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DATACENTRE SPECTRUM

How are the datacentre technologies evolving?

p. 16

1000 Edge Datacentres

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—SRIDHAR PINNAPUREDDY
Founder and CEO,
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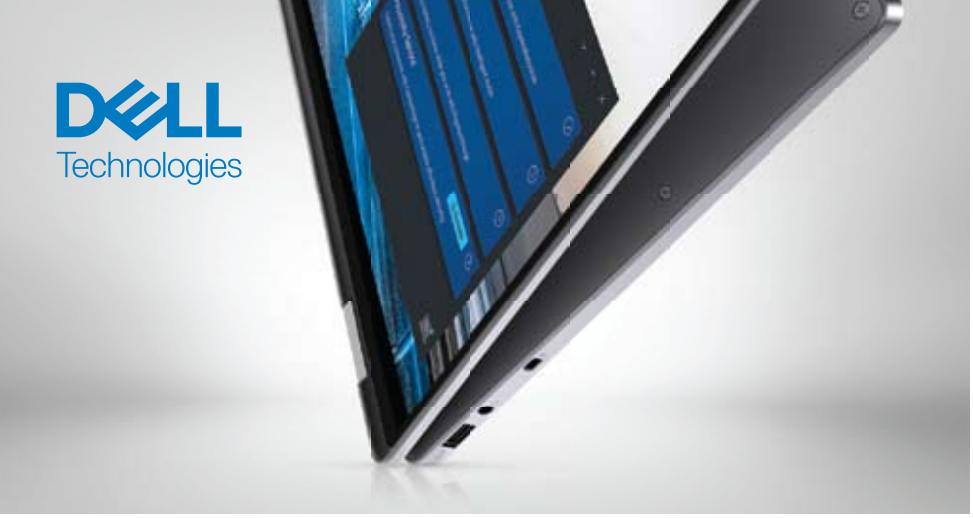

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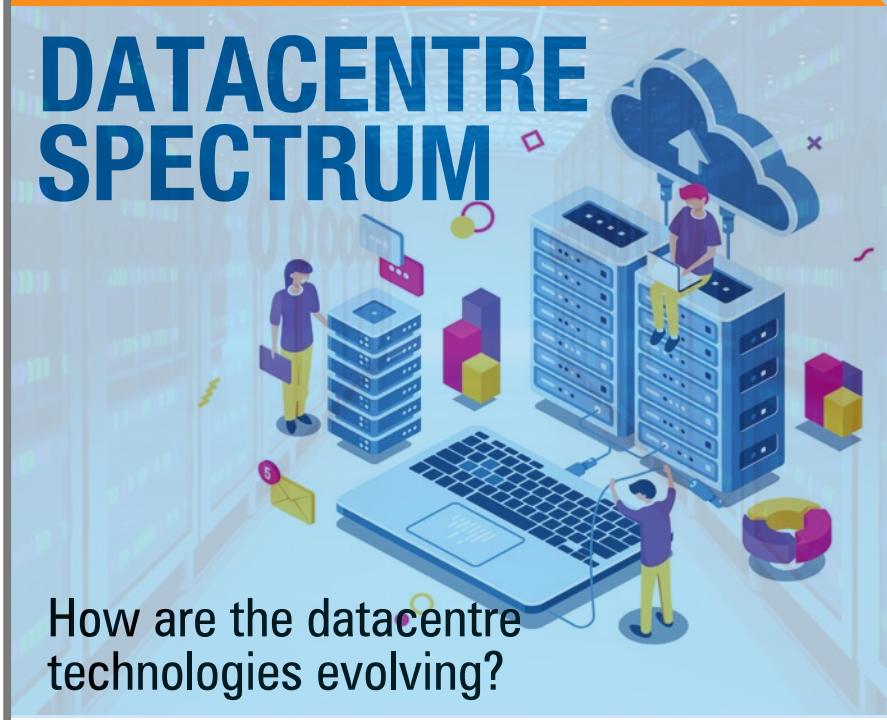

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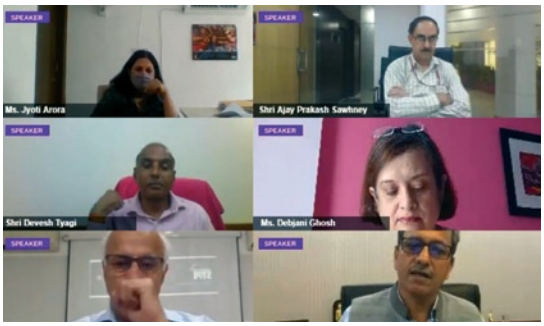

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New **Thoughts**

Greetings friends!

At the CII's 125-year celebrations, Prime Minister Narendra Modi said, "Today, countries are looking to support each other. The old ways of working and old policies, will not work anymore. Everyone has huge expectations from India. There is new thought coming out of India. The world is looking for a potential partner. India has gained lot of global trust in these tough times. It is up to CII to ensure that we must build on trust, quality and competitiveness. Getting growth back is not so difficult."

I will also repeat the words of our CMD, Pradeep Gupta, at the STPI's 29th Foundation Day. He said that Covid-19 has now accelerated digital transformation and WFH has become the mainstream. The mental blocks in our minds have been completely shattered. There are technologies such as AR/VR, AI etc., that will completely change the situation in the future.

Yes, indeed!

The Indian IT industry must become the safest and fastest-moving across the world. We need to redefine the customer experience in a contactless economy. People will require new skills to drive this digital transformation. There is a rising case for CASE. The acronym stands for Connected, Autonomous, Shared and Electric. Next, the increasing investments in automation of manufacturing processes are boosting demands for collaborative robots or cobots. These are much smarter and comparatively more productive in automating the tasks assigned and pushing the bar for automation capabilities. Industry 4.0 impact will get deeper and deeper into the country. There will be use of Industry 4.0 across industries. If we need to be competitive, Industry 4.0 will play a huge role. IIoT, or Industry 4.0 is changing the landscape of manufacturing industry in India.

We also need to make software product companies in India. STPI has a huge role to play in all of this. We need to bring new-age products and companies. AI will drive datacentre adoption of new technologies. While Covid-19 has taught us to deliver services to any device/customers sitting anywhere, Cloud is the best go-to model when it comes to execution. Data has emerged as the major trend. There is also data creation, processing, transmission and storage. Edge computing, SDN, NFV, hybrid and multi-cloud, 5G etc. are all growing in importance.

Pradeep Chakraborty

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Datacentre Spectrum

The datacentre scene is evolving very fast, with many diverse developments taking place. On one hand, India has built the largest datacentre in Asia and received the highest design certificate for it from the US. On the other hand, there are signs that investments in datacentres may be declining in India, while investments in cheaper, cloud-based data storage and management options are going up. Read on to find out about this melange of datacentre-related developments

Today, data centers are no longer inefficient and clunky. There are many data centers, with the latest technologies, across the country, and more are to come over time. Players such as CtrlS, STT GDC India, NTT Netmagic, Yotta Infrastructure, etc., are among the leading data center players in the country.

According to Sridhar Pinnapureddy, Founder and CEO, CtrlS and Cloud4C Services, hybrid IT deployment, including cloud, IoT, AI, edge computing, intelligent monitoring, and the impending Personal Data Protection Bill 2019 will play a key role in shaping the Indian data center industry. CtrlS is emerging as the world's largest rated-4 data center.

For Jatinder Singh Pabla, VP, Sales & Marketing, STT GDC India, the Covid-19 outbreak and the necessary lockdown across the world, have had a significant impact on the way businesses operate. Like any other sector, stringent restrictions like the curfews, containment zones and travel restrictions made things a little difficult initially, mostly due to the limited awareness among the local authorities about data centers being part of essential services.

India has achieved the distinction of building the largest datacentre in Asia and acquiring the highest certification of design from the US for it. Perhaps this should be added to the achievements of the much-hyped Make in India programme of the Indian government!

Yotta Infrastructure - a Hiranandani Group company - has announced that their first datacentre - Yotta NM1 - located in their Panvel Datacentre Park - has been awarded the highest certification for datacentre design - the Uptime Institute Tier IV Certification of Design Documents Certification (TCDD). At 8.2 Lakh sq.ft, 7200 racks and 50 MW power, Yotta NM1 has achieved the rare distinction of being among the largest datacentres in the world and the largest in Asia, with this certification.

Dr. Niranjan Hiranandani, MD, Hiranandani Group, said, "Yotta's vision is to deliver the best quality datacentre services to its customer and at the most reasonable costs. We made this possible via our group capabilities of real-estate ownership, execution acumen, power generation and distribution capabilities. The Uptime Institute Tier IV Certification of Design Documents award attests to our commitment to deliver state-of-the-art IT infrastructure to the nation to further the Digital India mission."

With this certification, Yotta NM1 datacentre's design fulfils the Tier IV 'Fault-Tolerant' criteria, thereby assuring customers of the possibility of superior uptime and continued performance in the occurrence of a fault and its

YOTTA'S VISION IS TO DELIVER THE BEST QUALITY DATACENTRE SERVICES TO ITS CUSTOMER AND AT THE MOST REASONABLE COSTS. WE MADE THIS POSSIBLE VIA OUR GROUP CAPABILITIES OF REAL-ESTATE OWNERSHIP, EXECUTION ACUMEN, POWER GENERATION AND DISTRIBUTION CAPABILITIES. THE UPTIME INSTITUTE TIER IV CERTIFICATION OF DESIGN DOCUMENTS AWARD ATTESTS TO OUR COMMITMENT TO DELIVER STATE-OF-THE-ART IT INFRASTRUCTURE

— Dr. Niranjan Hiranandani, MD, Hiranandani Group

consequential impact. A fault tolerant datacentre facility and all the customer applications and workloads hosted there are capable of continuing to operate at full capacity despite a structural failure.

Sunil Gupta, Managing Partner & CEO, Yotta Infrastructure, said, "Uptime Institute's Tier IV Certification of Design Documents is the equivalent to the Oscar Awards for the datacentre industry, and we are thrilled with this achievement! Since inception, we have committed to provide the highest quality of datacentre and associated tech services to our customers, and we are happy to deliver what we promised our customers at the onset. It was a gruelling process that took over ten months to achieve. It demonstrates our relentless pursuit for innovation and is a testimony of our unparalleled commitment to our customers who look for nothing but the best. Having secured this initial design certification, we're now also moving forward immediately with the Uptime Institute Tier Certification of Constructed Facility (TCCF) which is expected to be completed and earned over the next few weeks."

"For the design for Yotta NM1 to achieve the Uptime Institute Tier IV Certification of Design Documents, while still keeping the space usage and overall costs at an optimised level, required an out of the box design approach. Yotta achieved this milestone by implementing truly unique and innovative design and engineering. This is most impressive," said Martin McCarthy, Chairman & CEO, Uptime Institute. "We congratulate Yotta Infrastructure on this rare achievement, for not only the largest datacentre designs in India, but one of the largest Uptime Institute Tier IV Certification of Design Documents to be awarded worldwide-ever."

Explaining the Fault Tolerant design of Yotta NM1, NK Jain, Chief Technical Advisor at Yotta Infrastructure, said, "Any single point of failure in power and cooling systems

FOR THE DESIGN FOR YOTTA NM1 TO ACHIEVE THE UPTIME INSTITUTE TIER IV CERTIFICATION OF DESIGN DOCUMENTS, WHILE STILL KEEPING THE SPACE USAGE AND OVERALL COSTS AT AN OPTIMISED LEVEL, REQUIRED AN OUT OF THE BOX DESIGN APPROACH. YOTTA ACHIEVED THIS MILESTONE BY IMPLEMENTING TRULY UNIQUE AND INNOVATIVE DESIGN AND ENGINEERING. THIS IS MOST IMPRESSIVE

— Martin McCarthy, Chairman & CEO, Uptime Institute

IN THE ERA OF THE FOURTH INDUSTRIAL REVOLUTION, WE EXPECT REGULATORY SUPPORT TO AUGMENT THE DATA CENTRE DEMAND IN INDIA. POLICY IMPETUS SUCH AS THE NATIONAL E-COMMERCE POLICY, PERSONAL DATA PROTECTION BILL, PROPOSED POLICY ON DATA CENTRE PARKS AND DIGITAL INITIATIVES BY THE GOVERNMENT WILL ACCELERATE DEMAND. THE COVID-19 SITUATION WILL FURTHER PROPEL THE NEXT WAVE OF GROWTH IN THE SECTOR

— Anshuman Magazine, Chairman & CEO, India, South East Asia, West Asia & Africa, CBRE

and various supporting systems including structural, civil, automation and others cannot bring down a customer's rack or other infrastructure at any point of time. Equally stringent are the criteria that even if there is an incident of fire at any place in the datacentre, full power and cooling should continue to the rack for at least one hour, even while fire may still be on."

Uptime Institute's proprietary but freely available Tier Standard is the globally recognised standard for datacentre reliability and overall performance, with over 1,600 Certifications issued in over 98 countries around the globe, said Mustapha Louni, Managing MD, West Asia and Africa. "Tier IV site infrastructure builds on the capabilities of Tier III, adding the concept of Fault Tolerance. Tier IV Certification designates the highest level of availability, performance and resilience that a datacentre can achieve. It is designed to support mission-critical operations, where failure is not a option."

Declining Investment?

While the above instance is truly inspiring for the Indian enterprises, there is some indication that post Corona spread, the expenditure on IT has recorded the steepest decline in India. Gartner has recently published a report in which it states the decline on IT expenditure by the CIOs in India to be at 8.1%, steepest fall in 2020. Gartner points to the apprehension of economic downturn as a result of Corona as the main reason behind this constricted investment in the IT infrastructure. Especially, investment on the on-premise datacentres has registered a setback at -13.2%, following on the heels of investment on devices at -15.1%.

On the other hand, a CBRE Report says that the datacentre market of India is slated to grow upto 40%, in cities like Mumbai, Delhi, Bangalore, Chennai, Kolkatta, Pune and NCR. Out of these, the growth is likely to be maximum in Mumbai at 41%, followed by Bangalore at 17% and Delhi-NCR at 16%. This report cites the rising demand and supply as the basis for this growth.

"With growing digital consumption patterns such as online gaming, online education, streaming, e-commerce, total internet hits etc., DC (datacentre) operators are expected to see a huge demand for datacentre space, thereby scaling up their DC facilities quickly to serve hyperscalers & enterprise clients," the CBRE Report said.

Another report from Orbis Research corroborates the findings of CBRE above. The report on Global Micro Server Market gives an in-depth quantitative and qualitative assessment by analysing all the data collected from market respondents and industry analysts across major verticals in the industry's value chain. Further, the research report also gives an overview of new trends in the global Micro Server market. The findings are given for different regions of the world.

The micro server market is projected to register a CAGR of 9.11% over the forecast period of 2019- 2024. According to the report, Cloud Computing Micro Servers may Offers Potential Growth.

The report explains that Hybrid Cloud is a combination of a public cloud provider, such as Google cloud, Amazon web services with a private cloud, i.e., designed to be used by a single organisation. Currently, many organisations, regardless of size, are transforming from traditional to digital mode of business.

THE FEAR OF A GLOBAL ECONOMIC RECESSION DUE TO THE COVID-19 PANDEMIC IS FORCING CIOs IN INDIA TO BE VERY CAUTIOUS ON THEIR IT SPENDING THIS YEAR. IN PARTNERSHIP WITH THEIR CFOs, CIOs IN INDIA ARE REPRIORITISING THEIR IT BUDGETS ON MISSION CRITICAL INITIATIVES

— Naveen Mishra, Senior Research Director, Gartner

Further, MSMEs are increasingly using big data analytics to acquire better business insights and are going for Hybrid Cloud services to save money on operations. Thus, low-cost storage of data needs micro-servers provide not only savings on expenditure, but also low power usage and acquire less space. Hence, they are regarded as benefic solutions over rack servers or blade servers for the MSMEs.

Many organisations need to update their applications frequently. This may be several times a day because of high user demands for interactive, rich and dynamic experience on various platforms. Hence, MSMEs use micro-server. Moreover, micro-servers provide scalability and agility on the cloud platform. The report says that because of these reasons, the usage of micro-servers may rise.

The report further says that Asia Pacific shall see the fastest growth in micro-servers usage. It makes a special mention of India, where because of Make in India initiative, MSMEs may demand more usage of micro-servers.

Yet another report from Orion Market Research says that the global cloud migration market for cloud migration is estimated to have considerable CAGR of 26.5% during the forecast period of 2020-2026. The major factor that

NOW, MORE THAN EVER, TO MAINTAIN BUSINESS CONTINUITY, ORGANISATIONS MUST PROTECT THEIR DATA IN ORDER TO OPERATE EFFICIENTLY AND WITHOUT DISRUPTION. HPE PRIMERA AND HPE NIMBLE STORAGE CUSTOMERS ARE ABLE TO ACCELERATE INNOVATION AND ADAPT TO THE CHANGING CIRCUMSTANCES OF THEIR BUSINESSES, WHILE ALSO PRESERVING CASH FLOW VIA HPE GREENLAKE, WITHOUT COMPROMISE TO APPLICATIONS. HPE REDUCES RISK, ELIMINATES COMPLEXITY AND LOWERS COSTS ASSOCIATED WITH DATA PROTECTION AND HAS THE WORLD'S SMARTEST STORAGE THAT UTILISES AI TO SELF-OPTIMISE IN REAL-TIME, GIVING CUSTOMERS THE POWER TO RUN THEIR INFRASTRUCTURE WITH AGILITY AND RELIABILITY

— Omer Asad, VP and GM, HPE Primera & HPE Nimble Storage

THE INTELLIGENT EDGE IS THE CATALYST THAT WILL SPARK LIMITLESS POSSIBILITIES FOR ORGANISATIONS AND ENTERPRISES THAT WANT TO ACCELERATE TRANSFORMATION AND ENSURE BUSINESS CONTINUITY BY LEVERAGING THEIR TECHNOLOGY INVESTMENTS AS THEIR GREATEST ASSET

— Keerti Melkote, President, Aruba

propels the market growth is the significant adoption of Cloud computing services in enterprises for better business outcomes through cost effective cloud migration services. Hybrid Cloud is becoming increasingly widespread and thus organisations require functional solutions that assist in obtaining the advantages of strategic workload allocation. With the rise witnessed in cloud migration services, organisations now have the prospect to create hybrid Cloud environments without having to splurge any money for in-house datacentres. Therefore, with the adoption of hybrid Cloud, the Cloud migration services are increasingly adopted by the enterprises that further contribute in the growth of the market.

The report estimates that through collaboration, the reliance on on-premises private cloud servers can be reduced significantly and companies can accumulate a strong portfolio of private servers that are handled by a skilled cloud services provider. Such collaborations can assist in maintaining a huge presence in the market for small and mid-sized organisations, enabling them to take advantage of everything a cloud approach has to offer. Even in the large-sized organisations that already possess private and public cloud infrastructures, migration can certainly assist in capitalising on their existing datacentres and cutting expenditures with strategic off-site hosting simultaneously.

AI-Driven Automated Datacentre

There are datacentre companies also adding emerging tech to their establishments to evolve state-of-the-art, agile and efficient datacentre solutions. Hewlett Packard Enterprise (HPE) has made these additions to HPE Primera and HPE Nimble Storage, including an AI-driven, self-healing and self-optimised system that delivers real-time autonomous operations.

This is part of a comprehensive update to the Intelligent Data Platform that provides customers with an AI-driven, built for cloud, as-a-service offering.

New capabilities include:

- Self-optimising system operations with embedded AI in HPE Primera and advanced cross-stack analytics in HPE InfoSight for Hyper-V
- Disaster recovery from a metro-wide disaster with 3-site replication across global sites for HPE Primera and HPE Nimble Storage, and near-instant asynchronous replication for HPE Primera
- All-NVMe support for HPE Primera that improves performance density, and Storage Class Memory for HPE Nimble Storage that delivers 2X faster response times
- On-demand storage automation optimised for virtualisation and containers for HPE Primera

Primera and Nimble Storage provide a modern, as-a-service experience through HPE GreenLake, combined with intelligence and automation that ensures applications are always-on and available.

Disruption Prevention

HPE InfoSight AI for infrastructure predicts and prevents disruptions from storage to virtual machines (VM). It can automatically act on intelligence in Primera to ensure

mission-critical apps are always-on and always-fast.

Primera is architected with an embedded AI engine that processes globally trained machine learning models to deliver real-time predictions into application behaviour and performance patterns. Now, it can take action on the predictions to self-optimise system operations in real-time by intelligently and dynamically optimising resource utilisation to ensure fast and predictable performance.

InfoSight for Nimble Storage now simplifies VM management and enables customers with Hyper-V environments with cross-stack analytics that pinpoints abnormal performance issues between storage and VMs, and underutilised virtual resources.

