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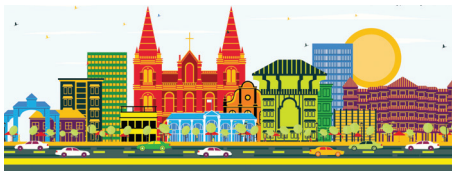

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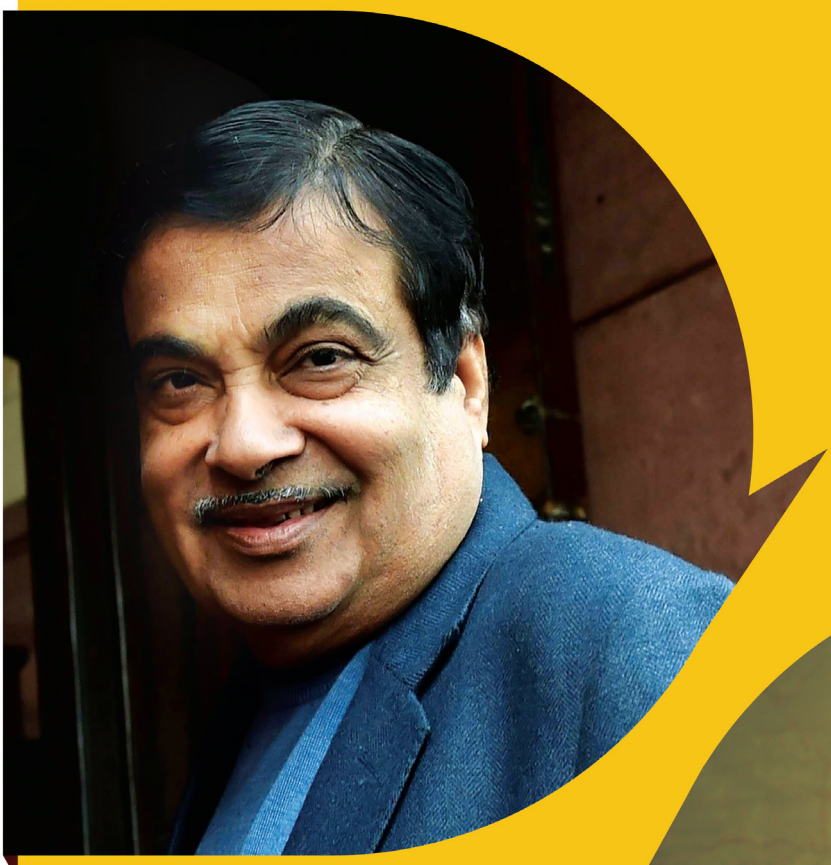

# MoRTH: The road to digitisation

Exclusive Interview

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Minister of Road, Transport and Highways (MoRTH)

# Oracle uses emerging tech to accelerate in India

From blockchain to AI, Oracle India is betting big on a series of smart innovations that the database major believes will help it grow faster than the competition

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**April 26 - 27, 2019**
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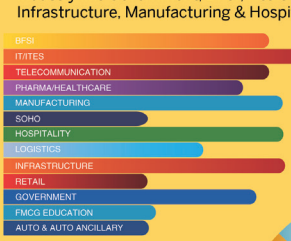


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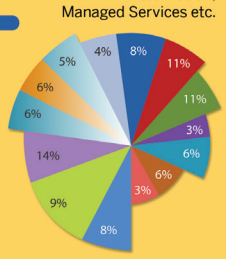


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*Srikanth RP, Editor*
*srikanth.rp@expressindia.com*

# Oracle uses wings of cloud to soar high in India

In the intensely competitive digital landscape, Oracle has used its traditional strengths in databases to go with full force in the cloud. In India, in line with the huge surge in digital initiatives taken by different corporate organisations, Oracle has seen huge adoption for its solutions. As a result, India has been conferred the best performing region within JAPAC for the last three years consecutively.

Some smart innovations such as the 'Cloud at Customer' offering (which provides the opportunity for customers to take advantage of the cloud model behind the customer's own firewall), and the Oracle Autonomous Database (touted as the industry's first 'self-driving, self-securing and self-repairing' database), have seen Oracle gain faster acceptance in the market. SBI for example, uses the Cloud at Customer' offering, while Federal Bank is using the Oracle Autonomous Data Warehouse for ATM performance analysis. Oracle has also understood the huge opportunity in automating migrations to the cloud, and has accordingly conceptualised 'Oracle Soar to the Cloud' – an automated cloud migration offering that will enable customers to reduce the time and cost of cloud migration by up to 30 per cent.

