Technology companies have to play—and they have done that to some extent—two roles.

First, they have to help the CIO in convincing the OT owner, which they have been doing using use cases and creating solutions for specific applications. HPE's focus on Aruba line of products, is a case in point. Aruba products are things that operational people can relate to far better than the traditional IT stuff like storage, computing and networking, which CIOs are comfortable.

Second, many technology equipment companies, including the likes of HPE, Dell, and IBM, now realize that this is their best opportunity to get back to the market, which they were losing to cloud providers. For that, they also have to convince the CIOs, who are getting too cozy with public cloud, because it gives them easier manageability, variable cost, seamless technology upgradation. Top vendors now promise the same with their equipment, which they are more than eager to lease, manage and of course, upgrade as in cloud—while appealing to the operational technology owners through their 'better security' pitch. This model, now branded by many vendors, is a serious and aggressive offering.

The cloud service providers and the data center service providers have not given up yet. While the hyperscalers are trying to partner telcos—as we have seen in case of AWS and Verizon—the

local service providers see this as an opportunity to get back to the game. Many are promising edge data centers as their differentiators, which hyperscalers would find difficult to provide. In India, the Central Government's Data Center Policy too encourages this model of edge data centers at various locations.

Edge computing, combined with 5G, may finally make the Industry 4.0 dream getting realized. Globally, manufacturing companies are definitively tilting towards edge computing. It seems India is now ready for the game. ■



# Personal Data Protection Bill: Did The Wait Just Get A Little Longer?

With the chairperson of the committee joining the ministry, there are concerns about the new bill getting delayed

By Shyamanuja Das

Four years after India's official action began towards creating a privacy regulation in India, the nation is still waiting for this elusive piece of legislation. The latest twist in the tale is that the chairperson and four members

of the joint parliamentary committee have been absorbed as ministers in the Central Cabinet, creating five more vacancies in this committee of 30 – and raising the total vacancy to seven.

However, what has created the gap is not the number of vacant positions,

but the fact that the chairperson position has become vacant with Meenakshi Lekhi joining the ministry as MoS for Culture and External Affairs.

## The Journey

The journey for a personal data pro-

tection regime or privacy regime, as it is often labeled, began in July 2017, with the constitution of an experts committee under the Chairmanship of Justice B N Srikrishna, former judge of Supreme Court of India, to identify key data protection issues in India and to 'make specific suggestions for consideration of the Central Government on principles to be considered for data protection in India and suggest a draft data protection bill.'

Barely a month after that, Supreme Court, on 24 August 2017, ruled that right to privacy is a fundamental right.

"The right to privacy is protected as an intrinsic part of the right to life and personal liberty under Article 21 and as a part of the freedoms guaranteed by Part III of the Constitution," the bench ruled in its order while over-ruling two earlier decisions by the apex court. The government had argued against privacy being a fundamental right.

### **This decision really accelerated the journey.**

The expert committee published a whitepaper on data protection issues in December 2017, in just four months of it being constituted. The government released the whitepaper, inviting public comments on the issues. Based on the consultation, the committee submitted its report and a draft data protection bill in July 2018—exactly a year after the SC judgment—and invited comments on it within two months.

The Indian draft data protection bill caught global attention because of a few reasons. One, it insisted on all organizations dealing with personal data of Indians to have one copy of that data within the shores of India, which created a lot of furore. Two, unlike the GDPR and UK Data Protection Act, the Indian draft bill was comparatively softer on government agencies when it comes to the rights of data owners, as compared to private organizations.

Due to General Elections, tabling of the Bill was delayed. After the General

## **While the earlier draft required that a copy of all personal data to be stored in India, the new bill restricted it only to sensitive and critical personal data**

Elections in 2019, the Government did some changes in the version submitted by Srikrishna Committee, which drew further criticism from many activists.

In the first week of December 2019, the Union Cabinet has cleared the bill, and the new bill was introduced in Lok Sabha on 11 December 2019. The new bill, by that time called Data Protection Bill 2019 brought about some significant changes.

One, it extended the obligations of significant data fiduciaries to what it called social media intermediaries. The Bill defined a social media intermediary as 'an intermediary who primarily or solely enables online interaction between two or more users and allows them to create, upload, share, disseminate, modify or access information using its services' while specifically excluding e-commerce companies, ISPs, on-line storage service providers, online encyclopedias, and search engine operators. In short, while Facebook, Twitter, LinkedIn could come in its definition, Wikipedia, Amazon and Google would not. It further clarified that such intermediaries are entities those 'whose actions have, or are likely to have a significant impact on electoral democracy, security of the State, public order or the sovereignty

and integrity of India.' It also talked about social media verification of accounts (even though voluntary), which were criticized by many.

Two, while the earlier draft bill submitted by Srikrishna Committee allowed access of personal data to the government for security purpose, based on principles of necessity and proportionality, the new bill stated that the Central Government may 'direct that all or any of the provisions of this Act shall not apply to any agency of the Government in respect of processing of such personal data'. The Srikrishna Committee draft was seen by many as giving too much concessions to government agencies. This took it a few steps further.

However, it diluted on data localization requirements mandated by the earlier draft bill. While the earlier draft required that a copy of all personal data to be stored in India, the new bill restricted it only to sensitive and critical personal data. It also added right to erasure, a major provision in most privacy legislations across the world, which was a good change.

While there were many other changes, what attracted a lot of criticism was the removal of the mandatory inclusion of a judicial member (the CJI or another Supreme Court judge) from the selection committee empowered to give recommendations to the Central Government for the appointment of members of the Data Protection Authority, reducing it to a panel of secretaries – Cabinet Secretary, Secretary Law and Secretary IT – thus handing it over to the government. What was questioned was how a body appointed solely by the Government would ensure enforcement of the provisions by the government agencies.

Amidst the discussion, the bill was referred to a Parliamentary committee set up for the purpose on 11 December 2019. The deadline for the committee was the first day of the last week of the Budget Session in 2020. Since then, the deadline has been extended four times.





## Lok Sabha Speaker Om Birla has said on the record that there would be no more extension of the deadline

### The Current Impasse

With the Chairperson joining the Central government, there has again been question mark on when the committee will submit its report.

Between January to December 2020, the Committee had had 66 sittings. After the initial briefing by the Ministry of Electronics and Information Technology, the committee has heard the oral evidence from the representatives of ministries and government agencies, regulators, associations, companies, law firms and other stakeholder groups.

Ministries of Electronics and Information Technology, Law & Justice, Home Affairs are among the min-

istries who have presented. Other government bodies and regulators who have presented include Unique Identification Authority of India, Reserve Bank of India, National Crime Record Bureau. Among associations, ASSOCHAM, NASSCOM have given oral evidence, while groups such as Dr APJ Abdul Kalam Centre, Forum for Integrated Security (FINS) have also presented. Among companies, Facebook, Twitter, Amazon, Google, Uber, Ola, Paytm, Jio Platforms, Reliance Jio Infocom, Bharti Airtel, and TrueCaller have presented oral evidence.

Between November and December last year, the committee had had 40 sittings to discuss and examine the bill

clause by clause. This means probably the time-taking work is over.

Yet, all these have to be summarized in a report and should be presented by the Chairman of the committee, the position for which is now vacant.

While that has created some disappointment, Lok Sabha Speaker Om Birla has said on the record that there would be no more extension for the committee, which raises some hopes.

Also, while talking about the need to refresh the IT Act (amidst the controversy with Twitter and WhatsApp) Meity Secretary Ajay Prakash Sawhney has publicly said that the immediate focus (and priority) is the Personal Data Protection Bill.

But till we see the bill getting passed, it is just another dream. As of now, the bill is caught up in the tarikh pe tarikh web, as Bollywood puts it.