ARUBA UNIFIES THE INFRASTRUCTURE ACROSS THE ENTERPRISE BUILT ON THE FOLLOWING CORE PRINCIPLES

- **AIOps** is the most important component of Aruba ESP, which uses AI and analytics to identify the main underlying causes with more than 95% accuracy, auto-remediate network issues, proactively monitor the user experience, tune the network to prevent problems before they occur and use peer benchmarking and prescriptive recommendations to continuously optimise and secure the network. In a live customer deployment, using AIOps resulted in a 15% increase in throughput capacity and reduced issue resolution time by nearly 90%, ultimately resulting in a vastly improved end user and IT experience.
- **Unified infrastructure** consolidates all network operations for switching, Wi-Fi and SD-WAN across campus, datacentre, branch and remote worker environments under Aruba Central, a cloud-native, single-pane-of-glass console that correlates cross-domain events to reduce issue resolution time and manual errors. In addition, Aruba's unified infrastructure approach provides customers with a choice between controller services on-premises or in the cloud, delivering maximum flexibility at enterprise scale.
- **Zero trust network security** combines built-in role-based access technology, Dynamic Segmentation and identity-based intrusion detection to authenticate, authorize and control every user and device connecting to the network, while still detecting, preventing, isolating and stopping attacks before they impact the business.

Aruba, another HPE company, introduced Aruba ESP (Edge Services Platform), an AI-powered, Cloud-native platform that predicts and resolves problems at the network edge before they happen. Built on AIOps, Zero Trust network security and a Unified Infrastructure for campus, datacentre, branch and remote worker locations, Aruba ESP delivers an automated, all-in-one platform that continuously analyses data across domains, ensures SLAs, identifies anomalies and self-optimises, while seeing and securing unknown devices on the network.

Aruba ESP is designed to deliver a Cloud experience at the edge and can be consumed either as a service in the cloud or on-premises, as a managed service delivered through Aruba partners, or via network as a service through HPE GreenLake.

Tailored for varying economic requirements, customers may also procure it with flexible financing options via HPE Financial Services. Utilising unstructured data at the edge requires a network that leverages AI via network telemetry to process that data at a rate and volume beyond what's possible at human scale.

It also requires an infrastructure with an AI-powered "sixth sense" that proactively identifies impending issues, recommends an accurate resolution and leverages automation to turn that into logical actions, all without manual intervention.

Similarly, Extreme Networks has integrated cloud management with AI & ML in its offering of a public cloud datacentre. The ExtremeCloud IQ platform is grounded by end-to-end enterprise network technology to help with data collection used for building, securing, and maintaining both agile and distributed work environments.

Extreme Networks is also boosting ExtremeCloud IQ cloud capabilities to provide 'unlimited' data to its customers. Existing ExtremeCloud IQ subscribers will be upgraded to unlimited data in this calendar year.

For customers in Australia and New Zealand, the data will reside in a Sydney-based cloud datacentre. Globally, ExtremeCloud IQ leverages 15 regional datacentres hosted by Amazon and Google, with Microsoft datacentres coming soon.

Sustainable Datacentre

A sustainable datacentre uses degradable material in its infrastructure and also low-cost energy options. A new report on Green Datacentre market offers a detailed assessment of this vertical with regards to the elements

IN A POST-COVID WORLD, IT TEAMS IN EVERY INDUSTRY WILL NEED MORE CONTROL AND BETTER INSIGHTS THAN EVER BEFORE TO ENSURE A SECURE, ENTERPRISE-GRADE CONNECTION FOR EMPLOYEES, WHEREVER THEY ARE LOCATED, AND CLOUD APPLICATIONS AND MANAGEMENT WILL BE REQUIRED TO SCALE AND ADAPT

— Zeus Kerravala, Founder & Principal, ZK Research

impacting the market size. Consisting of the current and future trends defining the dynamics of this vertical, this report also includes the regional landscape of Green Datacentre market in sync with its competitive terrain.

According to this report, sustainable Datacentre Market will exceed USD 35 billion by 2026. Growth of mega datacentres and trend of collocation will drive the market growth over the forecast time span of 2020-2026. According to the report, the sharp rise of cloud computing and increasing demand for data storage platforms will lead to a sharp rise in the construction of mega datacentres. The report points out that the enterprises including Google and Amazon are implementing hyper-scale and mega datacentres for storing data in new markets such as India and Mexico. Players are focusing on developing energy-efficient products and solutions to provide customers better products and sustain in the highly competitive market.

Co-Location Platforms for MSMEs

The rising adoption of co-location services by the MSMEs is accelerating the industry growth, says the report. These services are being widely adopted by organisations attempting to cut expenses incurred by maintaining and construction of datacentres. Co-location datacentres provide power, cooling, storage, server security and networking equipment. The need to cut recurring costs and opex is forcing even large companies to opt for a sustainable datacentre solution, says the report.

The Management Software Service Segment

This segment in the sustainable datacentre market is expected to see high growth in the coming years, according to this report. These services are essential for the efficient functioning of datacentres to ensure maximum production. The rising demand for reducing operational costs and providing fast high-quality IT infrastructure to support new business enterprises and MSMEs has led to the rising deployment of management software. Enterprises are recruiting several managed and professional service providers to optimise the IT infrastructure and manage systems and datacentres to achieve the desired business objectives and efficiencies.

The Asia Pacific sustainable datacentre market will evince a rising demand in the coming years, owing to the adoption and the growing usage of emerging technologies such as Cloud, IoT and AI, in countries including India, China, Japan, and Singapore. Technologies, such as ML and IoT, integrated with the systems by manufacturing companies will result in a growth of the volume of data generated, thus increase in the pressure of building sophisticated datacentre infrastructure. In addition, government initiatives, such as Digital India and Smart Cities, are further giving a fillip to the adoption of Cloud computing and IoT in India.

From the above, we not only see a melange of datacentre technologies growing in future, but also a focus on the fine tuning the efficiencies in the infrastructure, energy usage and cost investment by the enterprises, MSMEs and the government. It is no longer a situation where a single solution can satisfy all sectors. Each solution has to be carefully thought out to suit the specific needs of the sectors which are going to use it. innovation has to acquire a diversity if it has to travel to diverse locales of the world.

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—SRIDHAR PINNAPUREDDY
Founder and CEO, CtrlS Datacenters

CtrlS Is Emerging As World's Largest Hyperscale Rated 4 Datacenter With Highest Footprint of 6 Million Sqft. Sridhar Pinnapureddy, Founder and CEO, CtrlS Datacenters, tells us more

What are the trends that are likely to shape the Indian datacentre industry?

Hybrid IT deployment including cloud, IoT, AI, edge computing, intelligent monitoring and the impending Personal Data Protection Bill 2019 will play a key role in shaping the Indian datacentre Industry. Cloud adoption in India according to me is still in a very nascent stage.

It will gather momentum leading to higher occupancy of datacentres in the country. IoT deployment in India has surpassed 250 million and will cross a 2 billion in the next two years, witnessing major deployments across manufacturing, healthcare, retail, build-

"1,000 EDGE DATA CENTRES

ings, utilities, automobiles, transportation among others. This will lead to a surge of data across the connected devices, requiring both compute and storage, as most of the data will be analysed through analytics and leveraged by technologies such as AI/ML.

With rapid penetration of OTT, gaming and E-commerce transactions in the country, the tier-2, tier-3, including some select tier-4 cities, will seek high quality of services. Therefore, the content will have to move to the edge. This will see a rise in edge data centers.

Coming to the Personal Data Protection Bill 2019, the passing of the bill will lead to large localisation of data in the country, leading to large co-location and cloud capacity requirements in the country.

CtrlS is said to be emerging as the world's largest hyperscale rated-4 datacentre. Tell us about it

Yes, while CtrlS is Asia's largest Rated-4 Datacentre, we are emerging as the World's largest Rated-4 Hyperscale datacentre. We currently own and operated 1 million square feet of datacentre space in the country. All of them are built in the hyperscale format. We are now planning another 5 million square feet in the country, two million square feet hyperscale facilities each, in Mumbai and Hyderabad, and another 1 million square feet facility in Chennai, to address the growing demands of the country. With these projects, we will be the market leaders in the Indian Datacentre Industry and also as the World's largest Rated-4 Hyperscale datacentre.

What is the secret to growth at CtrlS?

Focus on the employees and customers has been our major thrust. It is my belief that happy employees make happy customers. Today, we serve 60 of the Fortune 500 global multinationals and 108 of ET 500 companies in India, including the world's largest telecom, manufacturing, e-commerce, financial services, and cloud players. Our focus has been to ensuring both employee and customer delight – both are like the eyes of our organization. This has resulted in CtrlS emerging as Top 100 Great Places to Work.

In fact, our NPS score of 60 reflects that our customers love CtrlS, and we love them too. The nature of the relationship with our customers is not transactional. We help, advise and act as an extended IT arm to our customers – which is why we have 89% our customers with us for over a decade. That speaks volumes about the loyalty and patronage that we enjoy. Our culture is a major differentiator – a culture of trust, fairness, integrity and transparency has helped us establish as the leader in the data center market. We thank both our employees and customers for the trust reposed in us. We will continue to work harder to delight them in future too.

How are you rebalancing your provision of data center services, co-location and capacity management?

At CtrlS, innovation has been the bedrock of growth. We have now invested in automation to ensure all the manual processes are automated – be it provisioning, capacity management and customer support. Robotic process automation (RPA) and AI have been key to ensuring that we are able to enhance efficiency, productivity and plan for the future. Our fully-owned subsidiary, Big Little Innovation (BLI), which is focused on AI/ML and RPA technologies, is currently working on100+ internal projects to automate across our group companies.

What has been the impact of Covid-19 on the data center industry?

This is indeed a very important question. CIOs across industries are doing a commendable job working 14 to 16 hours a day during Covid-19, and they are the true technology heroes during this crisis. Having said that, every business whether they are shut during lockdown or operational have a common need. Keep the infrastructure and applications running and secure the same from external security threats.

Companies such as online groceries, OTT players, online education and those among essential services, have witnessed a rapid growth during the Covid-19 pandemic, and they have scaled up their IT infrastructure primarily on the cloud to keep up with the growing demand.

Those in manufacturing and non-essential services have optimized their infrastructure, while securing the same. The overall Indian data center industry will continue to witness growth during the pandemic as DCs power both – countries' data and economy.

What is the role played as a data center to conserve nature? Are there any green initiatives?

We care for Mother Earth and we are aligned with United

COMING TO THE IMPACT OF OUR GREEN INITIATIVES, WE HAVE ELIMINATED CARBON FOOT PRINT EQUIVALENT TO 17,134 PASSENGERS DRIVEN IN A YEAR, EQUIVALENT TO 30 MILLION LITRES OF DIESEL CONSUMED IN A YEAR, BESIDES ELIMINATING 28,148 TONS OF WASTE PER YEAR

UPCOMING HYPERSCALE DATA PARK MUMBAI - 2 MILLION SQFT_ 250 MW

Nations Sustainable Development Goals. In fact, our Mumbai Datacentre is the world's 1st LEED Platinum Certified v4 O+M Datacentre. Our Noida datacente is India's first and only 100% air pollution free and quake proof facility. Our Bangalore and Hyderabad facilities are LEED Platinum certified. This aside, we have had 80 innovations in energy efficiency, and we have bagged CII's Energy Efficiency Awards over the last decade.

Coming to the impact our green initiatives, we have eliminated carbon foot print equivalent to 17,134 passengers driven in a year, equivalent to 30 million litres of diesel consumed in a year, besides eliminating 28,148 tons of waste per year. You would be delighted to note that our Mumbai DC-2 datacentre facility is the world's 1st solar-covered rated-4 datacentre in the world. It generates 1 MW of power through solar panels that surround our building.

We are also planning a 200 MW solar plant to support our power consumption in an effort to reduce the carbon footprint. In the future, we plan to power 100% of our facilities primarily through clean energy majorly through solar power.

Edge computing is likely to be the future. What are your plans?

The digital consumer behaviour has undergone a sea change in the last five years as the millennials are taking to the Internet just like fish to water. We have 290 million Internet users in rural India. This number is likely to surpass 600 million by 2025. The millennials and other technology-savvy users are driving the consumption of e-commerce, social media, OTTs, online gaming, distance education, online payment transactions etc. To address this growing demand we are planning edge datacentres, they would primarily be located in Tier-2 and Tier-3 cities.

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—MANOJ PAUL
MD, GPX India

"A DATACENTRE WITH OPEN CLOUD

GPX, a privately held company, designs, owns and operates, next generation, carrier neutral Datacentres (DCs) in rapidly developing commercial markets of Africa and South Asia regions. The DCs are strategically positioned in hub locations, which have easy access to important undersea cable systems. Manoj Paul, MD, GPX India, tells us more

What are the emerging trends for DC networking in 2020 and beyond?

The DC industry is growing very rapidly. Typically, a new DC building gets fully occupied and is sold out in 2-3 years. But when customers located in one DC expand to in a new DC building, they need high-speed connectivity, multiple 100gbps between the two locations.

Carrier neutral DCs are becoming more popular so that customers have multiple options for building their network switch fabric-based connectivity like Internet Exchange, Cloud Exchange and direct peering between Telcos and ISPs with Content providers (OTTs) over multiple 100gbps links.

How is the market now for adoption of hybrid cloud and DC virtualisation?

Cloud adoption has been seeing steady growth worldwide and also in India. According to Gartner, with the total public cloud services spend in India at $2.4 bn in 2019, India has recorded the third-highest growth rate of 24.5% in 2019 after China (33%) and Indonesia (29%).

It is expected that by 2022, over 60% of all mid and large enterprises would have migrated some of their apps and workloads on the cloud. The cloud industry in India is expected to grow at the rate of 30%+ YoY with the largest share being for Software-as-a-Service (SaaS).

Organisations, instead of buying a CRM package and procuring hardware to run it and deploying IT manpower to manage it, are preferring solutions on the cloud, so that they can avoid capex and grow easily on demand and scale down whenever required, without worrying about the uptime issues.

How are you rebalancing your provision of DC services, co-location and capacity management?

The presence of nodes for AWS Direct Connect, Google Dedicated Interconnect and Oracle Fast Connect within GPX DC and now with the launch of the Cloud Exchange, there will be a big demand from enterprises who would like to set up their own IT infrastructure at the GPX DC and connect to CSPs within the DC for their DR on cloud or shifting various workloads to cloud. GPX's new DC was launched in Nov 2019, which can support 1,400+ racks and has the required capacity to support this growth in demand from the enterprise customers.

We foresee big demand for network bandwidth for which the GPX DC has 12 telecom service providers, many of them have deployed DWDM network and can provide multiple 100Gbps bandwidths to meet any level of bandwidth that a customer may need.

How are you updating DR plans to reflect this new world of vendor-distributed work?

Cloud-based IT resources ensure easy connectivity for the distributed employees, partners and vendors. Cloud supports scalability based on need, both for computing resources and bandwidth. Enterprises, even small and medium, can easily and cost-effectively deploy DR on cloud and ring-fence their IT infra with redundancy through a DR set up and thus ensure their operations are not impacted because of the failure of IT set up in one place.

Are you looking at remote management of DCs?

Yes, that's an option in case of a crisis. Firstly, we have trained manpower 24x7 in the DC to manage the operations. We restrict remote access to our systems to ensure there is no possibility of a failure due to security breach. However, we have provision for the senior management to have access to the management system remotely, and to be always aware of the operating parameters with live updates. The DCs can also be monitored from other DCs of GPX in case of a crisis.

Demand for cloud services will soar in some sectors, but wither in some other verticals. Which sectors, specifically?

Cloud adoption will accelerate in India as less than 50% of organisations have adopted cloud. Within that, most have a hybrid strategy of certain workloads on-premise and others on cloud. The journey to everything on the cloud is just starting for most Indian organisations. Hence, we can see good growth in the near future.

Specific sectors that will see a huge cloud demand are:

- **Education:** It will be a lot more on digital media and most learning institutes instead of buying hardware and software will roll out online services using the power of the cloud.
- **OTT:** India is the only country with over 25 homegrown and 7 international OTT networks, with around 10GB download per month per smartphone-highest in the world. More and more content including movies would be consumed over mobile, smart TVs platforms which would mean demand for more resources on the cloud to cater to this increased demand.
- **Financial institutes:** More and more people will adopt electronic payments and most of the new-age financial institutes rely heavily on cloud services.
- **E-commerce:** It will grow, and so will be their use of public cloud.
- **Banking and insurance:** More and more people will adopt electronic payments, branchless banking, number of online transactions would grow as most of the new-age financial institutes rely heavily on cloud services. The companies in this sector are actively using interconnection to scale, so they can better serve all the players, and consumers that need to interact in real-time, within the growing banking and insurance industry, along with the mobile digital payments industry.
- **Telecommunications:** Telecom companies are also becoming content providers and delivering platforms

CLOUD ADOPTION HAS BEEN SEEING STEADY GROWTH WORLDWIDE AND ALSO IN INDIA. ACCORDING TO GARTNER, WITH THE TOTAL PUBLIC CLOUD SERVICES SPEND IN INDIA AT $2.4 BN IN 2019, INDIA HAS RECORDED THE THIRD-HIGHEST GROWTH RATE OF 24.5% IN 2019 AFTER CHINA (33%) AND INDONESIA (29%)

for new modes of doing business, e.g., Jio. Many telecom companies would also use cloud services. These communications carriers create new types of interconnection services to fight commoditisation and scale those services to remain relevant in a more competitive marketplace.

- **Manufacturing:** New segments in this the traditional market, such as the industrial Internet (Industry 4.0) and the Internet of Things (IoT), are driving the need for compute and storage in the cloud. Greater interconnection would be needed that allows the manufacturers and their customers to gain new efficiencies by scaling the digital capabilities of their IT infrastructures and reducing costs.
- **Securities and trading:** Controlled within a regulatory environment and measured by the speed in which they can handle a growing number of transactions, financial services companies are leveraging cloud and better Interconnection to distributed users to scale their digital platforms to do more trades faster, while maintaining strict compliance regulations.

How are CIOs looking at DCs in the Covid-19 situation?

During the Covid-19 lockdown, many organisations realised that their in-house DC is very difficult to maintain in the situation, wherein, the staff was not available in the office and could not get to the office for rectification/ upgrade due to travel restrictions during lockdown.

Moreover, since suddenly, several employees were logging in remotely, the Internet bandwidth at the head office got chocked leading to poor performance. This experience would push enterprises, small or large, to move out of their in-house DCs (server farms) and either migrate to cloud or move their inhouse IT infrastructure to the third-party DCs like GPX.

The third-party DC service providers come under ESMA (Essential Services Maintenance Act). They can continue the operation even during such a lockdown period. It also means that in case any maintenance support is needed, the engineers present inside the DC can provide the necessary remote hands support, and take care of the enterprises need, without any employee of the enterprise having to travel during a lockdown.

Moreover, in a situation like today, due to WFH, so many more employees and partners are logging in remotely. This can be a challenge, if only one or two service providers are present in the building of the enterprise. However, in a DC like GPX, which has 12 telecom service providers and over 130 ISPs present with their fibre infrastructure, an enterprise customer can easily get additional bandwidth of several 10G or even 100G at a competitive price, in a matter of few hours.

Covid-19 may either kill the DC, or forever change storage. What do you think about this?

In the next few years, we are going to see businesses and individuals continuing with the increased use of WFH, video conferencing, webinars and online learning. There will be more digital payments.

Higher adoption of cloud services and more enterprises would move out from in-house DCs to third-party DCs. All these would lead to a higher demand for DC co-location services. Note, that growth in cloud services also means growth in DC business, where CSPs host their servers.

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—KRITHIWAS NEELAKANTAN
Director, Next Gen Datacentre & Cloud, NetApp

NetApp offers hybrid cloud data services for management of applications and data across cloud and on-premises environments. Here, Krithiwas Neelakantan, Director, Next Gen Datacentre & Cloud, NetApp, talks about the emerging trends for datacentre networking and more

AUTOMATING DATACENTRE

What are the five emerging trends for Datacentre networking in 2020?

Some of the emerging trends to look out for Datacentre networking include:

- **Hybrid IT deployments –** Data centres will deploy more hybrid cloud architecture and multi-cloud solutions, allowing companies to take advantage of the power of public cloud computing while enjoying the security of a private network.

Hybrid cloud architecture will store data in a private network while also establishing connections to a public cloud service. This architecture allows companies to protect and control their data while still using it in a public cloud environment.

- **Hyper-scale data centres –** While the demand for cloud services continue their momentum, there will be massive investments towards the construction of more Datacentre facilities.
- **Datacentre automation –** Moving forward, enterprises will focus on increasing their agility and operational efficiency. Datacentre automation through software solutions will ensure that the growing demand for data and the speed at which businesses operate today will not be put at risk which could have been a possibility due to manual troubleshooting and monitoring
- **AI services –** AI's potential in the Datacentre is nearly limitless and we have only scratched the surface. Increased adoption of AI will enable Datacentres to meet the most challenging SLAs, bring down operation costs, protect uptime - and even ensure better client servicing by reducing the number of incidents that require escalation.
- **Operation excellence and cost optimisation –** With huge dependency on a diversified IT environment, Datacentre operation teams are ensuring that critical applications run smoothly without impacting business. Managing a skilled workforce with an automated maintenance of Datacentre management will be key trend moving forward.
- **Data platform Innovation –** Organisations will invest heavily in storage resources required to accommodate the data deluge which is happening today. The advent of 5G and IoT devices will be a catalyst for storage technology innovation

How is the market now for adoption of hybrid cloud and Datacentre virtualisation?