> "With its traditional reach in databases, Oracle has successfully leveraged its legacy strengths, while continuing to bet big on emerging technologies like AI, ML, and blockchain to accelerate its growth in the future

With respect to its SaaS business, Oracle is seeing growth close to 31 per cent on a year-on-year basis, with customers such as Taj hotels, Hindalco, Indian Oil, SBI, Adani, Reliance, AU Finance, Transworld, SBI and Bajaj Electricals.

Oracle has also been smart enough to leverage its solutions for solving some of biggest problems. For example, to solve the big issue of fake drugs, it recently tied up with NITI Aayog, Apollo Hospitals, and global pharmaceutical manufacturer Strides Pharma Sciences, to pilot a real drug supply chain using blockchain decentralised ledger and IoT. This project, if successful, can help Oracle pilot this solution in other parts of the globe. This is a huge market, as the WHO estimates that the healthcare industry loses close to US$ 30 billion due to counterfeit drugs.

For every customer, the company has taken a solution-oriented approach, aimed at solving the core problem for the customer. For example, in case of telecom, the focus is on how telecom firms can grow their market share profitably in a market that is being dominated by one large telecom player. In the case of banking which has problems related to NPA, the focus is on how automation can help companies close their books faster. Additionally, as the whole banking scenario has changed with respect to usage of technology, there is a need for banks to re-architect their core applications, specifically with respect to payment load.

With its traditional reach in databases, Oracle has successfully leveraged its legacy strengths, while continuing to bet big on emerging technologies like AI, ML, and blockchain to accelerate its growth in the future.

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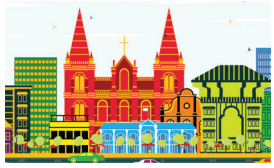

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The Indian Express (P) Ltd.
Business Publication Division
1st Floor, Express Tower,
Nariman Point, Mumbai- 400 021
Board line: 022- 67440000 Ext. 527

**Aparna Tawade**
Mobile: +919870853253
Email: aparna.tawade@expressindia.com

**Ravi Nair**
Mobile No. +91 9820955602,
Email: ravindranath.nair@expressindia.com

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Mobile : +91 9899707440
Email id: prabhas.jha@expressindia.com

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**Debnarayan Dutta**
Mobile No. +91 9051150480,
Email: debnarayan.dutta@expressindia.com

**Ajanta Sengupta**
Mobile: +91 9831182580
Email : ajanta.sengupta@expressindia.com

**AHMEDABAD**
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The Indian Express (P) Ltd.
3rd Floor,
Sambhav House,
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# ORACLE USES EMERGING TECH TO ACCELERATE IN INDIA

From blockchain to AI, Oracle India is betting big on a series of smart innovations that the database major believes will help it grow faster than the competition

SHAILENDER KUMAR
REGIONAL MANAGING DIRECTOR, ORACLE INDIA

# COVER STORY



**Srikanth RP**
srikanthrp@expressindia.com

India is on the verge of a major digital disruption – a disruption that can be seen across industries. Research firm, Gartner, estimates that India's IT spending is projected to total US$ 89.2 billion in 2019, an increase of 6.7 per cent from the estimated spending of US$ 83.6 billion in 2018. Gartner estimates that IT spending in India continues to be driven by digital business transformation initiatives, from both private and public organisations, as both sectors have become adaptive to business model change and bring new practices, develop new capabilities and create new ways to succeed in the digital world.

Global majors like Oracle are betting big on this market, as India is experiencing a growth in digital initiatives like never before. Backed by its foundational reach in databases, the company has gone with full force in the cloud, with the company offering the complete stack across Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS).

Shailender Kumar, Regional Managing Director, Oracle India, states, "In the past few years, India has been delivering strong results. Due to which, India has been conferred the best performing region within JAPAC last three years consecutively. In India, Oracle serves more than 15,000 customers (license and cloud together) across the private and public sectors."

While the database segment continues to be the biggest area of strength, Oracle has also been trying to grow the market by using emerging technologies to solve some of the country's biggest problems. Take the case of fake drugs, a global menace that the World Health Organisation (WHO) believes costs the healthcare industry close to US$ 30 billion due to counterfeit drugs. Oracle believes that blockchain can be used for fighting the growing problem of fake drugs in India.