Yet, with the provisions being largely clear, it is time for the organizations dealing with personal data to start taking the next steps. ■



# Managing And Protecting A Cloud-Native Future

As containers continue to grow in terms of both popularity and impact, businesses must ensure that they have the ability to protect and backup data across physical, virtual, cloud and Kubernetes environments

**By Michael Cade**

Cloud-native adoptions and the use of Kubernetes are on the rise. 451 Research notes that nearly three-quarters of organizations globally are currently using or planning to adopt Kubernetes within the next two years. Many businesses, particularly in industries such as financial services which produce and consume massive amounts of data, were already looking for ways to speed up development cycles before the pandemic. With so much business going online in 2020 and organizations looking to build or extend their digital offerings, this need is accentuated further still.

To understand why Kubernetes is experiencing such growth and what it means for businesses, we need to understand the pets versus cattle analogy that is so familiar to many

Vast amounts live on other farms, and we pay other people to look after them, even though it's still our responsibility if they get lost, stolen, or sick. In fact, nowadays it doesn't matter where they are and what they're being kept in. All we care about is what they produce – or returning to the world of technology – what they enable. This of course refers to the modern digital infrastructure, comprised of physical, virtual, and cloud workloads.

### Containerization accelerating DevOps

In recent years, we've added containers. Whereas VMs refer to hardware being run on multiple operating system (OS) instances, containers enable multiple workloads to run on a single operating OS instance. This makes them lighter, more agile, and faster to spin up than VMs, which run on

flexibility when it comes to balancing capacity against demand fluctuations, continuously adding value to applications, and the ability to run several applications running on different platforms simultaneously. Finally, Kubernetes strengthens the link between development, quality assurance and operations teams. DevOps is about facilitating collaboration and breaking down silos within these teams, uniting them to achieve a common goal: creating more value for the organization and its customers. Ultimately, this is the very essence of what Kubernetes can deliver to a business: the ability to deliver applications faster, at greater scale, and with greater accuracy.

DevOps at its very core describes a process of doing things in a cloud-native manner, so Kubernetes fits like a glove into the broader aim of any DevOps organization working towards a common goal. The potential benefits are beyond the imagination of many organizations. DevOps tapping into the automation and scalability that Kubernetes offer means faster development cycles. In layman's terms, businesses can upgrade, patch and refresh applications far more frequently than they could before. In financial services, for example, this is a key advantage. When bank branches across the world were forced to close in 2020, the vast majority were ready to service their customers digitally through online and mobile banking. This level of digital sophistication is partly due to the disruption of challenger banks which has taken place over the past decade as companies like Monzo and Revolut have forced the hands of the global powerhouses. A consequence of these events is that banking apps and services now need to be updated and improved on a monthly basis rather than a few times a year.

Moving forward, technologies such as AI and machine learning will further automate how we bank, making managing our personal finance, saving money, and keeping track of spending easier. This is something that cloud-native platforms and DevOps

## Kubernetes strengthens the link between development, quality assurance and operations teams. DevOps is about facilitating collaboration and breaking down silos within these teams...

in IT. At a fairly basic level, the idea is that some IT managers view the servers and systems within their organization's IT infrastructure as pets. They name them, care for them, and devote their working lives to keeping them happy, healthy, and alive. As organizations' IT provisions scaled up, their menagerie of three or four servers became 10-20 physical servers, perhaps a few virtual machines (VMs), and a couple of different clouds. What we now have is a herd of cattle rather than a few pets. Yes, we look after them, but as individual entities, they're replaceable.

If we wanted to continue this analogy, modern IT teams now manage something which is more akin to an industrial farming facility. We can't count or see all our animals anymore.

their own OS and have larger storage footprints. While ITDMs are not as engrossed as the speeds and feeds of their storage infrastructure, they are very focused on the performance of their application and their end users (internal or external).

This is where Kubernetes as a platform becomes invaluable as they allow IT to group together containers that make up an application into logical units. Running Kubernetes offers IT teams the ability to accelerate and scale application delivery, reliably and with minimal risk. They can also automate application delivery, reducing the risk of change, enabling continuous improvement, refreshment, and replacement while removing repetitive, manual processes. Kubernetes gives IT teams greater agility and



will enable fast-paced and extensive innovation on, as banks compete to have the best apps and personalized services available.

### Modern data protection

When we talk about the scalability that cloud-native and Kubernetes provides, we can also refer to the repeatability and accuracy with which new containerized environments can be spun up. Staying with the example of financial services, as we emerge from the pandemic, we will see physical retail branches change in their makeup, requiring more advanced digital and contactless systems. Introducing new technologies and devices in-store will become part of the new norm as people return to the high street but expect a digital-first experience. This will likely prompt some level of IT refresh across multiple branches to ensure customers can bank on getting a consistent experience across every location.

Approaches such as Infrastructure as Code (IaC) will therefore become vital to organizations looking to provide a consistent and inclusive 'in-person' experience across physical sites. IaC refers to the process of managing and provisioning infrastructure through machine-readable definition files rather than manual configuration, which can be hindered by human mistakes. IaC provides the ability to take a repeatable task and run it the same way every single time. Looking back to the old days, replicating IT environments across multiple sites could only be done by configuring and setting up one site, then using the exact same team and process for every single site. In reality, this isn't achievable if you have over 100 retail banks on every high street in India, let alone globally. IaC means that the configuration method used for the first site is essentially defined in software code which can be lifted and used to create an exact replica over and over. Furthermore, for businesses with Platform Ops teams which provide operational services to development



## Approaches such as Infrastructure as Code (IaC) will become vital to organizations looking to provide a consistent and inclusive 'in-person' experience...

teams in a way that allows them to self-serve, dovetailing with Site Reliability Engineers (SRE), spinning up workloads is no longer a lengthy task. Whether those workloads are in the cloud, on-premises, virtual or containers, IaC offers greater speed and efficiency whilst also making the process repeatable. This not only speeds up the process of rolling out a digital infrastructure across multiple sites, it also reduces the possibility of human errors, which may not be malicious but can lead to system outages and cybersecurity vulnerabilities.

In financial services, as well as so many other industries, data protection is undermining digital transformation efforts, with backup failures and incompletions leaving 58% of organizations' data potentially unprotected according to the Veeam Data Protection Report 2021. Kubernetes and cloud-native platforms are fundamental to organizations' continuous digital transformation, but do not remove the requirement around data management. If anything, there are more nuanced challenges to data protection posed by using code to deploy and version applications as you have state-

ful data being written to them from external sources such as databases and end users. This data is not contained within code but is now stateful. It must be protected either as part of the Continuous Integration (CI) / Continuous Delivery (CD) pipelines and a native API triggering a backup before any code change or a policy defined to take a backup using native tools made for Kubernetes. Organizations looking to leverage Kubernetes are therefore best-advised to partner with an expert in modern data protection with specialist capabilities around cloud-native platforms and tools.

As containers continue to grow in terms of both popularity and impact, businesses must ensure that they have the ability to protect and backup data across physical, virtual, cloud and Kubernetes environments. This is why businesses looking to take advantage of the agility, scalability, and automatability that Kubernetes offer cannot overlook the need to modernize their data protection strategies and capabilities in tandem. ■

*The author is Senior Global Technologist at Veeam*



# Leveraging The Edge In A Hybrid, Multi-Cloud Regime

Centralized, cloud-hosted management coupled with a growing portfolio of common cloud and edge capabilities puts hyper-scale cloud providers in a good position to address a broader range of requirements for computing closer to the edge

By Rajesh Dangi

There is a common saying – Let technology open your eyes, not overwhelm you – this would be very pertinent to Edge computing, as it continues to expand our perimeter of computing from data canter to hand-held devices. According to the new Worldwide Edge Spending Guide from IDC, the worldwide edge computing

market will reach USD 250.6 billion in 2024 with a compound annual growth rate (CAGR) of 12.5% over the 2019–2024 forecast period.