Today, customers are looking towards increased agility and automation from their IT service providers. Hybrid multi-cloud solutions are the way forward when to comes to deployment of services because of the primary benefit of agility and the need to adapt and change direction quickly as a core principle of a digital business. Enterprises need to combine public clouds, private clouds, and on-premises resources to gain the agility they need for a competitive advantage.

With hybrid cloud, the days of silos and months of provisioning time are over - private clouds are responding at the speed of the public cloud. Advantage comes with creating a hybrid cloud infrastructure based on frictionless consumption, self-service, automation, programmable APIs and infrastructure independence. This advantage ensures customers can unleash agility and latent abilities in their own organisations to thrive with data.

With the unprecedented demand for data, enterprises that have begun their cloud journey will automatically opt for server virtualisation. Going forward, more than half of organisations plan to use storage virtualisation and application virtualisation by 2021. Application virtualisation is predicted to jump from 39% now to 56% by then. We will see a fully virtualised software-defined Datacentre architecture, that will play a key role in provisioning of IT resources and applications and make them available for consumption.

How are you rebalancing your provision of Datacentre services, co-location and capacity management?

A crisis of this scale calls for businesses to relook at their existing protocols and facilities and identify opportunities to fine-tune their infrastructure. The future demands that we support and empower our workforce to keep their productivity high – and extend our businesses to our customers in a smooth digitized manner.

We have capacity management analytic solutions that help gain visibility into IT utilisation, so that teams can manage capacity and efficiently dispense capital. Our On-Command Insight makes it easy by providing a global view of the storage infrastructure. So, one can track data infrastructure usage in multiple geographic locations simultaneously, monitor hybrid cloud capacity, performance, and cost trends. It can also help align costs with service levels and leverage a centralized view into historical trends to forecast performance and capacity requirements.

How are you updating DR plans to reflect this new world of vendor-distributed work?

Our disaster recovery plans are broadly based on the three pillars of business continuity:

- Understanding if infrastructure is ready for the next 30 days: Proactively protect and optimize hybrid cloud infrastructure with a range of tools that can give

enterprise complete visibility into their infrastructure—both on the public cloud and on-premises. For e.g. NetApp Active IQ delivers AI-driven insights into the health of all NetApp systems, including new predictive risk models for systems that are reaching performance or capacity limits

- Supporting remote workers: Helping enterprises roll out new remote work policies, by helping them build and deploy cloud-based EUC and VDI to improve the performance and scalability of on-premises VDI infrastructure.
- Ensuring that data and applications are available and performing:We can help organizations rationalize their data and application infrastructure, move data between on-premises storage and cloud, and help ensure data availability across clouds.

Are you looking at remote management of Datacentres?

The substantial increase in data and the speed at which businesses operate today mean that manual monitoring, troubleshooting and remediation is too slow to be effective and can put businesses at risk. Here, automation can make day-two operations almost autonomous.

Datacentre automation is immensely valuable as it frees up human computational time and delivers insight into server nodes and configurations. It also automates routine procedures like updating, patching, and reporting. Datacentre automation helps produce and program all Datacentre scheduling and monitoring tasks as well as enforces regulation of standards and policies.

We are providing remote support to sites that do not permit physical access. Our Technical Support Centre is providing a robust 24/7 support with 11 centres around the world. Our Business Continuity Plan is designed to provide a seamless remote or work-from-home capability for our support teams. Our onsite capabilities continue to operate, except in areas where official restrictions are in place that prevent a field engineer from physically accessing a customer or partner site.

Demand for cloud services will soar in some sectors, but wither in other verticals. Which sectors, specifically?

The whole demand for cloud services is built on agility, scale and simplicity. Industries are bound to benefit from cloud services in the current situation. While Covid has taught us to deliver services to any device/customers sitting anywhere, cloud is the best go-to model when it comes to execution.

In this current scenario, we have seen the surge in adoption of hybrid cloud model, in education, healthcare, BFSI, public sector, retail and agri-tech sectors. This is primarily because of two reasons: flexibility and scalability. A hybrid cloud approach aligns to a dynamic environment and lets enterprises match their actual data management requirements to the public cloud, private cloud, or on-premises resources that are best able to handle them.

Similarly, we are witnessing dynamic workloads due to huge demand spikes. A hybrid model approach is ideal as it will allow enterprises to easily scale public cloud for dynamic workloads, while leaving less volatile or more sensitive, workloads to a private cloud or on-premises Datacentre.

How are CIOs looking at Datacentres in post Covid-19?

Increasingly, CIOs are looking to drive value for their business. The pandemic is an interesting inflection point for CIOs to recraft their IT plans in a hybrid cloud environment. The key is to align IT with functional and operational benefits which includes, rebooting Datacentre strategy and ensure agility, scalability and security in a true hybrid environment.

The current circumstances have put the spotlight on the need for a proper data management policy for enterprises. For a CIO, disaster recovery and data protection will be major factors in data management policy. It is pertinent to ensure responsive, uninterrupted experiences with key enterprise applications (such as Oracle Database, SAP HANA, Microsoft SQL Server, MongoDB and new AI workloads). Powerful data management softwares will deliver the industry's highest performance, superior flexibility and best-in-class data services and cloud integration.

Fast and efficient array-based data replication for backup, disaster recovery; and data mobility solutions will be in the forefront of data protection by implementing two physically separate, mirrored clusters. Enterprises and specifically CIOs will need to deploy data management solutions on the premise and in the cloud. This will enable simplified data management across the hybrid cloud environment. Organisations can move data to all their main public clouds, and then move it back to on premises, helping build a robust disaster recovery architecture.

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MARKET PERFECTLY PRIMED FOR CLOUD ADOPTION

ThoughtWorks is a privately owned, global technology company with 42 offices in 15 countries. It provides software design and delivery and tools and consulting services. Here, Sunit Parekh, Technical Principal at ThoughtWorks. Saurabh Mookherjee, Lead Infrastructure Consultant, ThoughtWorks, tells us more

What are the emerging trends for datacentre networking in 2020 and beyond?
The emerging trends would involve key practices like customers and accounts adopting virtual private networking. Add to this the push for higher bandwidth, low latency connectivity and the requirement for disaster recovery (DR) or backup sites which the company can temporarily relocate to, in case of security issues or natural disasters. The icing on the cake would be pre-built connectivity with cloud service providers because that enables elasticity and extensibility in infrastructure.

How is the market now for adoption of hybrid cloud and datacentre virtualisation?
We believe the market is perfectly primed for cloud adoption. Cloud technology is built on top of virtualisation, which allows for fine grained allocation of resources. This is a definitive requirement for public cloud offerings that can cater to multiple customers.

The fact is private datacentres can also benefit from deploying technologies to build private clouds. This ensures a more efficient use of hardware resources and also provides a layer of abstraction thus, freeing development teams from worrying about acquiring and provisioning infrastructure to deploy their applications on.

How are you rebalancing your provision of datacentre services, co-location and capacity management?
As of now, the trend is moving towards cloud adoption over the last couple of years. The overwhelming first choice is cloud unless there are regulatory or compliance requirements that demand on-premise datacentres. Enterprises are seeing challenges in terms of upfront capacity commitment and lead time while upgrading for future needs when they opt for on-premise datacentres.

How are you updating DR plans to reflect this new world of vendor-distributed work?
Enterprises choose datacentre vendors who have DR setups because their offerings specifically meet all regulatory and compliance guidelines. And in DR setups, connectivity between datacentres having high-bandwidth, low-latency networking is very important (mostly fibre).

Are you looking at remote management of datacentres?
The fact is no one visits datacentres anymore and that mandates the need for remote management. Additionally, cloud technologies, both public and private allow for infrastructure as code that can be maintained easily in source code version control systems - just like application code can. This provides an easy method to track configuration changes and feature introductions.

The fast-growing ecosystem of tools and techniques to develop cloud native applications means the requirement for datacentre management in the traditional sense could be minimal or not required at all in certain cases.

Demand for cloud services will soar in some sectors, but wither in other verticals. Can you mention these sectors?
We believe that cloud services will undoubtedly rise across all sectors that have been affected and servicing the Covid-19 pandemic - healthcare, insurance, financial services, education, ecommerce, telecom and more. Automobile and travel are two sectors where we will see some resistance. However, the overall trend is more towards adoption given the current scenario.

How are CIOs looking at datacentres in Covid-19?
CIOs are looking at a hybrid approach, where the strategy is to go cloud-first. Only critical applications with regulatory and compliance requirements will look at the datacentre option. The current Covid-19 crisis has pushed enterprises further towards cloud adoption as the lead time is quite high when it comes to datacentres.

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—JN MYLARAIAH
Director, Enterprise Sales, India & SAARC, CommScope

Enterprise data centres are doing more than ever, from ever-expanding storage management to bandwidth-intensive virtualised and cloud applications. With CommScope infrastructure solutions, your datacentre is ready for all this and more. Here, JN Mylaraiah, Director, Enterprise Sales, India & SAARC, CommScope, tells us more

AI, EDGE COMPUTING TO DRIVE DATACENTRE ADOPTION

What are the emerging trends for datacentre networking in 2020 and beyond?

2020 will see the rise of edge computing, thanks to the promise of 5G. In 2020 and beyond, the first applications using 5G's super high speed, low latency, machine-to-machine communications will be

introduced. These new offerings – like high-resolution cloud gaming, industrial IoT process control and onsite augmented reality guidance for workers – will demonstrate the value that 5G can unlock.

This significantly reduces latency and enables these new, low-latency 5G applications to fully realise their promise. As a result, we'll see more datacentres move to edge computing in order to bring these applications to fruition.

Next, AI will drive datacentre adoption of new technologies. The deployment of machine learning, deep learning and other AI technologies has become mainstream, powering many of the cloud and networking services used by enterprises daily.

We expect to see the use of AI accelerates, as companies increasingly use the data they collect to build and deploy AI models powering new services and generating new business insights. Datacentre networks hence need to respond to customer demand, not just with faster networks and servers in their core, but also at the edge to enable the deployment of AI models closer to end-users.

This represents both a challenge and an opportunity. If the right networking, computing and edge datacentre technologies are adopted to support AI, customers demand is expected to increase. That is why we can expect datacentre network operators to increasingly focus on how they can deliver the performance needed for AI-enabled cloud services.

We will also see the first applications of advanced technologies like 5G begin to find their way in the datacentre, while the deployment of machine learning and other AI technologies will create new ways of learning and doing things.

How are you rebalancing your provision of datacentre services, co-location and capacity management?

Enterprise datacentres are doing more than ever, from ever-expanding storage management to bandwidth intensive virtualised and cloud applications. CommScope's datacentre solutions, including a comprehensive portfolio of fibre and copper structured cabling, will allow datacentres to enable a flexible infrastructure to enhance the delivery of new enterprise applications, including managing data explosion and minimises cost upgrades.

How are CIOs looking at datacentres in Covid-19?

Before the current situation, we were already seeing that every 60 seconds, more than 38,000 hours of music on Spotify are downloaded, nearly 70,000 hours of Netflix videos are streamed and about some 150 million emails are sent. During the lockdown, we saw an increased consumption around home entertainment around the world.

Hence, we will see a faster adoption of cloud services and platforms as enterprise applications and workloads are moving toward Cloud. Accessing real-time info (stock trading) and streaming (home-based learning, Netflix) are two examples where consumers are expecting a seamless experience because to the consumers, data is presumably 'always online' and this again, will rely on the datacentre, which is expected to be optimised to meet the current needs.

Covid-19 may either kill the datacentre, or forever change storage. What do you think about it?

Covid-19 has brought to focus just how crucial connectivity is in keeping our society functioning in the face of rapid and unpredictable change. It's showing the industry the advantage of having forward-looking network design. And consequently, it's also showing the datacentre industry where the opportunities for network innovation can lie.

As datacentre operators begin to implement these changes, they're not only investing in solving today's problems, they're quietly laying the framework for a new connected world, as data centre growth continues to be spurred by the rapid pace of digitisation and the surge in demand for cloud-based services.

As the focus shifts back towards recovery and employees begin to return to their workplace, as students go back to campuses, as sports teams kick off a new season and fans enter stadiums and venues, that same "essential" infrastructure needs to be in place and will continue to be critical.

As we prepare for the next wave of evolution as the world shift back towards normalcy, the datacentre industry has to keep in mind three focus areas in order to thrive: simplicity, reliability, and adaptability.

A simple networking portfolio often provides benefits that are best understood when they aren't there – a single network to support multiple applications, power and data

on the same media, a solution that is easy to design and easy to deploy.

A reliable network provides the resiliency needed to withstand the unexpected. Performance guarantees above the industry standards provide bandwidth to support both today's applications and the applications of tomorrow.

Adaptable networks are flexible and expandable in all kinds of environments and with various types of applications. Indoors, outdoors, IT and OT networks – adaptable networks support them all.

How is the interest now for SDN-based networks?

Increasingly, fuelled by the strong growth in cloud adoption, we are seeing customers, especially from the communications service provider (CSPs) sector, transition to SDN and also NFV to jump-start agility and drive greater efficiency and savings throughout their networks. And accordingly, SDN remains top of the agenda when looking at networking investments for Indian organisations in 2020, according to a recent TechTarget study.

Realising the benefits of SDN and NFV, however, creates unique challenges—chief among which is getting the various and diverse hardware and software components in the network to talk to one another in order to manage and deliver all these services and capabilities, seamlessly and efficiently. This is where Network Automation and Orchestration (NAO) come in.

To be clear, automation and orchestration are two separate functions. Automation enables the network to complete a single task or function without human intervention—increasing the efficiency and reliability of that task. While automation refers to a single task, orchestration defines the series of steps or tasks required to fulfil a service.

Together, they ensure that specific processes – like compute allocation or provisioning of compute resources—occur consistently each time with minimum human intervention. The two are indeed separate, but they must work together in order to create the network efficiency, flexibility and value required to keep pace with the advancements of SDN and NFV.

As enterprise networks continue to virtualise and the decoupling of control and data planes increases, the role of NAO becomes more prominent. In fact, a 2019 study by Research and Markets shows global NAO spending will increase at nearly 18% CAGR, reaching nearly $20 billion (USD) by 2023.

Would you be going for high-bandwidth switches?

Across India, we are observing a demand surge for Internet bandwidth from datacentre partners and customers, to facilitate home workers and consumers. For example, datacentre operator Web Werks has seen internet traffic jump between two and ten times since the nationwide lockdown.

While the new Wi-Fi-6 in the short term promises to bring about dramatically-increased wireless bandwidth and network efficiency, and drive multi-gigabit networking that deliver exceptional wired and wireless connections for today's increasingly demanding environments, Wi-Fi-6's true benefits – and those of wireless connectivity for that matter – will only come when the technology is paired the right kind of wireless access.

Furthermore, beyond high-performance, multi-gigabit switching which enables great online experiences for remote workers in these unprecedented times, security and privacy are also critical pillars of superior user experience. The sudden switch to remote working has forced many businesses to streamline network on-boarding so users and personal endpoint devices can gain network access simply and securely.

However, the sheer volume and diversity of devices now that require network access have vastly escalated the cyber threat surface area, as each connected end device becomes a possible point of entry over poorly-secured home Wi-Fi, for an attacker to gain access to sensitive data held on the device, in the cloud, or in the corporate network. This means that remote security must now operate in sync with other security products.

We recommend deploying network switches that are not only high-bandwidth, but also dovetail secure network access for BYOD, guest users, and IT-owned devices, and ultimately unify wired and wireless network access. Undertaking this integrated approach to network infrastructure can allow even small-scale IT teams to remotely and easily add new users and devices connected with multi-gigabit switches; administer guest networks; and manage entire WiFi-enabled buildings and campuses or multi-site deployments.

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—VINOD GANESAN
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PRIVATE CLOUD FOR DATACENTRES

Many organisations in Asia Pacific have made strategic pivots and changes to their business strategies to mitigate the disruptions caused by the pandemic. Regardless of where they are in terms of preparing for the new normal, having a data-centric strategy will be key in helping them navigate an increasingly volatile operating environment and an uncertain future.

However, becoming truly data-driven has remained elusive for many organisations. Most existing data platforms are unable to provide the analytics capability on any cloud, the speed and agility the business needs as well as the security and governance required by IT teams.

Culminating their vision of an enterprise data cloud, Cloudera has launched a private cloud offering under Cloudera Data Platform to ensure every organisation has the right tools to become truly data-driven. Vinod Ganesan, Country Manager, India, Cloudera, discusses it with us in this exclusive interaction

Could you tell us about the launch of CDP private cloud and how the concept of data cloud has been evolving?

We strongly believe that data makes possible what looks impossible today. Cloudera's mission has been to empower people to draw insights from complex data patterns. We do that through our innovative data platform which has been designed to support, manage and govern data with the flexibility of deploying it across any cloud platform. We have worked with a lot of enterprise customers who are leaders in their own businesses - whether it is 8 out of the top ten global banks or 10 out of the top 10 telcos or automotive companies. We've had the privilege of an intimate view of the kind of challenges they face in their data-driven journey. We commissioned a study with the Harvard Business Review last year. The purpose of this study was to validate some of the findings that we had reached through our own customer engagements. We were looking at what are the inhibitors the customers face in their global data journey.

In a study with Harvard Business Review, Cloudera uncovered some important insights. Some statistics –

- 41% customers say that they don't have a strategy to deal with data management, especially in a multi cloud environment.
- Over 60% of the customers said that they didn't know what kind of data they needed to act as their business initiators.
- 54% customers acknowledged that data silos are their biggest challenge.
- 69% of the customers said that they required an expert's support in data architecture building. This gave us the insight that we needed to develop our own private data platform architecture.

The key tenet of this enterprise data architecture is in the form of four key capabilities we provide back to our customers.

- **The first key capability** is the ability for them to support data across hybrid and multi cloud environments. And to see how they manage this data efficiently across these environments.
- **The 2nd important aspect** is around the multifunctional ability of the platform, essentially the ability to manage the data across its life cycle, all the way from edge to AI and the ability to embark on multiple use cases that their organisations require, which needs to be supported by this platform.
- **Another key capability,** for it to effectively deliver on the capabilities, is to deliver effectively the security that cuts across all these layers and can give a different experience.
- **Last but not the least** is to be able to build all this using an open source platform. When I say open source, we're not just talking about the benefits of community innovation which we have been delivering over the years but also how do we introduce open standards and open KPIs so that they are able to integrate their legacy systems back into these environments seamlessly.

With these four crucial capabilities, Cloudera started its journey of building the industry's first enterprise data platform called Cloudera Data Platform. Back in Sept 2019, we launched the first form of this platform which is a public cloud release. We wanted to drive quick adoption and also wanted to garner feedback on its use so that we could add more value to that offering. This month, we have launched the Cloudera Private Cloud Platform. It is essentially the capability for customers to mimic the efficiencies and agility of the public cloud platforms, but with the flexibility of a private cloud. This is how our journey has evolved.

In post-lockdown period, how do you see the business growth of this private cloud platform?

These are unprecedented times which require a lot of organisations to adopt massive changes not solely on their operations but also how they manage their workforce, the way they need to scale up security and platform demands to meet the changing need. In the process, there were a lot of efficiencies and lessons learned by organisations to manage through this phase. So the key question is once this lockdown opens, are we going to go back to our original ways of working or are we going to take some of these learnings and implement them into a long term strategy?

If you look at India's scenario, IDC recently published a study, in which they said that 50% of the Indian enterprises will be adopting hybrid cloud by 2021. So, what it means is that while cloud is being seen as an enabler to drive business agility, it also comes with its own set of challenges of dealing with data management issues across hybrid cloud platforms. I think our

> THE KEY QUESTION IS ONCE THIS LOCKDOWN OPENS, ARE WE GOING TO GO BACK TO OUR ORIGINAL WAYS OF WORKING OR ARE WE GOING TO TAKE SOME OF THESE LEARNINGS AND IMPLEMENT THEM INTO A LONG TERM STRATEGY?

introduction of CDP and the Private Cloud factor that we've recently announced helps organisations who want to embark on this journey to set up that crucial data foundation which is key. For them to bounce back to business as usual, businesses will have to take significant advantage of opportunities that lie in front of them. They can't do it unless they have an underlying data platform that supports them with that required agility. Data will be an essential ingredient for every business' Get Well strategy.

Are there any challenges you're facing in countries like India while deploying this cloud platform?

The adoption of the cloud in India, especially in the industries like banking and financial services haven't really fully adopted cloud architectures because they have concerns about providing security and governance framework while supporting that required agility. One of the key patterns which is emerging in India is what we call as shadow IT. According to Gartner, 40% of the IT spend will be taken away by shadow IT.