'Internet of Things' coupled with enterprises in OTT, e-commerce, proximity-based geo local services, distributed Web-CDNs and telecom players, etc. who look forward to fulfil evolving consumer needs through tech will be

the major drivers of growth for Edge computing sector. Additionally, the increased demand for automated decision-making solutions, AR/VR technologies and need for efficient management of data across industries will further augment the need for Edge computing. The evolution of tech and the amplified discussions around 5G and its control over practi-

cally everything physical does raise question on data security. However, Edge computing's potential to improve network security through local security and other features further strengthens its scope of application across industries, including self-driven vehicles, AI, robotics and surveillance notably among others.

### What is Edge?

In simple terms, Edge computing is an approach that processes data at the edge of the network or near the consumer. Citing an example in telecommunications, a mobile can be considered to be an edge device. Hence, every device that generates data at the edge of a network, functions as an edge device. Factors such as an increase in load on the cloud infrastructure globally and a rise in the number of intelligent applications are the major factors driving the growth of the global edge computing market.

Edge computing reduces the need for long-distance back and forth communications between client and server/cloud that means improved response times. Technically, the concept reduces latency and bandwidth usage and significantly improves application response times. As per Kuba Stolarski, research director at IDC, in the 'Worldwide Edge Infrastructure (Compute and Storage) Forecast, 2019-2023' report, she adds: "With enhanced interconnectivity enabling improved edge access to more core applications, and with new IoT and industry-specific business use cases, edge infrastructure is poised to be one of the main growth engines in the server and storage market for the next decade and beyond."

### The cusp of computing shift is here

A network of large data centers are primary drivers of the present-day computing. The synergy is well-tuned for current technologies and may not be conducive for the foreseeable tech-led innovations. For instance, self-driving car will have to take lightning

## Enterprises must prioritize a distributed cloud-based edge solution as the default and future-proof option by relying on partnerships...

fast and 100% accurate decisions in real-time and cues from a data center several miles away may not be able to do justice to it, the case might be similar for industries that deal with remote surgeries, drone deliveries and so on. However, an efficient Edge computing mechanism will enable addressing it as it is all about processing data on the spot, eliminating the need to connect to a faraway data center.

With the plethora of advantages, Edge computing comes with its own set of challenges such as the ability to scale. Deployments of Edge range from hundreds to thousands of nodes and clusters that need to be managed in locations where there may be minimal to absolutely no IT staff at all. Remember there will be a running 'Edge computing stack' at top of a telecom tower itself and demands low touch and complete remote manageability. While companies need to also ensure a central way to deploy and manage, otherwise, it can become complicated and capex intensive exercise the hardware designers and solution architects must build the resiliency to failure by design. The next consideration is building the entire Edge Stack by a single vendor is impossible as edge deployments can vary greatly depending on use cases. In such cases, organizations need to ensure interoperability within a multi-vendor hardware and software environment via set of standards which too are evolving as we speak. Furthermore, to deliver consistency sharing of

a secure control plane via automation, management, and orchestration will be imperative. This is where hybrid cloud plays a key role as one would want to manage entire infrastructure in the same way as before and create an environment where one can regularly develop an application once and deploy it anywhere at a single click.

### Looking Ahead

According to Gartner, Edge computing platforms are software and hardware that enable a zero-touch, secure, distributed computing architecture for applications and data processing at or near the edge. Centralized, cloud-hosted management coupled with a growing portfolio of common cloud and edge capabilities puts hyper-scale cloud providers in a good position to address a broader range of requirements for computing closer to the edge. Still, by end of 2023, only 20% of installed edge computing platforms will be delivered and managed by hyper-scale cloud providers (an increase from less than 1% in 2020).

Edge computing tackles a growing demand to address lower latency, process the growing amount of data on the edge, and support resilience to network disconnection. It is broad enough to support many submarkets but will evolve from supporting thousands of custom patterns to merely dozens after consolidation and cocreation process, with cloud providers playing an important role to the edge or complementing edge solutions working with telecom providers. Enterprises must prioritize a distributed cloud-based edge solution as the default and future-proof option by relying on partnerships and ecosystems over a single-vendor approach as more open infrastructure and upstream open-source technologies that demonstrate large-scale adoption and faster evolution than the traditional OEM principles at play. ■

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# Three Steps To Close The Enterprise Cybersecurity Skills Gap

Enterprises need to mitigate the demand-supply gap by building long-term and short-term workforce strategies, talent transformation, and knowledge-sharing initiatives

By Jatinder Singh

**T**he growing number of remote workers and increased online activities have augmented cybersecurity breaches like never before. In the first quarter of 2020 alone, the country saw 37% more data breaches than 2019, as per a study by

IBM. According to another survey by Computer Emergency Response Team (CERT-In), India witnessed 1.16 million cases of cyberattacks in 2020, nearly three times that of 2019.

Taking advantage of COVID-19 driven work from home environment, cybercriminals have adopted a range

of novel tactics to target insecure network endpoints to launch targeted campaigns and large-scale distributed denial-of-service attacks. Many companies, including Air India, Dominos, Facebook, Juspay, Bigbasket, Upstox, among several others, have seen data breaches in recent times, compromis-



ing the personal information of millions of customers.

Despite growing investments by organizations in deploying real-time cybersecurity solutions to spot and halt incongruities and unsure behaviors, it becomes challenging for enterprises to predict the new threat patterns. The growing drought of cybersecurity talent is further making the job of enterprise IT teams more challenging to create a robust in-house security monitoring ecosystem.

The industry findings reveal that companies that are understrength with cybersecurity professionals are more prone to cyberattacks. Much like the global phenomenon, India faces a massive skill-gap challenge and needs about ten lakhs of qualified cybersecurity professionals by 2025, according to Data Security Council estimates. The country currently has just about 2 lakh cybersecurity professionals.

Here are three steps the businesses must take to mitigate this talent shortage challenge and build secure networks for the future.

### **Short- and long-term planning**

Most organizations are still at a very early stage of implementing security automation and response mechanisms and hence need quality cybersecurity in-house talent to build and monitor corporate security intelligence. However, having skilled talent onboard requires intensive practical experience, and due to the mismatch in the demand-supply equilibrium, all organizations can't hire and retain exceptional, experienced cybersecurity talent.

In such a scenario, IT leaders should focus on short and long-term workforce planning. For instance, hiring an external or foreign consultant to beef up cybersecurity ecosystems can be a makeshift arrangement, especially for big companies that can afford the fees of expansive consultants. However, enterprises need to train their IT teams on necessary skills and emerging technologies such as zero-trust to safeguard critical

infrastructure and data for a long-term strategy.

There should be long-term planning on the kind of technologies that an enterprise wishes to deploy. Accordingly, they can take the services of external cybersecurity experts to get their people trained extensively on securing those technologies.

Essentially, scaling and firming up cybersecurity talent will be critical for a robust security approach in the era where technologies such as 5G, artificial intelligence, and automation will take center stage.

### **Reskilling, upskilling and more incentives**

Another alternative for enterprises is to run skill gap analysis and leverage the transferable skills of existing IT employees. Concerns such as poor career growth and lack of attractive

## **Cybersecurity professionals need to be vigilant like military personnel and keep up with the latest trends to defend the networks**

incentives also prohibit many young IT professionals from entering the cybersecurity profession.

Organizations should take substantial efforts should be taken to reskill, upskill and retain the existing cybersecurity talent. Cybersecurity is an evolving and complex field. In the age of multi-cloud infrastructure, the industry witnesses new and unpredictable attacks every day. Cybersecurity professionals need to be vigilant like military personnel and keep up with the latest trends to defend the networks. Regular training, certifications, and attractive incentives can go a long way in attracting young and experienced talent and retaining them for a more extended period.

### **Knowledge sharing and collaboration**

It is essential to understand that in the

cybersecurity space, most of the formal educational programs run by universities do not offer required training to the candidates to tackle threats in a real-time business environment. Moreover, most enterprises find it hard to absorb the essential cybersecurity talent considering the limited internal IT security training tools and resources at their disposal. They also can't afford to provide them long-term practical training without adequate supervision in the growing cybersecurity threat environment.

"Formal educational programs and industry cybersecurity training programs will never replicate cybersecurity experience, and employers must be willing to embrace their role in developing the cybersecurity leaders of tomorrow—a proposition that always carries the risk that the employee may leave. However,

employers alone cannot shoulder this responsibility—especially when the resounding skills gap is not technical, but rather soft skills," states the ISACA report on State of Cybersecurity 2021.

Enterprises should take aggressive steps to tackle this demand-supply problem by devising industry-focused cybersecurity training and career development programs. Organizations can build a robust talent pipeline through partnerships and outreach programs with educational institutes and peer companies. Companies like IBM, HCL, Wipro, and TCS have taken early steps in this direction, but IT organizations need more training and reskill the existing cybersecurity talent pool.

This will help develop future-focused cybersecurity talent and bridge the industry-academia gap in the long run. ■



# The Great Rethink: Driving Change Through Technology

As changes are implemented at a rapid pace, organizations must communicate effectively with employees to understand the need for change, and the benefits it can bring

By Albert Nel

**T**he past twelve months have caused unparalleled disruption to the way we work but businesses quickly pivoted and responded to the challenges of the pandemic. They

are now determining what changes remain for the long-term, and the type of technology that is needed to effectively manage new ways of working, changing consumer expectations and restructured supply chains.

Even before the pandemic, the world was in the midst of the fourth industrial revolution. COVID-19 subsequently intensified the technological disruption, plunging the world into a new equilibrium.

Industry 4.0 will continue to make big waves for businesses, characterised by great accelerations in connectivity, automation, artificial intelligence, and computing power. The movement is revolutionizing the way traditional industries work, particularly by increasing focus on automation, reserving human labour for more meaningful tasks. This is forcing organizations to change the way they work.

Shifting attitudes and culture is one of the most challenging parts of The Great Rethink. As changes are implemented at a rapid pace, organizations must communicate effectively with employees to understand the need for change, and the benefits it can bring.

### Technology is driving necessary change

COVID-19 has accelerated the speed of technological disruption, making it critical for businesses that didn't get it right last year to make the necessary adjustments to ensure they're able to keep up with evolving customer expectations.

The organizations that had appropriate digital infrastructures in place were better placed to ride the waves of the pandemic. For example, if the framework for collecting the correct customer data was in place, insights could quickly be gathered, uncovering pain points or future needs of customers. Being in tune with the needs of your customer base is critical for providing stability during a time of crisis and beyond.

Businesses can no longer be big slow-moving machines; they need to be agile and constantly reinventing themselves to thrive. Embracing technologies such as artificial intelligence will increase the speed of change by making tasks easier to complete or even taking over some tasks completely so teams can focus their attention on high-value activities.

There were many different technologies adopted by businesses during the past twelve months includ-



**Embracing technologies such as AI will increase the speed of change by making tasks easier to complete or even taking over some tasks completely so teams can focus on high-value activities**

ing collaboration tools, cloud platforms and security platforms. Artificial intelligence was an integral part of these platforms and will continue to be the focal point of the digital revolution due to its ability to deliver real-time customer insights and in turn deliver a hyper-personalized customer experience.

### What's next for businesses?

Work from home (or work from anywhere) has become an integral part of modern work. Direct to consumer has exploded. Contactless is the new normal, for everything from payment to pickup and delivery. Supply chains are going digital, becoming more agile and regionalizing. These are just a handful of the changes to the working world that are here to stay.

Meeting rising customer expectations in a world of digital experiences and omnichannel customer journeys requires a unified, modern technology platform that is agile, data-driven and

able to deliver personalized experiences at scale.

Customer experience has never been more important if businesses are to beat the competition. During the pandemic, customer needs rapidly evolved with customers expecting instant, integrated and consistent service experiences across channels. This trend will continue so businesses need to adopt technologies to ensure they retain customer loyalty.

At the heart of this must be an intelligent and secure information management platform that enables organizations to provide a seamless flow of information between team members wherever they may be and is able to deliver personalized customer experience at scale. This is foundational for thriving in our rapidly evolving world—and the world we will build with The Great Rethink. ■

*The author is Vice President - APAC at OpenText*





# Gearing Up For Future Of Work Using Tech-Driven Innovation

CIOs play an indispensable role in building the organizational work culture in the remote working regime brought about by the pandemic-led disruption. How the CIO of the analytics company, SAS, met the challenge...

By Jatinder Singh

**D**uring the initial phase of the pandemic, few knew how to continue with running the business and how long the uncertainty would last. Staying connected to business, improving remote work management, and meeting erratic client expecta-

tions became challenging in the new work-from-home ecosystem.

Things were even more complex for SAS, a business analytics software and services firm. The challenge for SAS was two-fold. The first was to keep the business running. In that sense, it was similar to the challenge faced by

any other business organization. The second—a challenge and an opportunity—was to demonstrate leadership—as more and more customers accelerated digitization and prepared for a data-centric future.

"We had questions about productivity efforts. Like everyone else, our



initial response to the pandemic was to get all our employees home, safe, sound, connected, and ultimately enabling them to remain productive," says Jay Upchurch - Executive Vice President & CIO, SAS.

The focus was on taking innovative measures to ensure seamless culture shift and raising awareness about the multifaceted challenges in store for an indefinite future. Moving to a fully work-from-home environment, that too at an unprecedented pace, was a paradigm shift for employees. Like any other organization, SAS had to ensure that the confidence of its customers remains high, and this could be possible only by cultivating a robust remote 'culture.'

Being a technology company deep into analytics and AI, there were huge expectations from its clients and employees to deliver high-level experiences.

### Data-centric culture

SAS's key areas of growth are data-led experiences and innovation. Hence, there is no wonder that the company takes consistent efforts to design its internal tech strategy around data.

"How many times have you heard stories about customer engagement where the context of the call or the context of interaction was lost. The exchange was purely verbal or was only placed on hiding the emotion that was already there. If you had context for everything else that was going on, again, those are data points. So when we see today's organizational ecosystem, we see it as a collection of data. We have to ingest that data and figure out the right way to put it together to deliver the right outcome," Jay describes.

SAS continues with this culture in the work-from-home model by kicking off various employee experience initiatives. These initiatives, according to SAS, include developing a self-service portal for its employees to keep everyone connected and share challenges, upgrading security and remote network monitoring tools to keep people

## The focus was on taking innovative measures to ensure seamless culture shift and raising awareness about the multifaceted challenges in store for an indefinite future

secure and productive. By leveraging its cloud-based customer intelligence 360 platform, the company boasts of helping them stay close to customers and understand customer engagement through predictive analytics.

Through its One View platform, SAS can get a single view of all its interactions with customers and down to the individual customer view. The US-based firm is also running various transformation projects in finance, legal and other areas to drive customer success and optimized sales experience. It is also leveraging the

Viya environment, through which it gets reliable, scalable, and secure analytics inventory management and governance necessary for agile IT. To support its employees and customers, the analytics firm has turned to natural language processing-based automated chatbots for many of its self-services and as an example to its help desk.

"A lot of that has to do with the amenities that we have in our office. It is the collaboration and the tools that we give our employees to work for hand-in-hand and shoulder-to-shoulder. And it's proven to be wildly successful for us now for 46 years. And so when we suddenly send everybody home, and some of those benefits weren't at our fingertips, we became very concerned about what does that mean," mentions Jay.

Another challenge for SAS was to ensure that the workforce remains connected to the organization. While the pandemic resulted in more significant job losses and unemployment, it is also true that many organizations found it difficult to retain exceptional talent due to a lack of job satisfaction and engagement in the remote work environment.