What is shadow IT? Typically, businesses want to move at a particular pace but the IT is unable to support the pace. So, businesses go ahead and find their own investments in on-point solutions by leveraging cloud as a medium to accelerate that process. But in doing so, one of the key risks that gets uncovered is on data security and governance because you are not able to really manage that environment, you don't have control on who has access to that data, etc. So, IT now needs to take control on this aspect. That's where we can help organisations with our enterprise data cloud architecture which gives them that architecture to meet the flexibility and agility demands of the business and at the same time accelerate the deployment and mimic all the benefits that they would otherwise find in a public cloud environment. So you can now build a hybrid cloud environment which can integrate with your proprietary platforms.

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—NITIN MISHRA
Senior EVP & Chief Product Officer, NTT-Netmagic

Nitin Mishra, Senior EVP & Chief Product Officer, NTT-Netmagic, is responsible for cloud and datacentre services of NTT-Netmagic. He also looks over the security aspects. Here, he discusses some trends of datacentre operations in 2020

TRENDS IN DATACENTRE

What are the five emerging trends for datacentre networking in 2020 and beyond?

The five trends related to networking that we are witnessing are as follows:

- **Cloud Connectivity –** Cloud connectivity has rapidly come across as a major enabler for datacentres. It helps in seamless networking of different device types dispersed across geographic locations. Customers with workloads in datacentre and public cloud(s) are increasingly leveraging cloud connectivity to create secure Private networks.
- **Software Defined Networks –** Adoption of software defined networking is expected to go mainstream, as alternative to MPLS to create secure private network over Internet. These allow centralised policy control for network and security policies
- **Edge data centers –** With proliferation of IoT, there is a lot of emphasis being given to micro datacentres or Edge Computing. The

concept entails setting up of storage and computing facilities closer to the data collection points. This is going to transform the speeds at which the locally generated data is processed and will allay various concerns related to small network of personalized IoT devices such as data security and localisation needs.

- **Network dynamism –** In today's time, customer's bandwidth requirements are changing rapidly. The implementation of work-from-home strategies saw the demand shoot up and we anticipate demand variations continue in the coming times too. Hence, a business should have access to adequate data and services as and when needed. Companies are also rapidly transitioning to hybrid cloud systems that offer single-window management of different cloud assets. Thus, the trend is to put in place agile networks that can handle all these scenarios or other unforeseen contingencies too.
- **Network virtualisation and security –** The software defined network and security is moving closer to application with micro-segmentation capabilities. There is high level of automation that comes with network virtualisation redefining provisioning and management.

How is the market now for adoption of hybrid cloud and datacenter virtualisation?

We see hybrid cloud computing and datacenter virtualisation are among the hottest trends of the year. Due to performance, licensing or compliance requirements not all workloads can be moved into public cloud. Hybrid cloud is becoming the preferred choice to deploy enterprise applications by running some on private cloud and others on public cloud and establishing a private interconnect. Datacentre virtualisation with network and security virtualisation provides capability to take security close to application. It goes well with hybrid setup for seamless connect across compatible cloud setups.

How are you rebalancing your provision of datacentre services, co-location and capacity management?

Our first priority has been to ensure continuation of our clients' business processes. Since we cameunder the essential services category, we managed the presence of critical staff at our data centers in accordance with the government policies. Our personnel continue to workremotely and are taking care of servers and databases. We have plans to expand our data center capacities and will soon try to make our newer facilities live. In the near future, we are also looking to installing new equipment at various locations.

We have always built our capacity with an eye on the future growth in demand and ample redundancy. Thus, even during the lockdown, we not only managed to continue offering the same seamless level of service to our clients, but, were also in a position to cater to new clients. Our cloud and bandwidth capacities offer ample scope. Usually we operate with over 30% buffer capacity. Hence, even in the scenario of the demand for bandwidth and storage rising rapidly, we have not faced any problems until now.

How are you updating DR plans to reflect this new world of vendor-distributed work?

DR management is the need of the hour. At NTT-Netmagic, we offer DRaaS which is a complete DR Management program based on the pay-per-use model. We have integrated automated DR processes and real time visibility into the organisation's objectives related to availability, Recovery Time (RTO) and Recovery Points (RPO). This new offering will help our customers enjoy a more affordable alternative to traditional DR solutions. This helps the clients in reducing downtime to the minimum and avoiding service disruptions. By entrusting us to manage the DR process, our customers don't need to focus on things other than their core business activities.

Are you going for remote management of datacentres?

We offer end-to-end remote datacentre management services. We have an optimal mix of onsite and offshore services that allow us to provide a comprehensive and integrated suite of remotely managed services to private or 3rd party datacentres.

We have the RDM framework which helps our clients consolidate, standardise and set universal performance SLAs for their IT operations, even if they are spread across several datacentre locations, on different technologies, business processes and IT user groups.

Demand for cloud services will soar in some sectors, but wither in other verticals. According to you, in which sectors this might happen?

Cloud services will see adoption across the verticals. There may be delayed transformation in certain verticals, which

CLOUD SERVICES WILL SEE ADOPTION ACROSS THE VERTICALS. THERE MAY BE DELAYED TRANSFORMATION IN CERTAIN VERTICALS, WHICH ARE BADLY IMPACTED BY COVID. THE VERTICALS LIKE TRAVEL, HOSPITALITY, RETAIL WILL CUT DOWN ON EXPENDITURE IN MIDTERM, BUT EXPECT THEM TO ADOPT CLOUD AS THEIR BUSINESSES COME BACK ON TRACK

are badly impacted by COVID. The verticals like travel, hospitality, retail will cut down on expenditure in midterm, but expect them to adopt cloud as their businesses come back on track.

Currently, we are seeing increased demand from gaming companies, OTT players, E-commerce and Healthcare.

How are CIOs looking at datacentres in Covid-19?

Covid-19 pandemic has been a major challenge for the CIOs. There is a massive impact on business continuity, working style and supply chains. CIOs are now focusing on strategic projects and their IT priorities have changed. The focus is higher on remote working tools and secure communication platformsthey are greatly turning to co-location datacentres to resolve three major problems:

- **Data security –** These days phishing scams and ransomware attacks are becoming increasingly common. Hence, CIOs are trying for having enterprise level security in place. Compared to private datacenters, the co-location datacentres usually have more advanced, robust and multi-layered data security systems in place.
- **DR in the cloud –** Work from home has become the go-to operational process today. Thus, the cloud technology has become the key to resilience and continued business operations. CIOs are now looking at the datacentres to offer this cloud elasticity and dynamically scale their IT infrastructure to meet increasing remote worker needs. This is where the datacentres are ideal Managed Service Providers for them. There is availability of large number of customer networks and the best resources. Thus, the Covid-19 situation has made the datacentres highly strategic for the CIOs.

Covid-19 may either kill the datacentre, or forever change storage. What do you think about this?

Covid-19 has already started boosting the demand for datacentre storage. There are various benefits that a collocation datacentre offers over a conventional company owned data/server facility. During the Covid-19 related lockdown, we saw how the movement of personnel was hampered all over the country and while datacentres were exempted under the essential services category, it is the small and medium enterprises with their own storage/servers that had to face disruptions. With the shutdown of offices and commercial complexes, a lot of such companies were not able to access their servers in case of need. In many cases, the power supply to the office complexes and buildings was discontinued after the lockdown and there were reports of server malfunctioning in the absence of the required air-conditioning.

Among our existing clients also, we saw the demand for datacentre services such as cloud storage and bandwidth increase tremendously after the adoption of work-from-home practices. Even the functions that were non-technical in nature, have now become digital and data intensive. For instance, team meetings and any strategy discussions are now being held online via video conferencing whereas earlier the teams simply used to huddle in the meeting rooms. Hence, the prevalent Covid-19 situation has made datacentre services even more crucial for businesses. The storage preferences are likely to change from privately stored data to data stored at collocation datacentres within the country.

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—JATINDER SINGH PABLA
VP, Sales & Marketing, STT GDC India

STT GDC India commands over 33% revenue market share among all data centre colocation service providers in India. With wide range of data centre colocation solutions in India, it hosts mission-critical infrastructure for some of the top Fortune 500 companies in 16 state-of-the-art data centre facilities across 8 cities. Here, Jatinder Singh Pabla, VP, Sales & Marketing, STT GDC India, tells us more

SHIFT TOWARDS BETTER DATACENTRE TECHNOLOGIES

How are you dealing with the Covid-19 situation? What plans have you put in place?

The Covid-19 outbreak and the necessary lockdown across the world has had a significant impact on the way businesses operate. Like any other sector, stringent restrictions like the curfews, containment zones and travel

restrictions made things a little difficult for us initially, mostly due to the limited awareness amongst the local authorities about datacentres being part of essential services.

However, as a part of our commitment to ensure uninterrupted services to our customers, we induced a comprehensive Business Continuity plan and undertook several measures like stocking additional spares and HSD fuel at site, provision of on-site food and stay arrangements as well as transportation facilities for our critical facilities staff, maintenance of health and hygiene including sanitization of our facilities by specialized agencies etc. We also provided additional allowances to our staff to ensure high motivation levels and meeting their cash flow requirements in this difficult period.

We have also enhanced our network security, by strengthening our independent network for Building Management System (BMS) and IT infrastructure with centralized Network Operating Centre (NOC) facility that has enabled us to minimize network vulnerability. With a DC footprint as widespread as ours, we have implemented a process to interconnect all our BMS equipment, ensuring that there is redundancy in place, safeguarding and enabling smooth continuity of the operations.

Our CFM staff have risen up to the challenges and demonstrated great resolve in keeping the lights on and running 24x7 and maintaining the required service levels till date.

How are you now facilitating digital work? What are the solutions that you are now offering for Future of Work / WFH?

As an organisation providing 24x7 mission-critical services, our technical and critical facilities management staff are required to be on site and continue to operate from our facilities in efficiently defined shifts that meet all government prescribed norms. The support and back-end functions like Help desks, Finance, HR, Legal and Sales etc., have been advised to work from home since mid-March, before the lockdown was announced.

We have worked out a formal work from home policy that takes care of employee health, welfare and at the same time ensures that our teams continue to operate with highest possible levels of productivity.

All employees have been facilitated with BYOD laptops, and company-paid mobile and broadband services, which are used to access all corporate applications hosted on a hybrid Cloud architecture via VPN and other secure means. Collaboration tools like Skype for business and Teams are used extensively for meetings and video calls. Video conferences are encouraged to ensure that the interpersonal connect is maintained.

How are the latest technologies going to redefine workplace?

To break the information silos among employees, a network of connected technologies that facilitate and enable a digital workplace are important. 'Digital first' organisations all over the globe are rapidly adopting such technologies in order to increase efficiency and be ready for unprecedented situations.

In the past few years, we have witnessed an increase in the adoption of cloud services for professional use. During the crisis a number of enterprises with captive data centres have moved to either quota or hybrid cloud architecture, in order to cut down on operational or maintenance costs. SMEs, start-ups and other organisations have also moved to a cloud setup due to reduced availability of capital.

Adding on, a number of organisations have recently started involving multi-level secure access systems to ensure the safety of their data and assets. To warrant an easier access, enable work over mobile devices and ensure uninterrupted connectivity organisations are increasingly adopting the MDM (mobile device management) and EDM (enterprise mobile management) software.

Most of these software and technologies have been in use for more of a personal domain like the cloud structures for storing pictures on our phones. Moreover, adoption of video-conferencing apps by organisations has also been on the rise to enable and ensure interconnectedness among employees.

Smart workspaces or digital workspaces have one common characteristic across the globe and that is interconnectedness. With the lockdown due to the pandemic and a serious need to remain at a distance even when at the workplace, interconnectedness has become a crucial aspect of streamlining activities and enabling effective working. AI, ML, big data, automated warehouses (enabling continuity of work even with a small or no staff at all), intelligent spaces (IoT enabled workspaces) are where the world is headed. Every other piece of technology that has capacitated the continual functioning of offices/ businesses during the pandemic, are all enabled by AI and ML in some or the other form.

Even within the data centre industry, we have seen a shift towards better technologies for "lights out data centres," that will limit environmental fluctuations and human access. A data driven disruption is here and the abrupt shift caused due to the Covid-19 has given us a small glimpse of our digital future.

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—HARNATH BABU
CIO, KPMG

FIVE EMERGING TRENDS IN DATACENTRE NETWORKING

KPMG International Co-operative is a multinational professional services network and one of the Big Four accounting organisations. Seated in Amstelveen, the Netherlands, KPMG is a network of firms in 147 countries, with over 219,000 employees and has three lines of services: financial audit, tax, and advisory. Here, Harnath Babu, KPMG, talks about what to expect for datacentres in 2020 and beyond

What are the five emerging trends for datacentre networking in 2020 and beyond?

With the rapid adoption of cloud, Internet of Things (IoT), and over-the-top high quality, bandwidth-hungry content combined with the need to maintain network security, we can see how the datacenter networking industry is undergoing an enormous change. Listed below are some of the trends that I believe are set to have a huge impact on datacenter networking:

- **Edge computing –** With the growth of IoT and applications requiring real-time computing power, the need for edge-computing systems is also increasing these days. Edge datacentres are also being used to extend network reach and improve speed, providing powerful processing resources that can handle tasks that are huge for IoT devices.
- **Software-defined network –** Perhaps, one of the major trends in datacentre networking has been the widespread push of software-defined networking (SDN). By giving the ability to enterprises to manage and provision network services from a centralised location, it enables them to deploy applications quickly as well as reduce the cost of deployment.
- **Network functions virtualisation –** Another trend making way in datacentre networking industry is the network functions virtualisation (NFV). With this, we can turn legacy networks in favour of a software-based networking approach – enabling resources to be provisioned faster and efficiently to support scalability.
- **Hybrid and multi-cloud –** Going forward, enterprises will follow hybrid and multi-cloud approach to manage the demand for flexible network with connectivity requirement between workloads and customer demands.
- **5G infrastructure –** With the evolution in datacentre networking industry, we will see 5G technology making a way in select markets and delivering lightning-fast services.

As datacentre technologies continue to advance, these trends are most likely to give way to some remarkable developments that will drive innovation a notch higher.

How is the market now for adoption of hybrid cloud and datacentre virtualisation?

Cloud computing is one of the most significant next-gen datacentre trends affecting businesses today. Therefore, most of the organisations these days are adopting the cloud-first strategy, thereby moving most of their workloads from on-premise to cloud which gives them the benefit of agility as well as on-demand scalability.

While this has worked out well for some, there are several companies that are apprehensive about migrating to the cloud due to security concerns as well as expenses of operating in a public cloud environment. In such a scenario, adopting hybrid cloud is one of the best approaches that give businesses greater flexibility and more data deployment options.

With this approach, it's easier for businesses to deploy System of Records (SOR) on premise as these hold sensitive data and have specific requirements for data privacy and infrastructure redundancy; and System of Engagement (SOE) on cloud that require flexibility, ease of deployment and continued services.

That being said, embracing software-defined data centre/data centre virtualisation remains a key priority to help organisations significantly improve IT agility.

How are you rebalancing your provision of datacentre services, co-location and capacity management?

We have modernised our entire datacentre environment

PERFORMING ROUTINE AND PREVENTIVE MAINTENANCE, UPGRADING CAPACITY, MANAGING VENDORS AS WELL AS ADDRESSING TECHNICAL ISSUES AS AND WHEN THEY OCCUR, REMAIN CRITICAL TO HELP ENSURE EFFICIENT BUSINESS CONTINUITY

and moved to a co-located hybrid cloud model that can be accessed easily as well as scaled to meet the demands for computing power. It is currently being utilised for production and several other environments. While the workloads that require high agility are deployed on-premise, several applications and collaboration capabilities are on cloud.

How are you updating DR plans to reflect this new world of vendor-distributed work?

For an enterprise, a comprehensive business continuity plan (BCP) includes all of the critical aspects to run the business including the vendor's plan and management.

At KPMG in India, we identified critical components for the continued provision of IT systems and services and engaged with the service providers to have proper disaster recovery systems and business continuity plans to help ensure that the operations are not impacted.

Are you looking at remote management of datacentres?

As we witness a surge in remote work with stay-at-home orders due to Covid-19, maintaining access to datacentre infrastructure and the essential communications is more important than ever. Performing routine and preventative maintenance, upgrading capacity, managing vendors as well as addressing technical issues as and when they occur, remain critical to help ensure efficient business continuity.

Demands for remote management of datacentres were already necessitating and shaping with the strategic direction of the firm after adoption of cloud computing and services. With remote working especially for handling critical services like datacentre, we have all the necessary security controls in place for remote access. Along with these solutions, we are also keen to look into new technology which can provide a consolidated all-layered approach to monitor, analyze and automate these services.

Demand for cloud services will soar in some sectors, but wither in other verticals. Which sectors, specifically?

Demand for cloud services is increasing manifold with the emergence of new business environment in the wake of Covid-19. Some of the sectors that will see an increase in the demand include professional services firms, knowledge workers, IT services industry, over-the-top content creators, telecommunications, education industry, E-commerce/online retailers, banking and insurance, as well as manufacturing.

How are CIOs looking at datacentres in/post Covid-19?

Covid-19 has transformed the business landscape across industries, and datacentres are no exception. As working remotely becomes the new normal, there is bound to be an increased demand of not only internet bandwidth but also video conferencing platforms, document collaboration tools, digital payment platforms and online learning – leading to proliferation of cloud adoption for business continuity, workforce enablement as well as to de-risk operations.

Looking ahead of the Covid-19 era, CIOs will consider accelerating migration from datacentres to cloud, network and modern IT infrastructure while adapting to the new normal. This would require enterprises to build their own digital strategy while considering cloud-native solutions along with anywhere connectivity and hybrid multi-cloud architecture to meet the ever-evolving business requirements.

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Smart and Edge Datacentres **for E-governance Services**

Digital technologies have the power to accelerate inclusive growth in countries such as India. It is expected that India because of its demographic dividend, is slated to see growth

The country, through digital transformation, is steadily marching towards realising a trillion-dollar digital economy by 2025. As governments across the globe embrace digitisation, several governmental processes have incorporated technology into their fold to facilitate e-governance services to their citizens.

E-governance is the usage of ICT by the government to improve the quality of services offered to citizens. It is also for the exchange of information, communication transactions and integration of various stand-alone systems and services catering to consumers, businesses, other government bodies and government employees – referred to as G2C, G2B, G2G and G2E services respectively. The most prominent G2C E-governance initiatives are Aadhaar, DigiLocker, E-seva, Digi Dhan and Apps like Umang.

The government has also made several inroads in the field of education, agriculture and health care. For example, through online registration facility, getting an

INDIA IS FACING A SURGE IN THE DEMAND FOR THE TRANSFORMATION OF ITS FIRST-GENERATION E-GOVERNANCE SERVICES THAT HARNESS THE POWER OF NEWER TECHNOLOGIES SUCH AS CLOUD, BIG DATA, AI, IOT AND ANALYTICS. THE DEMAND IS ALSO FUELLED FROM EMERGING SMART CITIES AND SMART POLICING SYSTEMS

OPD appointment, lab reports and blood availability in any government hospital has become convenient. A total of 239 hospitals offering this facility have already registered over 0.34 million patients in the OPD till date. Also, India's TB missed call initiative has reportedly enrolled over 93,000 patients over a span of four years. In the field of agriculture, mKisan, a mobile-based advisory service linked to call centres connected to research centres has been availed by over 50 million farmers for timely, specific, holistic and needs-based information.

In the field of education, the Credit framework for Skills and Education (CBCS) is enabling students to take courses of their choice, learn at their own pace, undergo additional courses, and adopt an interdisciplinary approach to learning. All 39 central universities have implemented CBCS. Additionally, under the Global Initiative for Academics Network (GIAN) — an initiative to attract the best foreign academics to Indian Universities of Excellence, 352 courses are being offered by foreign faculty from 38 countries.

Some of the G2B initiatives include e-Procurement and MCA 21 and services catering to the G2G segment include SmartGov and the Khajane Project. All these E-governance platforms are generating huge amounts of data that not only need to be stored but also accessed on-demand, transferred and analysed within government departments as and when required.

According to IDC, the global datasphere — the sum of the world's data will grow from 33 zettabytes (ZB) in 2018 to a gargantuan 175 ZB by 2025. As the volume, criticality, and sensitivity of data grows, it creates a massive need for e-governance services to adopt holistic infrastructure through data centers that can deliver reliable, innovative and cost-effective solutions.

A datacentre, therefore, forms the critical core of any E-governance system. Needless to say, the better the datacentre, the better the E-governance system.

Growing demand for E-governance in India

India is facing a surge in the demand for the transformation of its first-generation E-governance services that harness the power of newer technologies such as Cloud, Big Data, AI, IoT and Analytics. The demand is also fuelled from emerging smart cities and smart policing systems. A huge contributing factor for the growth of E-governance data center players is the fact that India is the second largest smartphone user globally, with a growing number of subscribers of e-governance services. For example, in August 2019, nearly 5 million people filed their tax returns online — a record for any single day.

Robust E-governance Datacentre

Given the value and criticality associated with E-governance data, the data centres that power these services should ideally be capable of withstanding major acts of nature such as floods, hurricanes, earthquakes, tornadoes, typhoons, heat and cold waves and repercussions of climate change. The technology, hardware and physical infrastructure including servers, storage and network switches, power distribution units (PDUs), computer room air conditioners and HVAC systems need to facilitate business continuity by allowing a high degree of availability and disaster recovery.The systems should offer visibility into network

> THE DATACENTRE NEEDS TO FOCUS ON ITS POWER MANAGEMENT, COOLING, AIR FLOW AND OTHER PARAMETERS CRUCIAL FOR OFFERING SEAMLESS SERVICES. FOR THIS, THE INFRASTRUCTURE NEEDS TO BE SMART AND ENERGY EFFICIENT

and application traffic, connectivity with disparate sets of data resources, security of the utmost standard, Quality of Service (QoS) as promised, high level of performance and uninterrupted access to users.

Smart Edge Datacentres

A smart datacentre can make an E-governance system agile and responsive, while fostering a learning environment and combining best practices, predictive analytics and IT automation. It taps into the power of AI and analytics to achieve positive operational outcomes, optimise cooling and overall datacentre performance, maximise customer experience and lower risk and IT costs. While identifying the root cause of issues and their impact on business in minutes, a smart data center can lower the total cost of ownership (TCO) by up to 20% and decrease IT response time by up to 30%, besides providing fast, accurate, contextual, actionable insights on a proactive basis.

Moreover, as smart cities unleash the full power of Big Data, IoT, Cloud and streaming services, there is a need for real-time collection and analysis of data on utilities, traffic, security and infrastructure to enable city officials to respond to problems faster than ever before. Hence, there is no room for latency in E-governance services. End users and devices demand anywhere, anytime access to applications and services and this creates the need for setting up edge datacentres for efficient delivery of E-governance services.

Edge datacentres facilitate data processing at or near the source of data generation, shortening the distance between the data and the end user. These are generally connected to a larger central data center or to multiple data centers. Today, only 10% of enterprise-generated data is created and processed outside the cloud or a traditional centralised datacentre. Analyst firm Gartner predicts that by 2025, this figure will reach 75%.

As the need for speed, efficiency, security, reliability, scalability and versatility of E-governance data grows, it becomes imperative for decision-makers to look at strengthening the E-governance ecosystem through smart and edge data centers that will meet the business expectations through higher service levels and increased user experience.

(The author is CEO, Datacentre Business, Sterling and Wilson)

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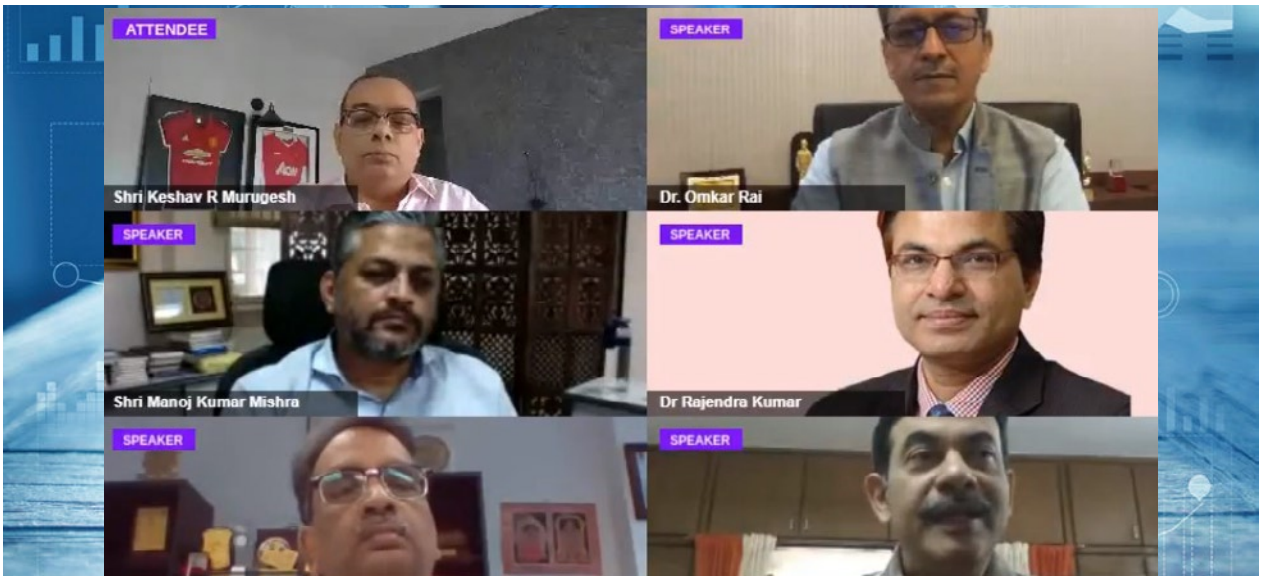
Innovation and Role **of Government**

The Software Technology Parks of India (STPI) recently celebrated its 29th Foundation Day. At the inaugural session, Dr Rajendra Kumar, Additional Secretary, Ministry of Electronics and IT welcomed the delegates stating that we should all work together to achieve the vision of a digital economy. Rajneesh Agarwal, Director, STPI Noida, who moderated the session, said that STPI is a premier government organization working for the promotion of IT



At the 29th STPI Foundation Day, Dr. Omkar Rai, DG, Software Technology Parks of India, said that the various state governments have been working for the promotion of the startup ecosystem. It can be presented with a very organised IT policy so that they can become a world-class startup ecosystem. Once recognised, startups are given lot of benefits. India has also been facing challenges in getting a market. Government has to play a role in helping them. Ministries can engage and give them a start. The SME community has to also give a list of problems that can be solved. Then, startups can become self-reliant and strong. They can also export their services.

The Atal Innovation Mission is one of the initiatives that have been taken up. STPI is working very closely with state governments, academia and industry. There should be professional guidance given to the Centers of Excellence. We have to run challenge-run programs. Whatever products that the startups create, we need to ensure that the Government is the largest consumer.

He added that the upcoming startups are very agile. The growth rate is also very high. Cost is also very less, which is an advantage. The cost to create IPR is also very less. We should also create a world-class technology infrastructure. The policy envisages that India should become a leading software product market by 2025. This number has to be achieved. It will encourage the upcoming startups. We are on the cusp of revolutionizing the startups ecosystem, and also compete with the USA and China. Rajneesh Agarwal added that we require policy, infrastructure, etc. We started CoEs across the country. One of them was started in Delhi for the ESDM sector, we started the Electropreneur Park.

Ameerpet Success Story

Jayesh Ranjan, Principal Secretary Industries & Commerce (I&C) and Information Technology (IT), Government of Telangana, said that STPI has set up IT tech parks at Ameerpet, Hyderabad. We have created a separate track for support. If you do innovation, you get more support. This requires a very holistic approach. Policies alone will

THERE SHOULD BE PROFESSIONAL GUIDANCE GIVEN TO THE CENTERS OF EXCELLENCE. WE HAVE TO RUN CHALLENGE-RUN PROGRAMS. WHATEVER PRODUCTS THAT THE STARTUPS CREATE, WE NEED TO ENSURE THAT THE GOVERNMENT IS THE LARGEST CONSUMER.

— Dr. Omkar Rai, DG, Software Technology Parks of India

not suffice. There are four pillars – policy, pillar, institutions and hand-holding.

We have now set up the largest incubator. T-Hub is startup incubator headquartered in Hyderabad, Telangana, India, making it the largest incubator in a single location in India. We also have an institution called TASK. All 200-odd engineering and professional colleges are part of this. We encourage students to create and convert projects. They have to build business plan development. RICH, another institute, brings the knowledge-based institutions together. We also have an institution for emerging technologies. We have created seven institutions. We have close to 250 people in these institutions.

We have provided support supervision. We should give them lots of hand-holding support. If you are operating within Teleng ana, the government will be the first customer. We will create a market for you, and also buy from you, at a price. In the last three years, 37 local solutions have been rolled out. Digitisation and getting more innovative products in the market is the next goal. We have started a series of CoEs.

Ideas for Odisha

Manoj Kumar Mishra, Secretary Electronics & IT, Government of Odisha, congratulated everyone on the 29th Foundation Day of the STPI. The 1991 policy of liberalisation is manifested into the STPI. Odisha is thankful to STPI. In many areas, the private sector is better. We have to combine with them for developing the infrastructure. We also have an Electropreneur Park. We have received lots of ideas within the pandemic.

In terms of initiatives, we have an excellent Fab Lab. We are looking at democratizing the market. We will have mini Fab Labs. People should be able to access all Fab Labs. The pandemic has been a disruptor. At the same time, the IT industry is very well connected. There will be different kinds of products. Product development will also have to come up. WFH has thrown us a lot of challenges. A lot of products can now come up.

Follow Israel's Lead

Keshav R. Murugesh, Group CEO, WNS Global Services, and former Chairman, Nasscom, said the creation of STPI was one of the most important decisions ever made. In 2019, India moved up to 52nd rank, up from 81 in minimising the risks for foreign countries. We are ranked third in the world for technology development.

Every area of technology, AI, IoT, 3D printing, quantum computing etc., are the areas of growth where India is working. The state and central governments are partnering with the industry to develop talent. There is a huge fillip being provided to the IT/BPM sector. The government is treating IT as an essential industry. IT has kept the lights on across the globe. WFH is the new normal. We have fast-forwarded the future inside a few days.

There are a lot of good examples for us to take from Israel. Over 300 MNCs have all tapped into Israeli innovation and R&D labs. Israeli companies do not rest on their laurels. They invest further! We need to set up a similar kind of environment. How can they intermingle and create new solutions? The Indian Government has opened up the strategic sector in India. That may be one of the first steps.

Investing more in some of the new areas will serve us extremely well. One recommendation made by Nasscom made in Budget 2020 was – how do we foster the way of working post-pandemic? We need to be recognized for fostering innovation. We need to reskill the population, in order to lead. Every company will want to come to India. The most important thing for us is to have boldness. We need to take the Indian IT industry from $191 billion to over $500 billion in the years ahead.

Rajneesh Agarwal concluded, adding that the success of IT is the success for the country. The vision of our policymakers is also laudable. It will enable the Indian technologists to move forward. How can startups be more involved in the economy? We can generate a market for India.

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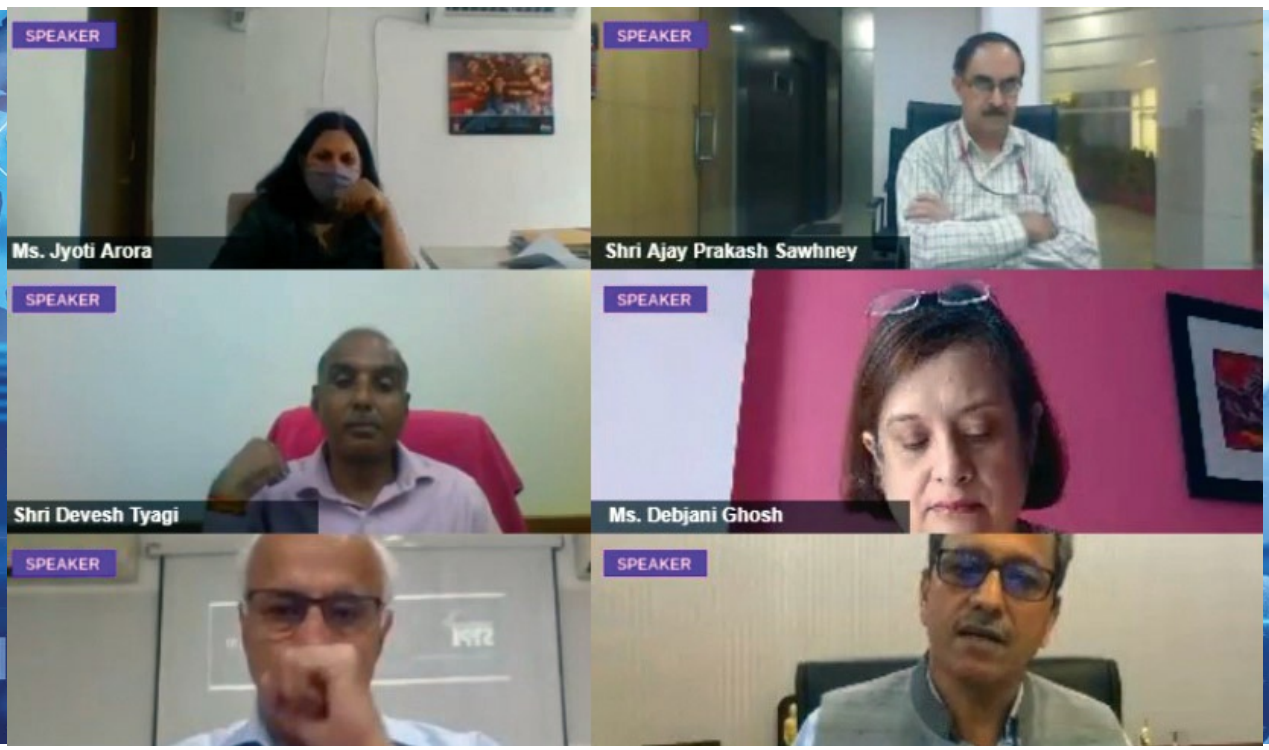
STPI Transforms **Government's Vision**

The opening session the 29th STPI Foundation Day kicked off with Dr. Omkar Rai, DG, Software Technology Parks of India, who said that the STPI is a very industry-friendly organisation. We have worked as a service provider to the Indian industry. We received the ISO certificate in the 1990s. We are providing the bandwidth and solving the problems of the Indian IT industry. We have been sticking with our work culture. As soon as Covid-19 happened, we gave a notification on March 11 for WFH



At the 29th STPI Foundation Day, Dr. Omkar Rai, DG, Software Technology Parks of India said that STPI has evolved over a period of time. We are trying to play a major role in transforming the Government's vision. We are seen as a generator and enabler of the IT industry. The CoE initiative launched by STPI is going on very well. STPI is also trying to play a major role in getting the startups ecosystem up and running. We are also trying to improve our deliveries. MeiTY has invested in certain areas. We will transform India into the largest software exporting nation.

> STPI HAS NEVER STOPPED RE-INVETING ITSELF. IT HAS ALSO HELPED THE INDUSTRY RE-INVENT ITSELF FROM TIME TO TIME. STPI IS THE ULTIMATE STARTUP OF STARTUPS

Stronger Industry

Debjani Ghosh, President, NASSCOM, added that they were worried about Covid-19 and about China. The way that Covid-19 has disrupted our lives is unprecedented. Within a few days, we moved over 4 million people and 2 million assets. It was fascinating to see how it all came together. Within a week, the industry had 98% of people WFH.

Even with the opening up, the industry has taken a very safe approach. We are going to see new norms emerge across manufacturing, retail, education, commerce, etc. We are going to see short-term downturn. We are ready for it. Long term, the IT industry will come out stronger.

The pandemic is opening new opportunities. We need to be ready. We must ensure that the Indian IT industry is the safest and fastest-moving across the world. I see a tremendous opportunity for the industry. We have to change our models very fast. We have to redefine customer experience in a contactless economy. We have to start investing in time and resources in new jobs. Our people will need new skills to drive this digital transformation.

We are absolutely committed to working with MeiTY. We decided to test out what it would be like. We opened up foundation courses in AI, etc., for free. We were tremendously surprised. Over 70,000 people signed up. They are realising the importance of skilling. Tech India will not take a beating, despite the pandemic. We are ready for business, despite the turmoil. Indian IT is ready for business. We are investing in skills and new technologies.

The IT industry is extremely resilient. We always come back stronger. The technology industry is not just about business. We also take care of our employees. We have stepped up, as and when the country has needed us. Our focus is on the employees and business continuity.

Five Pictures

Subroto Bagchi, Chairman, Odisha Skill Develpoment Authority, Government of Odisha and Co-Founder, Mindtree, said that STPI has provided three decades of service to the country. It is one of the organisations that has never lost its sense of purpose. STPI has never grudged the success of the child, the Indian IT industry. As the Indian IT industry became successful, people became billionaires. Lakhs of people became extremely rich. Not a single time did STPI mention about becoming part of the stock option plan. STPI has never stopped re-inveting itself. It has also helped the industry re-invent itself from time to time. STPI is the ultimate startup of startups.

When I look at 1989, there are five pictures. First, Wipro had a tiny export order from Bell Labs. Had it not been for the earth station that came up, we would not be able to transmit. In 1989-90, Wipro wanted to set up in Silicon Valley. I went to RBI to get USD 20,000. We had to crack the problem. I was also travelling. If you are an Indian, you would take the longest time to clear immigration. The assumptions were: you are an illegal immigrant and a taxi driver. Today, a third assumption is: you are also a software engineer.

Next, you could not bring the parallel processor to India for an export ban. Another image was of gold mortage. STPI was also involved in one of the darkest times of India. Andhra Pradesh had a cyclone where many people died in 1991. STPI was born in times of great distress. Imagine the visionaries, who were building an organisation that would go on to create dreams. Distress, dream and delivery is the message of STPI.

We are now pushing the reset button, thanks to the Covid-19. These are times of great geo-political imbalance. These are also times that will see major technological inventions. We need to think about STPI as a leader in times of distress. We also need leadership qualities in times of distress. Empathetic and visionary leadership is required. The essence of the leaders has been very strong. We need strong, empathetic and

THE IT INDUSTRY IS EXTREMELY RESILIENT. IT ALWAYS COMES BACK STRONGER. THE TECHNOLOGY INDUSTRY IS NOT JUST ABOUT BUSINESS. IT ALSO TAKES CARE OF IT EMPLOYEES. IT HAS STEPPED UP, AS AND WHEN THE COUNTRY HAS NEEDED THE IT LEADERS. IT LEADERS' FOCUS IS ON THE EMPLOYEES AND BUSINESS CONTINUITY

visionary leaders. We need to think of a strategic intent for the next 20 years.

Responder Mindset

He added that the STPI should look at building a vision committee. It should also do constant communications. An organisation also needs massive sense and response systems. Organisations like STPI need to have that. They should be the first responder mindset. Each one of us has to also create the first responder mindset. We should also build at a leadership level. Maximising will be very important. We need vision that builds the maximalist view.

India is the principal architects of the new world order. It is technology that will deliver constancy of purpose. The private sector is a bubble and the IT sector is also a bubble. We cannot afford bubbles. We have to embrace migrant labour problems as technology problem. We will succeed, when the poorest of the poor feels secure enough. STPI will be able to serve the purpose of this new world order.

Jyoti Arora, Special Secretary and FA, Ministry of Electronics and IT, noted that most of India lives in tier-2 and tier-3 cities. They may not have metro facilities. STPI is providing infrastructure and facilities to these cities. Subroto Bagchi talked about the challenges. STPI has re-invented itself many times over the three decades. People are expecting lot of innovation. There is lot of demand about how we work. Rai mentioned about CoEs. More new innovations need to happen. We should move on from services to products domain. There should be flexibility and collaborative approach. STPI has been doing that. We need to have better delivery in the times ahead.

Move to Software Products

Ajay Prakash Sawhney, Secretary, MeitY, added that STPI has been a partner in implementation. We have also involved the STPI in the extremely large and robust ITeS sector. Next challenge is, how are we moving into software products? How do we make software product companies out of India? STPI has a huge role to play in all of this. We are on to consolidation, sector wise. There are also several projects that are being implemented across states. It is time for consolidation. We need to bring new-age products and companies.

There is a huge opportunity for the industry to create new opportunities. These platforms can serve as ecosystems. The industry is also carrying the lead to the next generation of companies. They will flourish with new things on the horizon e.g., 5G and IoT are made for each other. How do we combine these creative things? The coming decade will see more new developments. We are already on the way. We have created CoEs. We are trying to bring in mentors from the industries, academia, etc.

Covid-19 has deeply impacted many things. We have realised every moment is precious. The urgency of what we have embarked upon is brought out by this crisis. Some of the finest successes come in distressing times. We are going through a difficult period. We need to re-imagine. We need to peg our ambitions high enough. Indians enjoy a very fertile imagination. Imagine, where can India be in 2030 and 2040 and what role STPI can play. We also need to have the guts to make that happen. We have to grow the product technology ecosystem. We are talking about Digital India.

Devesh Tyagi, Senior Director, Software Technology Parks of India, extended the vote of thanks.

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Emerging **Technologies and Innovation**

Cloud will become important. There may be some requirement of data that would need immediate action. Edge will also come into play. All of this will require a lot of AI. AI is still on the tip of the iceberg. The true powers of AI will be in smart mobility, healthcare etc.

Jaswinder Ahuja, Corporate VP and MD, Cadence Design Systems, said that the landscape is changing. Today, there are over 150 companies looking at process architectures. With the emergence of 5G, there are concerns regarding latency etc. The paradigm of the intelligent edge is coming up. It is also about Industry 4.0, robots, drones, etc. All of these things are tied together very closely.

We are also viewing a growing focus on systems. It is a very interesting time to see design starts, despite Covid-19. There is a rise of new categories of products and requirements. These are all global trends. There are no established market leaders right now, in many of these cases. The playing field is wide open. It is an opportunity and challenge for India. You need to have differentiation to build a global product.