"We use our creativity and our curiosity to analyze data, let the data tell a story, and let that output answer for a customer. And sometimes that requires collaboration, and creativity, and involves inquisitiveness. And we cultivate that with our culture," Jay shares.

### A new way of working

There is no doubt that the onslaught also brought many innovations and models of the future of work. Before



**"When we see today's organizational ecosystem, we see it as a collection of data. We have to ingest that data and figure out the right way to put it together to deliver the right outcome."**

**JAY UPCHURCH**  
Executive Vice President & CIO  
of SAS



## "CIOs and their organizations have now become much more present in the business as opposed to simply being kind of behind the scenes. Now CIOs are at the forefront of leading and driving that innovation..."

the pandemic, the well-being initiatives were primarily led by human resources (HR) or talent professionals in organizations. However, as the culture of hybrid-workplace and always-on digital era gains momentum, CIOs play a crucial role in enabling businesses to integrate technology into their well-being strategies.

Besides stabilizing critical infrastructure, at SAS, Jay had to shoulder a responsibility to integrate tech to drive the culture change and crisis management to enable the new way of working.

He says that deploying touchless technologies across all its offices ensures a safer environment for its people and creates innovative data-driven apps and tools to track employee health and their key concerns. Among enterprises, there is also a focus on deploying multiple workplace zones for employees

coming back to offices so that people who are found unwell can be quickly isolated.

There is also a greater focus on leveraging technology tools to reskill and upskill people and providing more significant training opportunities across teams. "We could, as a company, say, okay, we are leaning into the journey, the employee journey, a SAS staff of resources around the world and carrying that cost and aspiration of achieving the superior employee experience," Jay remarks.

SAS has been planning to re-open many of its offices in phases and confident to deliver a healthier employee experience. It says that depending on the region and employees' role; its people are rejoining offices. For instance, in Cary [SAS headquarters], in the United States, SAS houses about 5,000-6,000 employees every day. Currently, the company has

started office for about 600-700 people during any day of the week. "The focus is on following protocols but starting to enjoy some of those benefits again," Jay apprises.

With tough competition from companies like AWS, Microsoft, and Google in the corporate software, SAS perhaps knows that it has to leverage technology to leap forward. Attracting the new-age talent, helping them stay connected, understanding, surveying them constantly to get an idea of how they are feeling, offering them remote HR capabilities for training and wellness will continue to be a massive priority for the company.

### The takeaway

The pandemic tested the resiliency levels of organizations like never before. In the new working world, CIOs are expected to do more and be more. They are trying to contribute to product aspirations. They play a pivotal role in understanding or appreciating customers and employees by bringing tools to the business like analytics, data, AI, and machine learning to help enable those types of interactions that drive the business forward cost-effectively.

Jay thinks CIOs will continue to assume greater responsibilities as technology gets ingrained in almost every aspect of an organization's working model.

"CIOs and their organizations have now become much more present in the business as opposed to simply being kind of behind the scenes. Now CIOs are at the forefront of leading and driving that innovation. So I think for me, as a role when I think about every day with the last 18 to 24 months has changed that for me. And, of course, it changes the organization. CIOs are now expected to deliberate and provide answers to the questions such as do we have the right skillset? Do we have the right priorities? Are we aligned correctly? And then, you start thinking about challenges from the past and how disruptive they are to your current agenda". ■



# How Technology Is Enhancing Real-Time Supply Chain Visibility

Logistics companies in the Asia Pacific are turning to IoT, automation, and other location-based solutions to develop robust supply chains and elevate the customer experience

By **Jatinder Singh**

The past year has thrown severe challenges for industries of all scales and sizes. Amidst the multi-wave pandemic dynamics, the demand for different products and services has seen consistent fluctuations around the globe. From groceries, merchandise, medical supplies to other necessities, buyers are now heavily dependent upon digital channels to meet their day-to-day requirements.

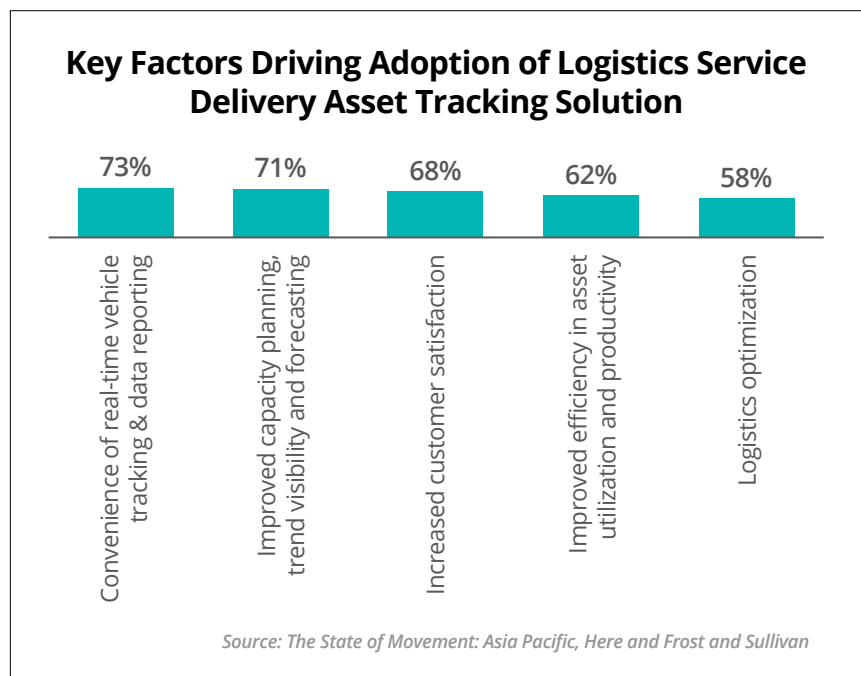
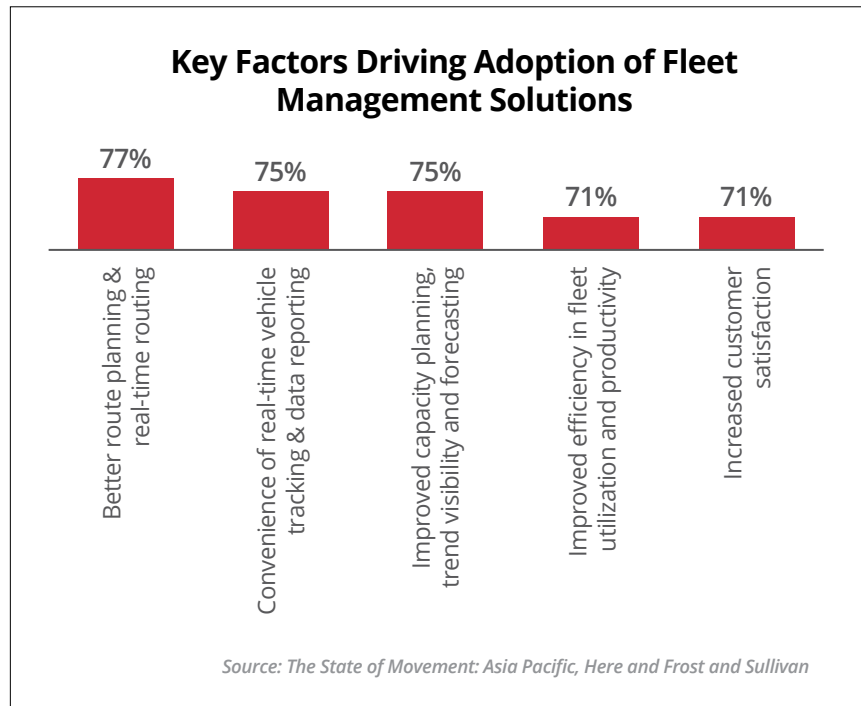
The erstwhile on-premises supply chain models are consistently failing to meet evolving customer requirements. To tackle this challenge, firms across the globe are making substantial technology investments in emerging technologies such as AI, IoT, and automation to improve processes and gain end-to-end visibility around inventories.