Focus on AI

Nivruti Rai, Country Head, Intel India, said that it has been a challenge in this pandemic. However, we

AI IS STILL ON THE TIP OF THE ICEBERG. THE TRUE POWERS OF AI WILL BE IN SMART MOBILITY, HEALTHCARE ETC. AI WILL BE A PERVASIVE TECHNOLOGY. PEOPLE ALSO TALK ABOUT UNSTRUCTURED DATA. WE ARE A VERY DATA RICH COUNTRY. ALL OF THIS IS BECOMING A STRENGTH FOR US

are no longer anxious about it. How does it relate to technology? Well, every single technology has now got an acceleration. There are segments like education, healthcare, workplace of future, gaming, entertainment etc., that have all become so very important. A lot of push and acceleration has happened. There are some foundational technologies that will also accelerate.

A lot of the way we live will be either e or tele. A lot of data will be acted upon. Cloud will become important. There may be some requirement of data that would need immediate action. Edge will also come into play. All of this will require a lot of AI. AI is still on the tip of the iceberg. The true powers of AI will be in smart mobility, healthcare, etc. AI will be a pervasive technology. People also talk about unstructured data. We are a very data-rich country. All of that is becoming a strength for us. We are already used to the pandemic. We now need to turn this pandemic around into an opportunity. We are looking forward to partnering with 28 CoEs that STPI has.

Cloud will be Key

Biren Ghose, Country Head, Technicolor, mentioned that there are brave creators. 50% of services that we had 10 years ago are no longer there. The created technologies are for everybody's use. There are thoughts that inspire innovation e.g., autonomous drones, AR/VR, smartphone film making etc. This is going to be the infrastructure of the future. We are using gaming technology for creating The Lion King. That is the computing power no other industry uses. The IT/ITeS industry will now use these new technologies.

What is the big opportunity for STPI? It has been good at creating communities for serving market needs. Cloud is the tool that will be important. Biotech industry is right now in scaling. The CoEs can play a phenomenal role in designing the chips of the future. A cloud-based alliance is also required for STPI.

People Expect Service Delivery

Santosh Kumar Misra, Commissioner E-governance, Government of Tamil Nadu and CEO, Tamil Nadu E-governance Agency (TNeGA), noted that there is a silver lining in the cloud, particularly for the government. Courts are now looking at video conferencing, as a way of demolishing barriers. Earlier, WFH was never accepted as a valid work option. Today, it is the norm.

We were all cash guys, prior to demonetisation. Then, we were forced to move to the digital world. This is an opportunity that we need to capitalise on. The scales are mind boggling. New generation has not accepted the ways of the government. They are asking: you already have the information. They have a very different level of service expectations from the government. Later, this became the Chief Minister's announcement. Why don't we do public service delivery? People are expecting service delivery that is different from their predecessors. In Tamil Nadu, we also have a good health system. At least 99% data is captured. We give the people their immunization schedule as well.

There is also a problem of unstructured data. Usability is a very big issue. These are the challenges and opportunities. BharatNet is a very ambitious project. When we talk about institutional deliveries, it changes the landscape of the government delivery. NLP is a key area. It will have the power to change people. We need to bridge the vernacular gap. We also have set up a CoE

in Tamil Nadu. We are using blockchain, AI, etc. It should be used for creating a blockchain highway. We would invite Intel to be a partner with our CoE.

Industry 4.0 Impact

Ajai Chowdhary, Founder Member of HCL and currently, Chairman, Board of Governors at IIT Patna and Chairman, IIIT Naya Raipur, stated that innovation has triumphed! We created a ventilator in 8 weeks. Many more innovations have taken place. Innovation and entrepreneurship are deeply connected. We have seen lot of hardware innovations happen. This should be continued by STPI in future.

There are so many patents in the Electropreneur Park in Delhi. I see phenomenal growth in IoT. We will also need very high level of computing. We need quantum computing. You will see quantum cyber security products coming in. Voice technology will become big, in multiple languages. You need to enter villages using voice. Many chat bots will be created in multiple languages. Everything will get measured remotely. Startups can create devices that can measure remotely. This will also help the doctors.

Many years ago, I talked about access to all. Today, we are seeing it in a different way. 5G will make this happen. Autonomous cars will take off. There are many innovations using the India stack for PhonePe. We need a very large and deep healthcare system. The health stack is being developed.

The Industry 4.0 impact will get deeper and deeper into the country. India is looking to get electronics manufacturing into India. There will be use of Industry 4.0 across industries. If we need to be competitive, Industry 4.0 will play a huge role. The industry needs to look at Industry 4.0 in a very big way.

Data Quality

Anand Deshpande, Founder and Chairman, Persistent Systems, said that many different people have come together and are working in this pandemic. Decision making and actionable insights will become part of what we do. Data quality is a big part of what we are doing. India needs to think about data policies as well. The data we have in India can be used very effectively.

Next, we are looking at biology. Small businesses are about innovation and creating livelihood. Government can be a market for small businesses. We also want to do some real work. We need to look at research and R&D to solve our own problems. Once we do that, we will also become self-reliant. Atma Nirbhar Bharat can only happen once we start doing all of this.

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Developing **Entrepreneurship**

The concluding session of the 29th STPI Foundation Day explored the areas of entrepreneurship and future skilling. Shailendra Tyagi, Director, STPI Bengaluru, said that the entrepreneurship and startups play a major role. India needs to pay more attention to skills

In the concluding session of the 29th STPI Foundation Day, Achyuta Samanta, Member of Parliament, Lok Sabha, said that STPI has been contributing a lot to the growth of India. It was the backbone of the Indian IT industry. STPI still has a long way to grow with software and hardware.

Odisha was not so developed in 1989 when STPI had set up in Bhubaneshwar. Today, Bhubaneshwar has been attracting educational institutes and IT companies. We are providing them all the facilities. There will be good scope for the IT industry. Entrepreneurship is very close to my heart. We have shown how one professional institute can obtain the Institute of Eminence from the Government of India. We set up Kalinga Institute of Industrial Technology, and the Kalinga Institute of Social Sciences. Both the organisations have been applauded by everyone.

INDIA HAS CREATED THE ISLAND WHERE THE SOFTWARE INDUSTRY HAS DEFINITELY THRIVED. ENTREPRENEURSHIP HAS BEEN THE NEW MANTRA FOR SUCCESS. DIGITAL TRANSFORMATION HAS NOW BEEN ACCELERATED. THE CURRENT PANDEMIC HAS FORCED IT UPON US. WFH HAS BECOME THE MAINSTREAM. WITHIN TWO DAYS, MOST OF OUR COMPANIES WERE UP AND RUNNING. THE BLOCK IS ACTUALLY IN OUR MINDS. SOME OF THESE BLOCKS GOT COMPLETELY SHATTERED.

— Pradeep Gupta, CMD, Cybermedia

Digitisation Galore

Rajiv Kumar, Joint Secretary, Ministry of Electronics and IT added that the entrepreneurship and future skilling have shown the importance of digital. Most of the good things that MeiTY and DoT did, have been around digital. There was an uninterrupted flow of service throughout to our customers. Aadhar became the India stack. We have also come up with many such stacks, and many more are in the offing. We also have public digital platforms. They allow lot of digitisation that get seeped into our lives. There are UPI, GST etc. We have also allowed entrepreneurship to ride on our platforms. India has emerged as a leading startup nation, with over 9,000 startups. Companies are able to sell via e-commerce, which is the highest in the world.

We also have Technology Incubation and Development of Entrepreneurs — TIED 1.0 and TIED 2.0 for the startups. 20% of tech startups are located in tier-2 and tier-3 cities. We have rolled out the first challenge on the STPI portal. There is also the MeiTYstartup hub. There is a way by establishing CoEs. 25 are already operational e.g., there is AR/VR in Bhubaneshwar, and fintech is in Chennai. The Government has also come out with National Software Product Policy last year. The product space is a great test for entrepreneurship. We need to catch up. Also, skilling remains a great area of concern. We started a future skills initiative with Nasscom. We hope we can use this initiative and promote entrepreneurship.

Accelerated Digital Transformation

Pradeep Gupta, Chairman and MD, CyberMedia, added that this is a historical day when the STPI was created. Dataquest has been featuring the development of the software industry since 1990. India has created the island where the software industry has definitely thrived. Entrepreneurship has been the new mantra for success.

Digital transformation has now been accelerated. The current pandemic has forced it upon us. WFH has become the mainstream. Within two days, most of our companies were up and running. The block is actually in our minds. Some of these blocks got completely shattered.

Today, AI is forced upon us. There are technologies such as AR/VR, AI, etc., that will completely change the situation in the future. Everything today, with the industry, is now on the table. The kind of innovation that came out of the second World War was immense. Today, the innovation that will happen, will be even much more faster!

That brings all of the electronics also to the core e.g, at the Electropreneur Park, there have been 40 startups so far and 25 working prototypes are there, while 19 patents came out, etc. We recently did the hackathon in Bhubaneshwar. There were 546 entries. We are seeing a new world moving ahead. STPI has a major role to play in the major adoption of technology. Two of the companies at EP came out with solutions e.g., Leap Aeronautics is talking about air taxis in order to ferry people. There are many more bridges to cross. There are many more accolades to come.

Continuously Changing Skills

K. Ganesh, Serial Entrepreneur, Promoter, Big Basket, Protea Medical, TutorVista, Homeland, Housejoy, said that we had raised the money from foreign investors

WE HAVE TO DRIVE THE CULTURE OF PEOPLE INVESTING IN THEMSELVES. IT IS A UNIQUE PUBLIC-PRIVATE PARTNERSHIP. EVERYBODY WANTS TO GO OUT OF THEIR WAY TO MAKE THIS A SUCCESS. WE HAVE TO TRY AND BUILD THINGS FASTER.

— Amit Aggarwal, Co-Architect FutureSkills & CEO IT/ITeS, SSC Nasscom

showing the STPI Bangalore as our office. The world has been changing for some time now. The skills needed are continuously changing. Technology is already interfering into everyday life. All of this has greatly accelerated with Covid-19. Traditional education has undergone tremendous change. There are changing consumer behaviour. New entrants will have major advantage.

All of us are looking at ways to become lean and mean. We like to do things in full stack. We have only scratched the surface in e-commerce. Decision making of consumers has changed. There is huge opportunity in healthcare. We just need to stay focused on building the business.

Covid-19 a Feature

Jasminder Singh Gulati, Co-Founder, NowFloats and Founder, Digital Desh, said that Covid-19 is more of a feature. The ability to understand that it is not going away is also there. The way we have worked in the last three months has been significant. Many opportunities did not exist before. You are also doing things that never really thought of. Everything will have to be rethought.

WFH is a huge watershed opportunity. The way everybody has got into the WFH situation, and still learn to work with everyone. Your remote team is your team. The new leader has to think of how we make this work. We are going to see new opportunities. Things have become somewhat better. People who are driven, will take this opportunity, and succeed. The largest soft skill is to skill yourself. Self-skilling will happen.

Amit Aggarwal, Co-Architect FutureSkills and CEO IT/ITeS, SSC Nasscom, added that we are getting benefit as online platforms take off, we can provide skills. Now, we are building platforms in different languages. We are also giving full skilling. Individuals, who have solutions, can come to the site and get listed. We have to drive the culture of people investing in themselves. It is a unique public-private partnership. Everybody wants to go out of their way to make this a success. We have to try and build things faster. How do we invest in ourselves to learn?

Devesh Tyagi, STPI, said that we will not rest on our past laurels. Omkar Rai, STPI, added that we have been engaged since morning in discussions. We have received lot of affection and trust.

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A Challenge with **Opportunities**

As the pandemic continues to spill across the globe impacting lives, livelihood and businesses, it has made us realise that we need to flatten the curve and move forward on a war footing

With lives at stake, it becomes our foremost responsibility to have a humane approach to the situation, step up and create a safety net that will help maintain a balance while keeping employees safe and motivated.

New Opportunities

COVID-19 has also proved to be an opportunity for countries and businesses to look beyond regular working ways. This has also led software service providers – the industry that employs around four million people – to recognise and accept 'remote working' as the new norm. The "Future of Work" will involve fast-tracking the adoption of collaborative solutions, automation and security solutions with new-age technologies like IoT, Big Data, Artificial Intelligence, edge computing, and ultra-broadband solutions.

Opportunities in the post Covid-19 archetype will come in all sizes and shapes. We need to overcome challenges towards reshaping for business continuity and reskill for better opportunities. As businesses juggle between new systems and processes, priorities and challenges, they will need to identify systems resilience issues and address them in the post-pandemic world. The businesses must

OPPORTUNITIES IN THE POST COVID-19 ARCHETYPE WILL COME IN ALL SIZES AND SHAPES. WE NEED TO OVERCOME CHALLENGES TOWARDS RESHAPING FOR BUSINESS CONTINUITY AND RESKILL FOR BETTER OPPORTUNITIES.

— CP Gurnani, MD & CEO, Tech Mahindra

revisit the customer profile, assess new requirements, suggest them opportunities and prepare teams to deliver the software support for it.

Technology Enabling New Work Paradigm

Today, Indian software industry has to use its prowess and provide technology that will help meet requirement of safety and security, in an ecosystem, that is inclined to continue work from home as a new normal. Depending on the sector and scenario there will be a need to leverage new-age technologies and automation to enable future-of-work. The new world order will involve faster reskilling and setting up of agile work teams that will operate efficiently in this or similar work environments.

Virtual reality, robotics, drone-enabled delivery systems, digital systems in manufacturing and supply chains will be first in the lane for adoption. There is also a need for a robust security system and digital infrastructure. Security & risk management teams have to be more vigilant keeping regulatory issues, data and identity thefts and cyber-attacks leading to security breach in perspective, especially involving critical data, client information, confidential data among others.

Already, players are fast-tracking their next level of technology adoption towards scalable and secure cloud infrastructure and specialised software, collaboration solutions and telecom infrastructure.

Managing the Virtual Employee

As the sector works towards reorganising a more efficient model of contactless and borderless work, teams will need to take care of a cohesive business and software framework. Working towards an integrated command and monitor mechanism to address all these challenges will enable companies to minimise downtime. This will helpsafeguard remote access capabilities whileensuring that working structures and security measures are in place to assist leaders in managingtimelines, quality and checks.

Efficient and Effective Communication

This goes not only for the employees but also with the partner ecosystem, business associates and the changing customer behaviourat large. Currently, customers are also feeling the pangs of uncertainty and how will things move on here onwards and if they are in safe hands or not. This calls for assurance and transparent communication in order to help set the pace for delivering mission critical action plans as per schedule.

This is also a time to effectively and continuously communicate that a company's utmost priority is and will remain mitigating risk to its associates. Communication around the staggered return to work, new social distancing norms at workplace, new policies, infrastructure and behavioural changes to minimise risks and maximise performancehave to be clearly formulated and communicated.

These are testing times for us; however, every crisis brings with itself an opportunity – it is about how you manage the risk and the choices you make, that will determine your success. The software industry in India got the impetus to innovate, grow and establish amidst a crisis in the year 2000. Yet another opportunity knocks our door within two decades. If we get our act together and play our cards right, the software industry in India will reclaim the top position amidst the Fourth Revolution.

(The author is MD & CEO, Tech Mahindra)

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—RAJEEV SHARMA
Chief Strategy Officer, Mitsubishi Electric India

Mitsubishi Electric manufactures building systems, communication systems, industrial automation, medical systems, power systems, semiconductors and devices, transportation, visual information systems etc. Rajeev Sharma, Chief Strategy Officer, Mitsubishi Electric India, tells us more

COBOTS FOR INDUSTRY

What are the solutions being offered in automation?
Mitsubishi Electric offers wide range of automation and processing technologies which includes controllers, drives, industrial robots, visualisation products like HMIs and SCADA, low voltage switchgears and Computerised Numerical Controllers (CNCs) etc. We have solutions to build Smart machines and smart factories.

We also have pre-engineered software development packages called iQ-Monozukuri, which in Japanese is called "The Art of

Manufacturing". The iQ Monozukuri packages are specifically developed for processes like packaging, handling, converting etc. These solutions help reduce the development and deployment of industrial automation solutions to the industry and enables faster production, reducing the time to market and increase efficiency.

Mitsubishi Electric has been revolutionising IIoT solutions through the E-F@ctory, delivered through an alliance that is capable to serve all the digitisation needs. It serves the best automation technology for the best possible complete solutions. The components are added to provide a specific experience to the customer basis the market trends. The customer can choose from the categories of edge computing, IT systems and shop floor technologies and automation solutions.

How is Mitsubishi Electric viewing the Indian automation market?

We were in an accelerated growth period, till a few months ago. However, in the recent times, we have hit few roadblocks due to slowing consumption across various sectors. However, we have been focussed in taking our products and solutions across the varied industrial sectors.

Going forward, we will continue to adapt with the changing industrial environment and strive to provide cutting-edge solutions to our customers. In keeping with this ideology, we think that advances in industrial robotics and smart manufacturing solutions like E-F@ctory will drive the factories of tomorrow, which is why we have concentrated on three key features, viz, Intelligence, Integration and Safety; for our MELFA-FR Series industrial robots. They are capable of handling virtually all the automation needs. We plan to develop more functions in these three areas.

Also, next-generation intelligent functions make it simple to carry out work that has always defied automation. Safe, collaborative work applications allow robots and people to work together with high levels of safety. Mitsubishi Electric's E-F@ctory concept helps in integrating Factory Automation (FA) and IT functions, thus supporting the next generation of smart manufacturing.

What are the solutions being offered in power semiconductors and devices?

Mitsubishi Electric's insulated gate bipolar transistor (IGBT) and intelligent power modules (IPM) are used in many products, such as the industrial inverter and servo drive application to induce motion control. They are preferred for converting wind energy into power, which is then utilised for commercial purposes and for maintaining power supply in UPS etc. These power modules help in low power losses and ensure quality with reliability.

Our dual inline package - intelligent power modules (DIPIPM) are used to control the compressor motors, fan motors, and drum motors in air conditioners, refrigerators, washing machines, and other small motor application. It is the solution for most of the home appliances on which we are dependent in our day-to-day lives. Furthermore, the high voltage insulated gate bipolar transistor (HVIGBT) modules of Mitsubishi Electric are used for railway traction inverters and power transmission.

How is Mitsubishi Electric viewing the Indian power semiconductors market?

We have strategised the business development activities in two phases, i.e., short-term and mid-term phase. In the short-term phase, we will continue to focus on traction, utility solar, solar power and consumer durables.

For the mid-term phase, we are channelising our best efforts in getting the Design for emerging segments of EV charger, EV traction and high voltage direct current (HVDC)in the areas of power and healthcare, data display unit (DDU) for thin film transistor (TFT), and space for high frequency (HF) and optical devices (OPTO). The areas which will remain on our regular checks and development will be thin film transistor (TFT), industrial insulated gate bipolar transistor (IGBT) and most importantly, consumer durable applications.

How is the IoT business doing right now?

The IoT sector is emerging well and we are moving towards digitisation. Mitsubishi Electric is offering wide range of solutions for the IoT business to ensure responsiveness to customer needs, better transparency, agility, and cost savings.

How are the collaborative robots' businesses doing right now?

Increasing investments in automation of manufacturing processes is boosting the demand for collaborative robots or cobots. The cobots are designed to ensure collaboration

with humans at workplace to do efficient operations. The cobots are made to provide more exact movements, faster delivery in less time and maintaining high precision without compromising with performance or safety of humans. This is a rising segment for the automation industry as the future of collaborative robots holds striking innovations.

How is the Industry 4.0 business doing right now?

IIoT, or Industry 4.0 is changing the landscape of the manufacturing industry in India. While technologies such as robotics, AI, ML, cloud computing and big data analytics exist in the manufacturing sector, their integration with one another will transform the way we do business. In India, IIoT is still in the early stages, but it is already transforming the manufacturing sector in terms of responsiveness to customer needs, better transparency, agility and cost savings.

Factory automation is becoming more and more digital with the advent of smart manufacturing.

What are the future prospects of Mitsubishi Electric and its growth strategy?

Mitsubishi Electric is focused on making goods specifically to support Indian market needs. Our MSY-GR (T) series air conditioners provide high cooling performance with a guaranteed operating range up to 52 degree Celsius, which is suitable for the Indian Climatic needs to beat the heat in hot summers.

In factory automation systems, the graphic operation controller (GOC) has been designed, developed and manufactured by Mitsubishi Electric India for mid-segment users, and is aimed to meet the optimal automation needs of the Indian market.

Mitsubishi Electric India offers as standard Humiseal coating on certain PCBs. The polyurethane coating material is applied to the circuit board used in the inverter series FR-D700 and FR-E700, except for some non-coated parts, such as connectors, terminal blocks etc. Since, the FR-D700 and FR-E700 series has substrate coating as standard, the special code "-E16" is attached to the model name. These coatings can have a positive impact by improving performance in corrosion resistance and UV durability.

We will continue to provide products and solutions to our Indian customers to match their needs and ensure quality experience across businesses.

IoT solutions for Industry

- **Destination Oriented Allocation System (DOAS) –** Mitsubishi Electric' DOAS smartly channelises multi-car elevator systems by allocating cars efficiently according to the floors that passengers' input, while waiting in the hall, helping to reduce both wait and travel times. The system eliminates the need to press buttons upon entering the car.
- **Smart Metre Systems –** The smart metre systems from Mitsubishi Electric are introduced to visualise the power usage and automate metre reading. It is helping in maintaining high data collection rate. It gives the access to choose the optimal communication, which yield the highest economic efficiency related to the design tool.
- **Building Management Systems –** Building management systems and controllers are some of the most important devices within an air conditioning system. They provide a platform to minimise running costs and conserve energy. We consider both new build and refurbishment, Mitsubishi Electric's control systems readily integrate with industry standard BMS protocols.

What are your upcoming business and client-focused initiatives?

We at, Mitsubishi Electric ensure services and solutions to upgrade business and maintain long-term relations with our customers and business partners. Some of our initiatives are as follows:

Extended warranty scheme – Mitsubishi Electric India has announced a new warranty scheme on key components of their room air conditioners at no hidden cost. Effective from 1st April 2020, all inverter and non-inverter type of room air conditioners will come with 5 (1+4) years warranty on controller/PCB for repair/replacement and compressor for 10 (1+9) years for any kind of manufacturing or operational defect.

Training to business partners – We consistently organise training session and Webinars for our business partners and sales team. The sessions are about products, solutions like E-F@ctory, iQ platform, automation and smart manufacturing etc. During the pandemic conditions, we have organised 30+ webinars on our products and solutions. Such sessions help to explain our solutions and understand customer needs.

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Resilient **Digital Transformation**

Schneider Electric held the Innovation Day Resilient Digital Transformation. Here is an overview

Opening the conference on Innovation Day Resilient Digital Transformation, Pankaj Sharma, EVP, Secure Power Division, Schneider Electric, said the IT and OT convergence is happening all around us. Data centres are enabling the all-digital world through a centralised, regional edge, and local edge hybrid architecture.

Our goal in this era of digitalisation is to make the datacentres as sustainable and carbon friendly as possible. We need a broad portfolio of connected offers. We can integrate solutions, as well as integrated software and digital services. These three ingredients would help in the long run.

In the context of datacenrtes, there are three factors — building, power and IT. The future is in automating power. We are having the Schneider EcoStruxure datacentre that connects the end point to the cloud to maximise the value of data for greater efficiency. We are one of the few companies that take a lifecycle approach.

Challenge of AI and Exaptation

Dr. Omar Hatamleh, Technology Integration Manager, NASA, talked about the future of innovation and strategic transformation. According to him, the expected robotics market will be worth about $70 billion by 2025. The key challenge is artificial intelligence. It is applicable for manual labour and intellectual jobs. We now have algorithms, computing and big data. We also combine technologies. Real world examples include AI, VR, IoT, 5G and robotics. We can create an avatar for the people. You can, perhaps, imagine the capabilities in collective learning.

Having a team and joint resources can help in solving the complex data challenges. We need to establish collaborations that consist of various industries, academia, etc. We can solve anything by working together.

Digital Twin and Augmenting Reality

Delivering a strategy talk on reimagining intuitive industries, Peter Herweck, EVP, Industrial Automation, Schneider Electric, noted that there are examples in metals and mining. The challenge is to go underground and supply the power. Another example is the copper mine in Panama. This is in a remote location with poor infrastructure, a strict timeline, and challenging environmental conditions. How do we connect from the end point to the cloud? The operator can use the Schneider EcoStruxure. They can use augmented reality to run the machine. The points of interest are located strategically.

A digital twin begins with the EPC 4.0 strategy. Seventy assets are digitised and maintained in E3D -- one of the world's largest national energy companies. You can design and build. You can also operate and maintain. There is an end-to-end digital thread. You get real time data to use and improve operations. You can also run predictive maintenance.

Digital enablers are much easier to achieve today. You can optimise the data during all the stages. For design and build, there can be analysis of processes and equipment through multiple simulations for optimal safety, reliability and profitability. The Schneider EcoStruxureAsset Advisor has over 100 variables that get measured and computed.

Schneider is working with Adnoc, one of the world's leading energy producer and a primary catalyst for Abu Dhabi's growth and diversification. It is the world's 12th largest oil producer. We are also working with India's first greenfield smart city. Cybersecurity is very important. Cybersecurity sophistication continues to grow, with ICS and OT emerging as targets. Schneider is the founding members of the ISA Global Alliance, and Tech Accord partner.

Conservation of energy and automation provides full resiliency and efficiency. Connection is key to digital transparency and remote operations. Integration from design to build, operate and maintain is more than digitalization. It is about improving safety, optimising processes and increasing the productivity. The future of supply chain depends on resiliency through an integrated digitization. We also need to extend the cybersecurity to the last mile with IT/OT integration.

Digitally Resilient Enterprise

Talking about building a digitally resilient enterprise,

> DIGITAL ENABLERS ARE MUCH EASIER TO ACHIEVE TODAY. YOU CAN OPTIMISE THE DATA DURING ALL THE STAGES. FOR DESIGN AND BUILD, THERE CAN BE ANALYSIS OF PROCESSES AND EQUIPMENT THROUGH MULTIPLE SIMULATIONS FOR OPTIMAL SAFETY, RELIABILITY AND PROFITABILITY

Daniel-Zoe Jinemenez, AVP, IDC, gave the example of DBS Bank who has been changing the benchmark. It is also changing the balanced scorecard — top tier (40%), middle tier (20%) and lower tier (40%), are managed by DBS.

He further said that we should deliver innovative services and experiences at scale. There is a need to create a dynamic work model. CEOs need to drive the industrial ecosystems. The race towards the future enterprise includes the futures of customers, intelligence, operations and work. There should be empathy, insight, operations and work model -- all at scale.

The future of digital innovation will see software capabilities deliver innovation. The future of connectedness will be built around digital e.g., Domino's Pizza allowed customers to own the experience and being empathetic in their response. Rambam is working with start-ups to improve its Covid-19 response, for intelligence. For operations, Ford is partnering with 3M and GE to produce masks and ventilators.

So, how mature are organisations worldwide? 37% are opportunistic, and 36% are repeatable, worldwide. 15% are managed, but only 4% are optimised. The digital determination blueprint includes strategy, financials KPIs, business KPIs, and operational KPIs. Integrated strategies and technology roadmaps are uncommon. At least 63% enterprises are in the digitally distraught state. Only 37% are digitally determined. Enterprises need to develop new digital KPIs.

There are islands of innovation in the enterprise IT. Many are adopting the side-car approach. The enterprise IT platform needs to move to digital platform. There is need to designfor an integratedtechnology platform for scale. The DX platform is an integrated technology architecture. It has an intelligent core (data services), developer services, integration and orchestration services, and engagement services. There is need to enable digital services and experience.

By 2022, 30% of APEJ companies will incorporate metrics on digital resiliency for autonomous facilities. By

> NOT ALL DATACENTRES ARE CREATED EQUAL. MASSIVE COMPUTE AND STORAGE ARE LOCATED IN REMOTE AREAS. THE REGIONAL EDGE IS WHERE LARGE COMPUTE AND STORAGE IS LOCATED IN CENTRAL OR URBAN AREAS. THE LOCAL EDGE IS THE COMPUTE AND STORAGE

2023, 50% of CIOs will be entrepreneurial leaders. They will evolve the organizations into centers of excellence that engineer enterprise-wide collaboration and innovation. There is a need to assess maturity and set digitalization goals and digital metrics. There is also a need to invest in digital technologies and skills.

Sustainable Datacentres

Kevin Brown, SVP and CMO, Secure Power Division, Schneider Electric, talked about building sustainable and resilient edge datacentres. Not all datacentres are created equal. Massive compute and storage are located in remote areas. The regional edge is where large compute and storage is located in central or urban areas. The local edge is the compute and storage.

Recently, hyperscale datacentres are demonstrating their focus on renewable energy. We are also investing in technologies that improve sustainability, such as SF-6 free switchgear, advanced battery technology, liquid cooling, and interaction with grid. Now, it is time for the industry to focus on the local edge. Local edge datacentres are IT infrastructure enclosures/spaces etc.

Schneider sees three major edge computing areas -- commercial, industrial and telecom. There is also an edge energy challenge coming our way. Energy consumption by the edge datacentres will exceed 3K TWh per year in 20 years. Making the edge micro datacentres energy efficient at scale is crucial from a resource standpoint. The local edge dominates the availability equation and must be more resilient.

However, there is a paradox: resiliency brings lower efficiency. We are managing, supporting and standardizing using software tools, services and repeatable solutions using the latest technology. We utilize AI for predictive failure.

You can remotely manage local datacentres with the Schneider EcoStruxure IT expert. You can get instant visibility, do benchmarking and assessment, device configuration and firmware updates for remote device management, smart alarming and data-driven recommendations, etc. We have invested in new services powered by analytics.

Schneider Electric has an integrated, preconfigured and prefabricated EcoStruxure datacentres that deliver predictable performance and mitigate risk. We have a range of datacentres, from micro, to row and pod, to prefabricated modular datacentres. Schneider also recognises the need for an ecosystem to meet this challenge. We are working with the physical infrastructure providers, IT equipment providers etc.

The edge datacentre energy consumption will create a new challenge for the industry. Availability and sustainability can present a paradox that is forcing us to rethink on how we design and deploy the edge. Manageability, serviceability, and new solutions are enabled by a collaborative ecosystem. Schneider's focus is to address this challenge.

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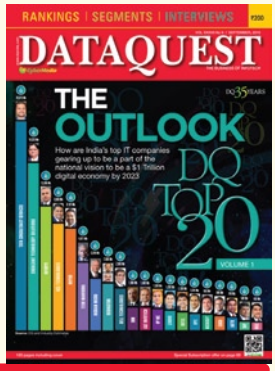

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Using AI for **Good Business and Sustainability**

From the Terminator and the Matrix in pop culture, to facial recognition and ethical issues, AI has always been a hot topic - and it's had a history of negative press. In fact, AI is a force for good! How has AI actually helped in the fight against corona virus — the crisis that's changed all our lives? And, how is it helping in other areas, for example, preventing climate change?

Ericsson recently held a workshop on AI for good business. Dr. Aleks Krotoski, Ericsson UnBoxed Office, Social Series and the host, said that they will be looking at the future of communication technologies. They will also look at AI, facial recognition etc., along with the ethical issues. AI has always been a hot topic. Well, what about AI for good? Or, AI for super good! We will look at how AI is helping us in the fight against coronavirus. How is it helping us in climate change?

White House Call to Action VS Covid-19

For the White House call to action to battle Covid-19, Ericsson partnered with the National Institutes of Health, Georgetown University and the White House Office of Science and Technology Policy on their open research dataset challenge Covid-19. This challenge has 10 open tasks ranging from understanding Covid-19 risk factors to finding treatment protocols.

There was the latest and greatest in data science to understand all of this happening around us. There were

> WE HAVE WORKED A REALLY LONG TIME TO INCREASE THE ENERGY EFFICIENCY OF THE NETWORKS. AI NOW ACTS AS AN ADDITIONAL TOOL THAT BUILDS IN MORE INTELLIGENCE INTO THE NETWORKS. ONE EXAMPLE YOU CAN USE AI FOR IN THE MOBILE NETWORKS IS TO PREDICT THE TRAFFIC AND USE YOUR RESOURCES. THIS WILL END UP SAVING A LOT OF ENERGY AS WELL

issues to go through, from ethics, to genome sequencing. With this rich talent, we were able to deliver back to the White House. It was an incredible experience. There was data retrieving and sifting. We started the challenge where White House had gathered many papers on Covid-19.

To keep America running, Ericsson web page, today, we're facing a new challenge, unlike anything we've seen or done before. We are in uncharted territory, as businesses, industries and societies are grinding to a halt. For all Americans, network connectivity has suddenly become profoundly important.

Business and Sustainability

Cecilia Nyström, Program Manager, Data and Analytics, Ericsson Business Area Managed Services, noted that they were working with AI researchers and collaborating with the different stakeholders. They were trying to determine how they could use their expertise in the telecom domain and AI domain. How they could use this information to help the society in the battle against Covid-19. We have also learnt about AI. There is a case to rethink cases and what the AI algorithm is all about.

She added: "We also learnt about climate change. Sustainability is really a great topic. We can do AI to increase the efficiency of the mobile networks. If you have the opportunity to reduce the energy consumption, you can also reduce costs. The combination between business and sustainability is really powerful. The data volumes in the mobile networks are really growing right now. It also means that new opportunities are also being enabled by all of this. However, it can also have a negative impact on the energy consumption.

Jörgen Gustafsson, Sector Manager, AI Infrastructure, Ericsson Research, noted that we are supporting with insights, as we are also looking to flatten the curve, and protect the privacy, which is very critical. The telecom network has produced lot of data. We take this aggregated data and use advanced AI and squeeze out insights.

Ethics of Using AI Systems

Now, organisations have principles they adhere to, as far as using AI systems go. Cecilia Nyström said, "We are working on the EU guidelines. We are building the infrastructure that is critical for the society. Questions like security and robustness are always very important. AI also brings some additional challenges."

Paul McLachlan added that Ericsson has taken ethics very seriously. We are very mindful of ethics. We are also looking at how we understand the models that are coming in. Not only are we pushing our best practices, we are also doing developments and further improve the methods. We are interested in data ethics and data governance. We are extremely sensitive as well. We take that trust and responsibility.

Next, there is the question about having robustness in AI. How can we use AI in network security?

Jörgen Gustafsson said, "We are extending robustness into the AI domain. We can trust the network, and it is just as robust as the other networks. We are starting from a very robust platform when it comes to security.

As for the role in sustainable development, Cecilia Nyström said, "We can play a very active role. We adhere to many UN goals. Besides customers, we also have a big responsibility when it comes to our own operations. We also need to reduce our own carbon."

WE NEED AI TO BE ABLE TO DEVELOP THE NETWORKS. IF YOU ARE USING 5G NETWORKS ANYWHERE, THERE ARE ONE OR TWO AI ELEMENTS THAT ARE ALSO MAKING IT WORK

Why have Biased AI?

Another area that Ericsson is looking at is how would you ensure that AI is not biased with anything?

Paul McLachlan, Head, Data Science, Ericsson said, "As we are building systems, we need to ensure that the systems themselves are not biased. We also need to have people who are not biased. We have a diverse set of people working on the AI teams. They work hand-in-hand to build models."

Gustafsson added that when we create algorithms, we ensure they are not biased. Are they having any gender bias? We verify that as well. We are humans after all!

Using AI Aspect of the Internet

Next comes the issue of looking at the AI aspect of the Internet. Jörgen Gustafsson said that when it comes to democratisation, we ensure how to train the data and whether there is any bias etc. The algorithm will help the system to learn.

Paul McLachlan added that all voices are being heard. There is a rich network in the USA. The power connecting everyone is democratic. That is a fundamental shift, being able to share your voice. As we bring in AI and there are 5G networks too, it can get a little more complex to operate a network. There are factors like geography and distance as well. For example, there may be a conversation going on between San Francisco and somewhere in Sweden. There should be a way to manage the network complexity. Ericsson is making sure that the networks are always up and available. There is AI in the loop. We need to manage the network complexity.

AI can also be used for network bandwidth allocation. Cecilia Nyström felt that the complexity of the network automatically increases. We are using these types of technologies to manage intelligently.

Open sourcing is a big part to help a project to grow. Is there any plan for open sourcing Ericsson's work? McLachlan said, "I am an advocate of open source code and network. However, we do operate critical infrastructure. We have to ensure that we are operating with lot of security and trust. We are very proud of our accomplishments."

Wide Usage of AI

Further to the wide usage of AI, perhaps it will become a commodity. Gustafsson added that it is very important to think of the world when we talk about AI. Covid-19 is a good example of what we are trying to do for the good of everyone. Once we can scale it up, this will benefit everyone.

As for privacy in AI, Gustafsson noted that there is the Covid-19 where there is non-sensitive data. We are also trying to understand how the network is performing. If we are not close to people, the virus will not spread. Authorities can give guidance about how to flatten the curve. We can take data that is almost useless and suddenly make it very useful.

Full AI for 5G and Future Networks

Finally, when can we expect full AI for 5G and future networks? Jörgen Gustafsson said that as AI becomes a fundamental, it will be an integrated part of the network. We need AI to be able to develop the networks. If you are using 5G networks anywhere, there are one or two AI elements that are also making it work.

Cecilia Nyström added that besides managing and developing, we will more and more get into optimizing. Maybe, you can also get a better network performance. Paul McLachlan said that a 5G AI network will be used by the consumers in the future. There could be XR/VR, so that people can interact and travel. We are also thinking about the Internet of Senses. We are looking at taste, touch, smell, etc. as well. The combination of XR/VR with AI will make it a very powerful technology.

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Digital Transformation for **FMCG**

Rockwell Automation India recently held a web conference on digital transformation in the new normal for the FMCG industry. Here is an overview

The event on digital transformation held by Rockwell Automation commenced with a fireside chat on managing business continuity during the Black Swan crisis. The participants were Dilip Sawhney, MD, Rockwell Automation India, Sriram P, Executive VP Operations, Pernod Ricard India and Yoginder S. Grewal, CTO, Hindustan Coca-Cola Beverages.

The discussion veered towards the lessons learnt, possible solutions and the prospects in the future. Automation seems to have emerged as a possible solution as a protection against a crisis like the Corona spread, as it reduces human contact in an industrial environment.

Lessons Learned

What are the lessons learned so far, from the crisis? Grewal said that they have simplified everything to the

WE ARE LIVING THROUGH THE MOST CHALLENGING PHASE OF OUR CAREERS. WE NEED TO OVERCOME THESE CHALLENGES. WE NEED TO COME OUT OF THE DISRUPTION. WE ARE PART OF AN INDUSTRY WITH MATURE SUPPLY CHAINS. HOW ARE YOU HANDLING DISRUPTION?

— Dilip Sawhney, MD, Rockwell Automation India

maximum. Once you have simplicity, everything will work. Sridhar agreed that they are now making the enterprise more resilient. The employee health is very important. We are looking at the budgets. We also need to change our own mindsets. Cash is very important. For FMCG companies, collaboration is very important. We need to look at the micro supply chain. As you take this ahead, life becomes simpler.

Next, how are the supply chains evolving? According to Sridhar, ecommerce will grow in 2-3 years. The Indian household incomes will also increase. We need to deliver supplies across India, urban and rural e.g., Nestle, has successfully brought back Maggie. We now need to create innovation and re-invent the business.

Dilip Sawhney also touched upon the dynamic playout. Grewal agreed that ecommerce is gaining in strength. We need to depend less on the traditional modes. Digital has become a buzzword. You also need to bring the previous solutions to their sunset. Digital is due to simplicity. We are still designing digital solutions based on our earlier experience. We need to get out of that mould, and think afresh.

So, how are companies now seeing the new normal? Sridhar said that technology will play a vital role in the life of any company. People who use technology, their companies are growing at least four times faster. Every factory is manually spraying on people and offices. Less travel is happening. We can also not spend on conferences. Right now, the virtual conferences are much better. We need to go digital and rely on data. We will need to do this in a very phased manner and adopt technologies. According to Grewal, this is a golden opportunity to drive digital. We, as professionals, should not lose this opportunity. The first experience matters.

Dilip Sawhney asked the question that as the industries transform, how are skills going to evolve? Grewal replied it is all about the attitude. If you have the right attitude, you can develop very fast and learn new skills. Attitude is the key. Everything is possible. Also, what is the impact on trade channels? Sridhar said that there will be a huge shift. Ecommerce will happen very fast and improve the customer satisfaction. Customers will get what they want.

Finally, how are companies seeing Industry 4.0 play out? Grewal said that everything is possible. We need to answer properly, why we need to do it. If we look at the RoI, we need to bring the customer and the quality into the picture. We need to focus on a high-impact item.

Industry 4.0 and Manufacturing

Arup Ghosh, Head IS Solution, Rockwell Automation India, spoke about Industry 4.0 and the new normal in manufacturing, especially in the FMCG sector. We are seeing lot of innovation in the manufacturing sector. There is an overwhelming spike for new products. We need to keep our plants operational. Businesses that have gone through digital transformation are now able to react better.

He added that those who can manage their businesses remotely are far better positioned to ensure plant safety. AR can be used as a remote guidance tool. AR can also be used for creating an asset digital replica. Rockwell

WE NEED TO ACCEPT THE STATUS QUO. WE ALSO NEED TO CHANGE OUR BUSINESS STRATEGIES. WE NEED TO RELOOK AT OUR OFFICE SPACES AND THE AMENDMENT OF LABOUR COSTS. SELF-RELIANT INDIA WILL PROVIDE LOTS OF SECTORS. WE ARE HOME DELIVERING NOW IN 5 STATES.

— Sriram P, Executive VP Operations, Pernod Ricard India

is offering free remote assistance with AR from its Factory Talk Innovation Suite, powered by PTC, to help manufacturers.

IIoT is enabling the remote monitoring. It manages smart devices and industrial data sources, along with the IoT cloud e.g., real-time plant monitoring can be done. You can now monitor production information. We can also tackle the spike in demand. We can have advanced analytics of digitised operations that provide real-time insight into the functioning of the production lines. We can also monitor remote assets and predict the anomalies or failures. We can bridge the digital with the physical. We can also connect to physical assets and IT/OT systems, understand the context, etc.