According to a research report, The state of movement: the Asia Pacific by Frost and Sullivan and location platform firm HERE Technologies, over one-third of logistics firms in the Asia Pacific (APAC) region are exploring technologies such as IoT (37%), warehouse automation (33%) and adopting electric vehicles (32%) to drive operational efficiencies.

Due to the COVID-19 and the subsequent factory shutdowns and border closures, trade tensions, and production relocations, there has been a growing focus on replacing the conventional on-premises systems with modern cloud and AI-based systems asset tracking and shipment monitoring among logistics companies.

### Increase push toward IoT and map-based solutions

For logistics industry professionals and online retailers, who also deal with significant staff shortages, there is a massive pressure to improve operational efficiencies, reduce overall costs and deliver exceptional customer experiences. Many freight and shipping firms in the Asia Pacific are resorting to AI-enabled IoT tracking



mechanisms to revolutionize their asset tracking mechanisms.

With IoT-enabled data-driven tools, organizations can monitor the condition of goods and inventories in real-time and help supply chain managers make informed decisions. Due to the current uncertain environment, there has been a significant acceleration

to deploy IoT, especially in the shipment monitoring of condition-sensitive items such as cold chain items and dangerous goods, amongst the firms across Australia, India, Indonesia, and Thailand.

IoT-enabled solutions help logistics companies locate the misdirected and misrouted assets and enable firms to



improve operational efficiency, better customer satisfaction levels, and create efficient and agile supply chains.

While GPS (77%), RFID (31%), and QR codes (20%) have high penetration rates in fleet management, IoT is gaining considerable popularity, with 21% of logistics companies have already adopted it, according to the Frost and Sullivan report.

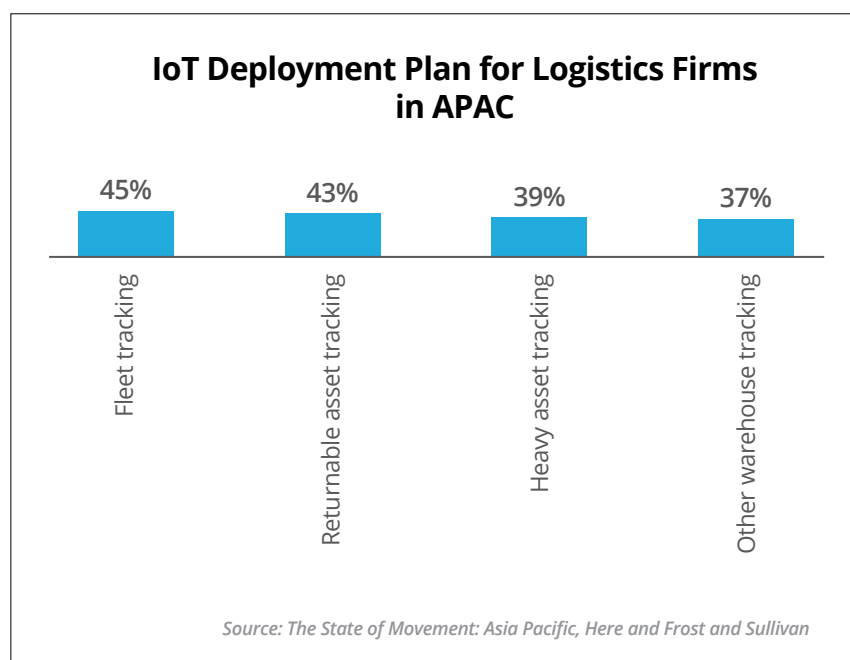
"In this complex environment, disruptions along the supply chain are inevitable. IoT sensors can be installed in different modes of transportation like trucks and containers to offer real-time condition and location tracking of shipments. Besides, sensors can also be used in warehouses to monitor and manage inventories. At the same time, those in retail outlets can facilitate more accurate demand forecasting," says the Frost and Sullivan-HERE report.

It further revealed that more than 50% of logistics companies in APAC are currently using map-based solutions for shipment monitoring across all shipment types. Logistics companies are moving towards map-based solutions with real-time location data, primarily for Courier, Express & Parcel (CEP), particularly in Australia (90%) and Japan (75%).

### Leveraging cloud for seamless collaboration

Moving to the cloud is the foundational step toward achieving seamless collaboration across multiple stakeholders, resulting in end-to-end visibility for a supply chain organization. Cloud-based process management tools and analytics can offer incredible insights into the shipment journey and any loopholes impacting the overall customer experience.

Leveraging real-time data, warehousing, inventory, and transporting reporting can be accessed in real-time by supply chain organizations from anywhere. This promotes real-time capacity planning and forecasting. According to the Frost and Sullivan report, more than 50% of logistics companies have stated their



intention of deploying cloud-based solutions shortly.

Akin to other industries, there is growing traction toward the hybrid cloud in logistics companies to leverage the combined advantages of flexibility, innovation, and data security.

### Automating processes for better efficiency

Over the last few years, many logistics and transportation companies are increasingly evaluating the capabilities of automation-based solutions such as robotic shuttles and intelligent bots that help them handle customer queries and transport goods in process-oriented ways.

Though the implementation of automation solutions often comes at a high upfront cost, it significantly returns on investment in the mid to longer term.

Compared to manual operations, these rule-based solutions help firms perform time-consuming, repetitive tasks such as picking and packing, invoicing, PO processing, and order fulfillment in a much effective manner. They also ensure that products get delivered in a touchless human environment for better security in today's watchful pandemic situation.

### Not without challenges

Despite all the advantages these new-age tech solutions offer, many technology leaders find it cumbersome to integrate fleet, asset tracking, and shipment solutions with their existing IT infrastructure. There is also a challenge to get a well-trained workforce for the management of fleet, asset tracking, and shipment monitoring solutions.

In addition to the above, challenges such as data accuracy and reliability, lack of features in the fleet, asset tracking, and shipment monitoring solutions present a colossal testing ground for technology leaders of the logistics and supply chain firms.

To overcome the challenge, the technology leaders in the logistics and supply chain sector need to develop intelligent strategies and collaborative efforts to create effective and robust supply chains and elevate the customer experience.

After all, in today's fast-moving digital age, customers expect shorter delivery cycles and high-quality goods. With real-time location awareness, logistic companies can be better equipped to exceed customer expectations. ■



# Firewalls And Their Cool Features

Next-generation firewalls provide insight into the applications themselves, providing a critical capability for networking professionals

By Debasish Mukherjee

The latest next-generation firewalls (NGFWs) utilize deep packet inspection to scan the entire packet payload to provide advanced intrusion prevention, anti-malware, content filtering and anti-spam. Many applications are delivered over the web, sharing common ports and HTTP or HTTPS protocols. This effectively leaves traditional firewalls blind to these applications and unable to prioritize productive and secure versus unproductive and potentially insecure traffic. Next-generation firewalls provide insight into the applications themselves, providing a critical capability for networking professionals.

Let us examine some of the things firewalls should be doing for your network security:

### **Control the applications allowed on the network- Application visualization lets you see which browsers are being used to enable policy making accordingly.**

As a company you want to make sure all of your employees are using the latest version of Internet Explorer. Your mission is to ensure all employees launching IE9 or IE10 are automatically redirected to the IE11 download site and restrict them from all other web access.

Your possible solutions may include:

- Physically check every system each day for the web browser version
- Write a custom script to automatically check browser versions

### **Manage the bandwidth for critical applications- Application priority can be date-based (think end of quarter priority for sales applications)**

Many mission-critical applications, such as Live Meeting, Salesforce.com and SharePoint, are cloud-based, or run across geographically dispersed networks. Ensuring that these applications have priority over unpro-

## **While it might be counterproductive to block all social networking applications, you may want to control how they can be used**

ductive web surfing improves business productivity.