Rockwell is partnering with the global FMCG majors. The ultimate lifecycle story is: doing it right, rather than, just present a knee-jerk reaction.

Digital Transformation Flourishing

There was a panel discussion on digital transformation. The speakers were Aniruddh Verma, Divisional Manager, Engineering & Projects, ITC, Suresh Madan, Senior Engineering Manager Nestlé India, Senthil Nathan Srinivasan, GM, IS CavinKare, Pranav Majgaonkar, MD, Armstrong Machine Builders.

Senthil Nathan Srinivasan opined that Covid-19 has brought about digital transformation. The new normal will see remote workforce as part of the BCP. Aniruddh Verma said that they are encouraging people to WFH. There is also disruption in warehousing and logistics. There is stress on people's safety as well. Pranav Majgaonkar felt that there is a need to automate the entire supply chain. Suresh Madan added that Nestle is now looking at the digital factory and how to handle that.

Actions Taken to Normalise

AniruddhVerma said that automation is an area we have been pursuing. Now, it has become the need. We need an intelligent data system as well. Lot of learning has been happening. There is alsothe need to sustain the social distancing norms in the factory. Lot of regulations will start coming into play.

Speaking about the labour issues, Senthil Nathan Srinivasan felt that there will be lot of changes in the bottom layer. We need lot of manpower. We need to look at improving the yield. The new normal will witness the change to digital. We need remote assistance, and do troubleshooting. This will get replaced with remote assistance. We also have to start connecting the remote locations.Cybersecurity has emerged as a key area. Availability of data in the edge and on the cloud will be widespread. However, there will always be a threat of security breach.

Tech Dealing with Disruption

Regarding technology dealing with disruption, Pranav Majgaonkar said that there is a lot of disruption happening. Software can be deployed. We also need partial remote connectivity. We are looking at remote monitoring solutions. There will be touchless operations. There is

WE HAVE ALREADY PREPARED AND MADE A PLAN IN ADVANCE. WE ARE NOW EXECUTING THE PLAN DURING THE CRISIS. ALL ORGANISATIONS NOW NEED TO FOCUS ON BCP. THERE ARE SEVERAL TECHNOLOGY SOLUTIONS AVAILABLE FOR WFH.

— Yoginder S. Grewal, CTO, Hindustan Coca-Cola Beverages

a need for a centralised software control system, along with an analytical AI engine. We have been giving remote support to a lot of companies.

Suresh Madan added that the biggest challenge in starting the factory is working on the shop floor. He said: "The next challenge is about project commissioning. We need to do a lot of tool box changes for everyone. We have created a new mantra for social distancing. We are preparing for the future. Covid-19 has created and accelerated digital transformation. It is high time we started working on the factory of the future. If and when we do it, in the right way, it will help us in the future. Smart machines will help major producers in a huge way."

Aniruddh Verma noted that in terms of designing a new plant, the focus of every machine should be connectivity to the data points and the intelligent systems. It should be connected to the raw materials. The end-of-the-line packaging is another area that will undergo a rapid automation. Senthil Nathan Srinivasan added that we need to focus more on remote management. Covid-19 has already decided what needs to be done. Decisions will be much faster.

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Future of **Automobile Industry**

With the advancement of technologies like AI, Robotics and IoT, the automobile industry has made some significant leaps towards growth and development. The utopian image of future – with cars that run on eco-friendly fuel and can drive themselves – isn't too far away now

Four major trends that are shaping the future of the automobile industry are collectively known as CASE. The acronym stands for Connected, Autonomous, Shared and Electric. Let us discuss about these trends in detail.

Connected

One of the major trends shaping the future of automobile sector is internet connectivity in cars. These cars that have internet connectivity can communicate with other devices inside and outside the car that are also connected to the internet.

A connected car can accomplish a myriad of tasks – it's sat-nav system can warn you about traffic holdups and suggest alternate routes; you can remotely start your car engine to melt the frost on the windows before you enter the car; you can remotely lock and unlock the car as well. Some car apps even provide car parking service which can help you park in tight spot or a narrow garage. People inside and around the car can access connect to internet via its WiFi hotspot and enjoy 4G internet access.

One such example of connectivity is the emergence of smart tablets like the Pioneer SDA-83TAB. These kinds of tablets can connect to your smartphone via a WiFi hotspot and double as a head unit. It allows you to use your smartphone remotely with ultimate ease without having to shift your focus from the road. With the recent voice command upgrades like the Alexa upgrade, these

> SOME CAR APPS EVEN PROVIDE CAR PARKING SERVICE WHICH CAN HELP YOU PARK IN TIGHT SPOT OR A NARROW GARAGE. PEOPLE INSIDE AND AROUND THE CAR CAN ACCESS CONNECT TO INTERNET VIA ITS WIFI HOTSPOT AND ENJOY 4G INTERNET ACCESS

technologies are going to make the driving experience more seamless than it ever has been.

In the near future, the connectivity would expand further beyond and the cars would be able to communicate with each other. By connecting with lasers, cameras and radars, these cars will be able to create a 3D map of the surroundings. This will eventually lead to self-driving cars. This point brings us to the second trend as well – autonomous driving.

Autonomous

As good drivers as we believe us to be, let's face it – we're humans – and by definition we're prone to making mistakes. This is why a lot of R&D is being dedicated towards manufacturing Autonomous cars. As the technology keeps on evolving, we'll see more and more autonomous cars on the streets.

New Heights – 3D-LiDAR Technology

Currently, we are at Level 2 of automation where the cars use millimetre wave radar and cameras to detect obstacles for driving assistance. But the accuracy of these systems largely depends upon the inclement weather and the attributes of the objects that are to be avoided.

To overcome these lacunae and move to the Level 3 of automation, 3D-LiDAR technology is being developed. The LiDAR system emits its own laser light and maps the surroundingsaccording to the input car-mounted sensors receive from the reflected light. This makes it a superior choice as LiDAR system work well in situations where cameras fail – such as at night.

The only drawback of 3D-LiDAR systems is that they are too large, heavy and expensive – but Pioneer is working on mass producing lightweight, compact, and low-cost 3D-LiDARs which will enter the market very soon.

Earlier, with 2D-LiDAR, we were able to only detect the depth of a single beam but Pioneer is implementing its digital signal processing technologies in digital tuners to enable unique processing to achieve high precision and stability. This makes the LiDAR technology weather independent and enables the detection of glossy black objects, which isn't possible with conventional LiDARs.

Shared

In a survey conducted by Assurant, 66% of the respondents said that the best thing about the future that will have autonomous vehicles that will provide service on-demand would be the savings as they wouldn't have to invest substantial money into owning a car.

Many shared car services have already sprung up and are on the rise. Many more will emerge in the near future. These service providers will own the fleets which would be hired by the people as per their needs.

Electric

Fossil fuels aren't good for the environment – not to mention the ever-increasing prices that put a lot pressure on the pocket. With e-vehicles, we'll finally see an end to this problem. During the early phase of development, range anxiety (the anxiety about the car running out of battery before reaching the destination) was a major issue. But, with the invention of more powerful batteries and growing number of charging stations, this issue has been resolved as well. The e-vehicle market is expected to grow at a robust CAGR of 43.13% from 2019 to 2030 – which, in itself, says enough.

CASE isn't just a jargon on a factory presentation anymore – it has become a reality. It is shaping the future of the automobile industry and making the transport safer, convenient and greener.

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—DR. RICHARD SOLEY
Executive Director, Digital Twin Consortium

TECHNOLOGY FOR BUSINESS GROWTH

The Object Management Group (OMG), with founders Ansys, Dell Technologies, Lendlease and Microsoft, recently announced the formation of Digital Twin Consortium. Digital twin technology enables companies to head off problems before they occur, prevent downtime, improve the customer experience, develop new opportunities, drive innovation and performance and plan for the future using simulations.

Members of Digital Twin Consortium will collaborate across multiple industries to learn from each other and develop and apply best practices. This new open membership organisation will drive consistency in vocabulary, architecture, security and interoperability to help advance the use of digital twin technology in many industries from aerospace to natural resources. Here, Dr. Richard Soley, Executive Director, Digital Twin Consortium, tells us more

What is the purpose of the Digital Twin Consortium? How different is it from the others?

The twin purposes are to accelerate the use of digital twins in market where they're underused, and amplify the interoperability and portability of digital twins, especially between markets. We are not familiar with another organisation with those aims.

Why is digital twin difficult due to lack of understanding and standardisation?

In some markets (e.g., large manufactured objects and semiconductor chips), the digital twins have been around for decades, causing unnecessary fragmentation of approaches. The Digital Twin Consortium exists to correct that with open source software.

How is digital twin technology changing the face of manufacturing?

The ability to model and simulate large manufactured devices, before building them or apart from manufacturing them, allows the organisation to correct and optimise the manufacture of devices at much lower cost and predict failure of the manufactured device, minimising downtime and maintenance cost.

How is the ecosystem for digital twin experts being developed? Who all have joined so far?

Many companies are committed to using and learning about digital twin technologies to gain enhanced insight into the performance of their processes, systems, services and products in multiple real-time applications

> MANY COMPANIES ARE COMMITTED TO USING AND LEARNING ABOUT DIGITAL TWIN TECHNOLOGIES TO GAIN ENHANCED INSIGHT INTO THE PERFORMANCE OF THEIR PROCESSES, SYSTEMS, SERVICES AND PRODUCTS IN MULTIPLE REAL-TIME APPLICATIONS AND ENVIRONMENTS TO IMPROVE EFFICIENCY AND QUALITY ARE JOINING THE CONSORTIUM

and environments to improve efficiency and quality are joining the consortium.

Companies on the forefront of deploying digital twin technologies are already reaping significant benefits and discovering new opportunities that are changing their business models. Those who implement the technology within their enterprises will gain a competitive advantage over those who do not.

The technology enables companies to head off problems before they occur, prevent downtime, improve the customer experience, develop new opportunities, drive innovation and performance and plan for the future using simulations.

Members of the Digital Twin Consortium collaborate with the experienced technologists, physical product experts and data scientists, across multiple industries, to learn from each other and develop and apply best practices, which accelerate the adoption of digital twin technology across their enterprises.

Users of digital twins are encouraged to join to reduce the risk of using digital twins within their business and maximise the benefits of digital twins by leveraging the Digital Twin Consortium ecosystem. This includes working with leaders in the field, being at the forefront of innovation and driving requirements for standards.

Why are folks like Rockwell, Emerson etc. not part of this? Or, will they come in later?

We are talking to everyone and open to all. The Consortium reached almost 50 members in the first few days and watch this space!

The Consortium will discuss and deliver the following:

- A shared terminology for digital twins and related technology.
- Shared guidance and best practices for delivering digital twins across industrial sectors, focusing on raising the level of the use and understanding of the technology, especially in sectors that are less mature.
- Support for the adoption of the digital twin process by collating the value driven out by proponents of those processes.
- Open source reference implementations of digital twins within and across various vertical markets.
- Recognition of common attributes of digital twins to codify requirements for standards for digital twins for portability and interoperability within and across vertical markets, and the development of substantive relationships with leading standards organisations to realize those standards.
- Sufficient guidance and open source code to enable tool chain interoperability.
- Sufficient guidance to move each industry from a fragmented, opaque and one-off project-based approach to a systems-based way creating, recognising, disseminating and embodying organisational knowledge, enabling continuous improvement.
- Identification of joint development activities on a non-competitive basis that everyone needs to do, such as security, hyperscale infrastructure and so on.
- Assistance for regulatory and government bodies to alter their existing procedures to accept digital exchange with digital twins to derive value from the approach and shorten approval times for the industry.

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—POOJAN KUMAR
CEO and Co-Founder, Clumio

Clumio has re-imagined the enterprise backup and recovery; taking full advantage of the scale, economics and elasticity of the public cloud to give a new and game changing backup experience. Clumio eliminates the complexity of managing infrastructure; on-premise and in the cloud, to deliver secure and authentic SaaS. Poojan Kumar, CEO and Co-Founder, Clumio, tells us more

“ A HOLISTIC SOLUTION

What are the activities that will be led by the Clumio R&D centre?

The Clumio Research and Development Centre in India will not just act as support for the global team. It has its own charter and will drive front-end innovation and research to build cloud solutions from the ground up. The engineering teams will play an integral part in product development and building best-in-class technology solutions.

Key examples of the work already done with the India team's support include the recent addition of Microsoft 365 to its secure backup as a service. This made Clumio a private, public and SaaS enterprise data protection service on a single platform.

The team also built the REST API platform for Clumio – it delivers on the promise of what REST architecture was supposed to solve for the internet era, applied to an enterprise domain such as backup, offered as a service. The team has also, in parallel, built strong foundations in simplifying user experience by constructing simple and intuitive user interfaces for several crosscutting features implemented by their state-of-the-art engineers from across the globe.

How are you positioning back-up as a service (BaaS)?

Clumio backup-as-a-service replaces the complexity of managing data across all clouds with an authentic approach to SaaS. Regardless of where data is managed, created or stored – whether it's in a cloud, a hypervisor, a database, or from another SaaS solution, enterprises will have a unified view of all of your backup data for the first time.

How are you redefining cloud data protection?

Clumio enables enterprises to make their all cloud vision a reality so that they can manage and protect their dispersed data, wherever that data resides. Companies can reap the full scalability, flexibility and elasticity benefits of the cloud, without additional hardware or software for data management and protection. Clumio's secure enterprise backup-as-a-service is a holistic solution that crosses environments, eliminating the need to create a different set of tools, workflows and policies for each cloud. The result is that enterprises can focus on more strategic aspects of the business.

What are the new cloud solutions that you are working on?

Recently, Clumio announced data protection for the Amazon RDS (Relational Database Service) workloads, eliminating cost, risk and compliance-related barriers to cloud adoption, specifically the migration of mission-critical apps to the cloud.

Clumio's service, the first data protection service for long-term retention of AWS native services, also orchestrates operational recovery snapshots for free. The company continues to advance SaaS backup for the all cloud enterprise, delivering a seamless public cloud backup solution and enabling companies to get to the cloud faster.

Clumio's enterprise backup-as-a-service consolidates the operational recovery, backup and compliance requirements – all within a predictable cost model. Clumio includes snapshot orchestration for free, air-gap snapshot protection and long-term retention, translating to secure and compliant data protection at a substantially lower cost.

This announcement for AWS comes after Clumio's recent addition of Microsoft 365 to its enterprise backup as a service – the first enterprise data protection service in the market to protect private cloud, public cloud and SaaS on a single platform. Clumio's AWS and Microsoft 365 data protection "firsts" empower enterprises to map to an "all cloud" model efficiently and effectively, expediting innovation in the process.

How will SaaS services in the public cloud going to be the draw/Uptake of SaaS services in the public cloud?

The data protection-as-a-service market – which includes expenditure on backup and disaster recovery cloud services – is projected to reach the US$10 billion mark by 2022, according to IDC. Enterprises have already moved their data warehouse, CRM and IT service management workloads to the cloud and Clumio is doing the same for data protection. Each of these workloads were best suited for cloud when they were built natively in the public cloud and offered to customers as software as a service.

Clumio is a secure, backup-as-a-service built natively in the public cloud that consolidates the protection of an enterprise data center and any remote sites without any hardware or software to size, configure, manage or buy. Like those that disrupted the markets for the workloads mentioned above, Clumio is disrupting the very large backup and disaster recovery cloud services market with this SaaS service in the public cloud.

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Prime Minister Promises **to get the Growth Back**

The Confederation of Indian Industry (CII) recently celebrated 125 years. Delivering the inaugural address at the 125th anniversary of CII, Narendra Modi said: "I congratulate CII for completing 125 years. I congratulate CII for providing strength to the country. In these times of Corona, such online events are perhaps, becoming the new normal. It is human's biggest strength that he finds a way out of troubled times. We are taking tough steps to fight against the virus. We are also trying to stabilise and speed up the economy. CII has focused on bringing growth back. Yes, we will definitely get our growth back. In these troubled times, how can I say this thing with such confidence? I have full faith on India's capabilities and crisis management. I am dependent on India's entrepreneurs, the industry leaders, and their intellect, etc.

"Even though Corona virus may have slowed us down, we are now in Unlock Phase 1. A lot of the economy has been opened up. More of the economy will open up in a week's time. India has decided to take the right step, at the right time, that is, to declare a national lockdown. In this battle, we have taken steps to protect the physical resources and human resources. Now, what next can the government do? We all know about Atma Nirbhar Bharat. We have to strengthen the economy. We will take many important decisions as soon as possible. We have also taken decisions that will be useful in the long run.

"There are 75 crore beneficiaries for whom free ration has been delivered to their homes. We are giving financial assistance worth Rs. 53,000 crores to the people. We have also taken steps to see people reach their homes. We have to back to strengthen the economy. Intent, investment, infrastructure, innovation and inclusion are the most important things today. We are also looking at reforms that are systematic, planned, interconnected and futuristic. We are looking at taking bold decisions and take steps to become a much stronger economy. We have tried to bring down any interference by the government for conducting businesses. We are also doing policy reforms that the country had probably given up.

"The MSMEs are also very important for us. They can participate in all activities without any worry. We are looking at benefiting them by closing the small tenders. We also need to look at the global monetary situation. Today, countries are looking to support each other. The old ways of working, and old policies, will not work anymore. Everyone has huge expectations from India. There is new thought coming out of India. India has also given medical supplies to over 150 countries. The world is looking for a potential partner. India has gained lot of global trust in these tough times. It is up to CII to ensure that we build trust, quality and competitiveness. I would like to assure you that I am standing with you. Getting growth back is not so difficult.

"Atmanirbhar Bharat or self-reliant India will need to become stronger and embrace the world. We do not need to depend anyone for the strategic sectors. Enterprises can become global forces. It is about creating employment. We need a robust, local supply chain. Post corona, even the CII has to come forward in a new role. You must facilitate the growth of the local industry. You must expand the local market. There should be products that are Made in India and Made for the World. We need to increase productivity across all the sectors."

Earlier, Vikram Kirloskar, President, CII, said that the CII has been dedicated to nation building. It is a social contract. CII has remained a strong and credible partner in India's development journey. India has established itself on the global stage with some innovations over the past few years. India has launched the Chandrayaan, gone the GST route, and is part of the international solar alliance, to name a few.

CII began its overseas work with international business and partners. We have done work in CSR and public health. Its work on women and poverty are among some of its initiatives. CII also set up CoEs across the country in 1995 for projects such as manufacturing, water for sustainability, etc. We have 68 offices across India.

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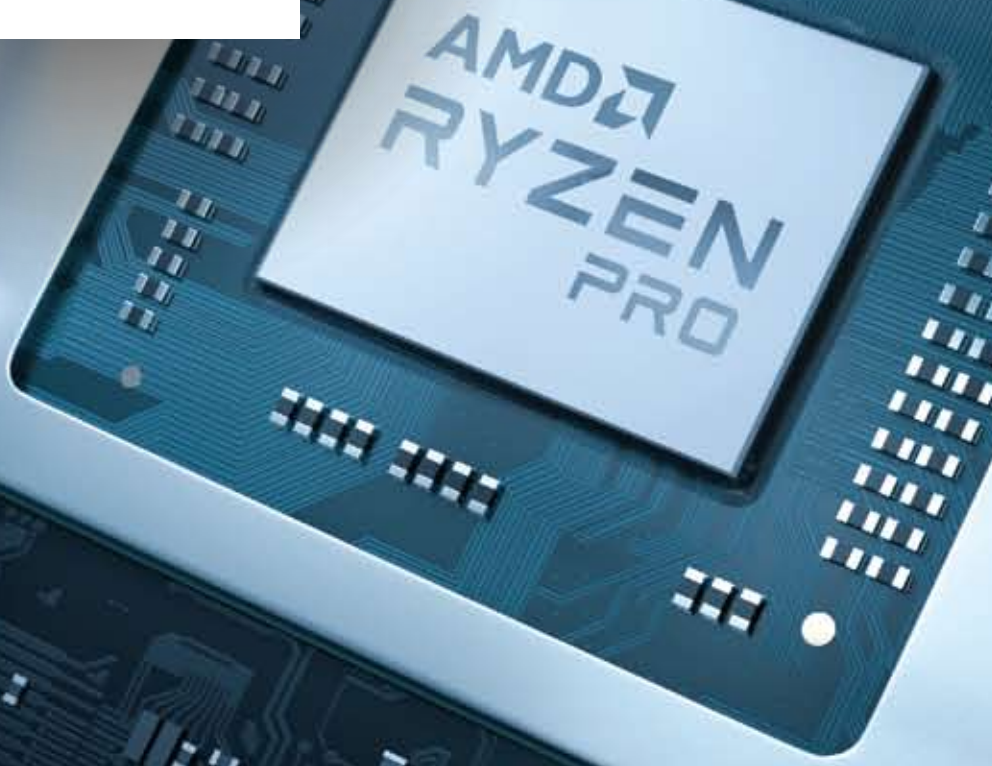

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