Create a policy to give bandwidth priority to the Live Meeting application:

- The Deep Packet Inspection engine looks for the application signature or application name
- Assign the Live Meeting application a higher bandwidth priority

### **Block peer-to-peer applications**

Unproductive peer-to-peer (P2P) applications such as BitTorrent are often used to download unlicensed versions of copyrighted media and can quickly consume bandwidth or transmit malware. However, the creation of new P2P applications, or simple changes (e.g., version numbers) to the existing P2P applications happen all the time so it is difficult to manually block any single P2P application.

Create a policy to block the use of P2P applications:

- The Deep Packet Inspection engine uses pre-defined P2P application signatures from the application signature list
- Choose the P2P applications from the pre-defined signature list
- Apply the policy to all users
- Block P2P applications through bandwidth and time-based restrictions

### **Block unproductive components of applications**

Social networking applications such

as Facebook, Instagram and YouTube have become new channels of communications for individuals and for companies. While it might be counterproductive to block all social networking applications, you may want to control how they can be used in the workplace. For example, you may want to let marketing personnel update the company's Facebook page, but not allow them to play Facebook games like Texas HoldEm Poker or Candy Crush Saga. With application intelligence and control, you can create a policy to allow access to Facebook, but block games.

Create a policy to allow Facebook, but block Facebook games:

- Select "All" users
- Select "Facebook games applications" as a category
- Create a single rule to "Block" all users from accessing games within Facebook

### **Visualize your application traffic - Visualization provides administrators with instant feedback on network traffic flows**

What's happening on my network? Who's wasting my bandwidth? Why is my network so slow? Have you ever asked yourself any of these questions? You could use a combination of separate tools to try to get answers, but this process is time consuming and will only provide you with information after-the-fact.

- View all traffic in real time by logging into the Application Flow Monitor:
- View real-time graphs of all application traffic
- View real-time graphs of ingress and egress bandwidth
- View real-time graphs of websites visited and all user activity
- Create your own filtering that gives you the most relevant information

### **Manage bandwidth for a group of users**

What do you do if your CEO complains that the business news videos that

he wants to watch every morning are choppy and won't play correctly? After investigation, you determine that it's due to a company-wide bandwidth management policy that you implemented for all streaming video? You could ease off on the bandwidth restrictions for everyone, but now there is a better answer: group-based bandwidth management.

Create a policy to exclude the executive team from streaming video bandwidth management:

- Choose the executive group imported from your LDAP server
- The Deep Packet Inspection engine uses pre-defined streaming video application signatures from the application signature list
- Apply bandwidth restriction to traffic with that header

## The ability to block attacks such as ransomware and breaches that are delivered through malware and intrusion attempts relieves the organization...

### Block ransomware attacks and breaches- Block malware attacks and intrusions before they enter your network!

Network security must be at the forefront of any IT administrator's focus. The ability to block attacks such as ransomware and breaches that are delivered through malware and intrusion attempts relieves the organization from great risk and spares potentially wasted resources.

### Identify connections by country

Is a connection to an IP in a foreign country from your local neighborhood office or a branch site just a benign connection from somebody browsing on the web, or is it botnet activity? You can use GeoIP country traffic identification to identify and control network traffic going to or coming from specific countries to either pro-

tect against attacks from known or suspected origins of threat activity, or to investigate suspicious traffic originating from the network.

View connections by country or create country-specific filters:

- Check which applications are connecting to IPs in other countries
- See which users and which computers are connecting to IPs other countries
- Create filters to restrict traffic to countries specified by you, with exclusion lists

### Prevent data leaks over email

In some companies, outbound email does not pass through their email security system, or that system does not check the content of email attachments. In either case "company confi-

dential" attachments can easily leave the organization. Since outbound network traffic goes through your firewall, you can detect and block this "data-in-motion." Create a policy to block email attachments that contain the "company confidential" watermark

The Deep Packet Inspection engine looks for:

- Email content = "Company confidential" and
- Email content = "Company proprietary" and
- Email content = "Private proprietary", etc.

### Prevent data leaks over web mail

Now let's assume your existing anti-spam protection can detect and block a normal outbound email that contains "company confidential" information. But what if an employee uses a web mail service, such as Yahoo® or

Gmail®, to send out "Company Confidential" information?

Create a policy to block "company confidential" attachments in web traffic:

- The Deep Packet Inspection engine looks for "company confidential" on files transferred via http or https
- Block message and notify the sender that the message is "company confidential"

### Bandwidth manage streaming audio and video

Access to streaming video from sites such as YouTube.com is sometimes useful but is often abused. Blocking these sites might work, but a preferable approach is to limit the total bandwidth given to streaming video, regardless of where it comes from. This also applies to streaming audio sites such as online music radio stations and music streaming services like Spotify and Apple Music. This traffic doesn't necessarily need to come from well-known sites but can also be hosted by blogs. Thus, the goal is to identify this traffic by what it is, rather by its origin.

Create a policy to limit streaming audio and streaming video by pre-defined signature list

- Select Streaming Video and Streaming Audio as application categories
- Set the amount of bandwidth that you want to allocate to these application categories (e.g., 10%)
- Create a rule that enforces Streaming Video and Streaming Audio to consume a maximum of 10% of bandwidth for everyone (perhaps excluding particular department groups, such as those in the training group)
- Optionally, schedule the rule to be effective during standard business hours, but not during lunch hours or after 6 p.m.
- Confirm the effectiveness of your new policy with real-time visualization by logging into the Application Flow Monitor ■

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*The author is Vice President, Regional Sales APAC at SonicWall*



# India Gets Ninth Hyperscaler Cloud Region, NCR Delhi Its First

With Google Cloud launching its second cloud region in India, India is now hot territory in global cloud map. More is coming.

By ITNEXT

**G**oogle Cloud recently launched its second cloud region in India at NCR Delhi – its 26th in the world and 10th in Asia Pacific. This is the first cloud region launched by a hyperscaler

in NCR Delhi and the ninth so far in India. Six hyperscaler cloud providers have presence in India.

Microsoft Azure has the maximum number of cloud regions in India, among all hyperscalers. It has three of its 65 global cloud regions in

India. The locations are Pune, Chennai and Mumbai.

With the launch of its NCR cloud region, Google Cloud now has two of its 26 global cloud regions in India. The first one was established in Mumbai. Both the regions have three availability zones each.

Amazon (AWS) has one cloud region – Mumbai – in India, with three availability zones. It has announced its second in Hyderabad which will be operational next year. AWS has 25 cloud regions.

Oracle has two of its thirty global cloud regions in India. The India West in Mumbai and India South in Hyderabad are its two cloud regions in India with one availability domain.

Alibaba Cloud, the cloud business of Chinese company, Alibaba, too has one of its 24 cloud regions in India, with two availability zones. It is also located in Mumbai. It has 12 cloud regions in China and 12 outside China.

IBM, though it has a data center in Mumbai, it does not have a full-fledged region in India. It has six global cloud regions.

From the nine cloud regions, five are centered in Pune, and one each in Chennai, Hyderabad, Pune and NCR Delhi. After launch of the new region by AWS, Hyderabad will go ahead of the other three to have two cloud regions from hyperscalers. ■

Provider	Launched in India	Global Regions	India Regions	Region Name
Amazon Web Services	June 2016	25	1	Mumbai
Google Cloud	November 2017	26	2	Mumbai NCR Delhi
Microsoft Azure	September 2015	65	3	Pune Chennai Mumbai
Oracle Cloud	January 2019	30	2	Mumbai Hyderabad
Alibaba Cloud	December 2017	24	1	Mumbai
IBM	NA	6	0	NA



## Hybrid Work In India – Key Trends

74% of Indian workers are keen on flexible  
remote work options

By ITNEXT

Creating a hybrid work plan for any organization requires a flexible operating model spanning people, places, and processes. To help people thrive, organizations need to rethink the entire employee experi-

ence—from creating culture to attracting and retaining talent and building privacy-backed listening systems. This is according to Microsoft's 2021 Work Index Trend study.

Rajiv Sodhi, Chief Operating Officer, Microsoft India, said, "If we have learnt

one thing in the last year, it's that we are no longer bound to traditional notions of space and time when it comes to how, when, and where we work. The Work Trend Index findings attest that remote work has created new opportunities but there are

challenges ahead as well. We believe hybrid work is the future, and a successful hybrid strategy will require extreme flexibility. As every organization fundamentally reimagines itself for the hybrid work era, we are collectively learning and innovating on how we will shape the future of work in India. It's time to embrace work as a frame of mind, not a place you go."

The last year has fundamentally changed the nature of work and shows that we are on the cusp of workplace disruption. The Work Trend Index study revealed the following trends among the workforce in India:

### **Flexible work is here to stay**

Illustrating the hybrid work paradox in India, nearly three-fourths (74%) of Indian employees say they want more flexible remote work options, while at the same time, 73% of them are also craving more in-person time with their teams. To prepare, 73% of business decision makers are considering

### **Work has become more human and authentic**

Coworkers leaned on each other in new ways to get through the last year. One among four (24%) Indian employees has cried with a colleague and 35% people are less likely to feel embarrassed now when their home lives show up at work. As living rooms made way for work meetings, 37% people got to meet their coworkers' families. People who interacted with their coworkers more closely than before experienced stronger work relationships, reported higher productivity and better overall wellbeing. The genuine interactions with coworkers are helping to foster a workplace where 63% of Indian workers said they are more likely to be their full, authentic selves at work.

### **Digital overload is real and rising**

Self-assessed productivity has remained the same or higher for

calls and meetings are unscheduled or conducted ad hoc and the average Teams meeting is 10 minutes longer, up from 35 to 45 minutes year-over-year. The average Teams user is sending 45% more chats per week and 42% more chats per person after hours. And despite meeting and chat overload, 50% of people respond to Teams chats within five minutes or less.

### **Gen Z is struggling more than other generations**

India's first generation of digital natives, or Gen Z, appears to be suffering and need to be re-energized. Nearly 71% of this generation — those between the ages of 18 and 25 — say they are merely surviving or flat-out struggling. Survey respondents reported that they were more likely to struggle balancing work with life and to feel exhausted after a typical day of work when compared to older generations. Gen Z also reported more difficulty feeling engaged or excited about work, getting a word in during meetings, and bringing new ideas to the table when compared to other generations.

### **Workplace networks are shrinking**

Anonymized collaboration trends between billions of Outlook emails and Microsoft Teams meetings reveal that the shift to remote work has shrunk our networks. Between April 2020 and February 2021, the number of people sending chats posted in a Teams channel — designed to include the whole team — have decreased by 5%. In contrast, the number of people sending small group or one-on-one chats have increased by 87%.

Strong workplace networks impact innovation and productivity. Respondents who reported weaker workplace relationships were less likely to report thriving at activities that lead to innovation, like thinking strategically, collaborating or brainstorming with others, and proposing new ideas. Among the Indian workforce, 29%

## **The digital intensity of workers' days has increased substantially in the last year. The time spent in Microsoft Teams meetings has more than doubled (2.5X) globally, 62% of Teams calls and meetings are unscheduled**

redesigning physical spaces to better accommodate hybrid work environments. The data is clear: extreme flexibility and hybrid work will define the post-pandemic workplace. Last year's move to remote work boosted feelings of inclusion for workers because everyone was in the same virtual room. But the move to hybrid will need to ensure employees are given the flexibility to work when and where they want, as well as the tools they need to equally contribute from wherever they happen to be.

many employees over the past year, but at a human cost. 62% of the Indian workforce says their companies are asking too much of them at a time like this and 13% say their employer doesn't care about their work-life balance. More than half (57%) of Indian employees feel overworked and 32% feel exhausted.

The digital intensity of workers' days has increased substantially in the last year. The time spent in Microsoft Teams meetings has more than doubled (2.5X) globally, 62% of Teams



## Almost 62% of India's workforce (including 51% of Gen Z) expressed their intention to switch jobs this year. Globally though, 41% of employees are considering leaving their employers this year

have experienced decreased interaction with coworkers.

### Talent is on the move in a hybrid world

A vast talent marketplace is one of the brightest outcomes from the shift to remote work. Remote job postings on LinkedIn increased more than five times in the last year, and people are taking notice. Almost 62% of India's workforce (including 51% of Gen Z) expressed their intention to switch jobs this year. Globally though, 41% of employees are considering leaving their employers this year. Being able to work remotely now, nearly 68% of Indian workers are likely to move to a new location. This fundamental shift

expands economic opportunity for individuals and enables organizations to build high-performing, diverse teams from a near-limitless talent pool.

The 2021 Work Trend Index outlines findings from a study of more than 30,000 people in 31 countries and analyses trillions of aggregate productivity and labor signals across Microsoft 365 and LinkedIn. It also includes perspectives from experts who have studied collaboration, social capital, and space design at work for decades.

### The future of work is here and it's hybrid

The shift to hybrid work is a strategic business opportunity for every orga-

nization – one that requires a new operating model. The Hybrid Work Playbook shares learnings about how to reimagine people, places and processes for a hybrid world:

- **People:** Every organization needs a plan and policies that put us on the path to extreme flexibility and help us build digital empathy into every aspect of our culture – from global guidelines to team-level meeting norms that help everyone feel included and engaged.
- **Places:** Relying solely on shared physical location to collaborate, connect, or build social capital is no longer viable. But spaces and places are still important and reimagining them starts with prioritizing employee safety and maintaining consistent person, reference, and task spaces for all employees, whether they are on-site or remote.
- **Processes:** The shift to hybrid work presents a rare opportunity to transform key business processes in bold new ways. Cloud readiness, digitization of business processes, and a Zero Trust security architecture will be key enablers in adapting to the new hybrid reality. ■





Two times  
the revelation



**Sekhar Guduru**

Head - IT, TCS



AN ENTERPRISE TECH THAT  
WILL IMPACT THE REST OF 2021

Cloud Computing

MY PEER IN THE IT  
COMMUNITY

Pradeep Rathod, Head - IT  
(Corporate Banking - India),  
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MY FAVORITE ACTOR

Amitabh Bachchan



A TECH IDOL I ADMIRE

Steve Jobs



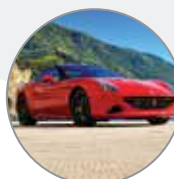
A HOBBY WHICH I WOULD  
LIKE TO PURSUE AGAIN

Playing Football



MY FAVORITE CAR

Ferrari



**Pradeep Rathod**

Head - IT (Corporate Banking - India),  
Standard Chartered Bank



A BOOK I READ RECENTLY

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A GADGET WHICH  
I USE THE MOST

Smart Watch



A HOLIDAY SPOT I WOULD LIKE  
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# डिजिट अब हिंदी में

देश का सबसे लोकप्रिय और विश्वसनीय टेक्नोलॉजी वेबसाइट डिजिट अब हिंदी में उपलब्ध है। नयी हिंदी वेबसाइट आपको टेक्नोलॉजी से जुड़े हर छोटी बड़ी घटनाओं से अवगत रखेगी। साथ में नए हिंदी वेबसाइट पर आपको डिजिट टेस्ट लैब से विस्तृत गैजेट रिव्यू से लेकर टेक सुझाव मिलेंगे। डिजिट जल्द ही और भी अन्य भारतीय भाषाओं में उपलब्ध होगा।

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