Oracle has recently tied up with NITI Aayog, Apollo Hospitals, and global pharmaceutical manufacturer Strides Pharma Sciences, to pilot a real drug supply chain using blockchain decentralised ledger and IoT software. Oracle's blockchain software permanently registers a drug's record in the manufacturer's drug supply chain (serial number, labelling, scanning), leaving no scope for record tampering. From here on, at every point of hand change, it records the drug's movement – from manufacturer to logistics, from the stockist to hospital, or from the pharmacy to the consumer. In case of a fake drug, the software will detect the irregularity and notify the concerned nodal point. Additionally, IoT provides functionality to track critical information such as chemical ingredients of the drug or maintenance of temperature control in case of life saving drugs or vaccines.

Kumar explains, "With blockchain, every movement of the drug through its supply chain is recorded – that way, the drug supply chain is completely transparent, secure, decentralised and verifiable. We believe blockchain and IoT can play a significant role in ceasing fake drug distribution and we are all geared to work with NITI Aayog in this major program."

The opportunity is huge, when you consider the size of the Indian pharmaceutical industry – the third largest in the world in volume, accounting for 10 per cent of the world's production.

Mitesh Agarwal,
Vice President – Key Accounts,
Oracle India

Prasad Rai,
Vice President-Applications,
Oracle India

### Self-repairing databases

Oracle India is also seeing a huge growth for its Oracle Autonomous Database – touted as the industry's first 'self-driving, self-securing and self-repairing' database. Armed with deeper and more meaningful insights, Oracle says that customers have been able to significantly improve and fast-track business decisions, introduce new products/services to market quicker and create a smarter workforce. A case in point is Federal Bank which used the solution to get smarter insights related to ATM performance.

"Performing ATM Analytics on Oracle Autonomous Data Warehouse, we uploaded only aggregate data pertaining to ATM performance metrics. In just under four weeks, we had an intuitive, user-friendly solution with full drill-down and roll-up capabilities. This empowered our senior leaders with actionable intelligence for faster decision-making. We're now looking to enhance the scope with social media content for better sentiment analysis and a more holistic understanding of our customers," says Shalini Warrier, COO, Federal Bank.

Oracle is also witnessing good traction in the SMB and start-up space for the Oracle Autonomous Data Warehouse. "Our customers are demanding faster, deeper, more accurate insights from us, but most database technologies aren't fast enough to handle such heavy duty analytics workloads for real-time reporting. We used Oracle Autonomous Data Warehouse out of the box, and we realised an average performance improvement in the range of 30-50 per cent for our defined scenarios. We were able to quickly create dashboards in near-real time to capture the results of what-if analysis around a range of factors including session data, looking at user interactions in a particular timeframe or around particular tasks," says Manish Verma, Co-founder & CEO, Codeinks.

Oracle has also understood the huge opportunity in automating migrations to cloud, and has accordingly conceptualised 'Oracle Soar to the Cloud' – an automated cloud migration offering that will enable Oracle customers to reduce the time and cost of cloud migration by up to 30 per cent. With the help of a complete set of automated tools and proven cloud transition methodologies, the solution enables customers with applications running on premises to upgrade to Oracle Cloud Applications in as little as 20 weeks. Oracle Soar includes a discovery assessment, process analyser, automated data and configuration migration utilities, and rapid integration tools. Customers can keep the upgrade on-track by monitoring the status of their cloud transition via an intuitive mobile application, which features a step-by-step implementation guide indicating exactly what needs to be done each day.

Oracle Soar has been created for those companies that understand the value of moving to the cloud, but somehow still are struggling to do so. In ERP, it is not uncommon to see that many companies have not updated or upgraded their systems for a very long time. These outdated systems, coupled with customisations, make moving to the cloud seem a daunting task. With Oracle Soar, It's now easier to move from Oracle E-Business Suite to Oracle Fusion ERP in the cloud, than it is to upgrade from one version of E-Business Suite to another.

The company continues to see good traction across verticals. For example, the cloud has proved a game-changer for the SP Jain School of Global Management, where it has helped facilitate modern learning experiences by providing an unified view of academic and non-academic activities. The cloud has also helped streamline student data. This helps the organisation achieve insights at the click of a button. The company is keeping a close eye on machine learning and AI; and is already thinking about how AI can be used to automate repetitive tasks such as taking attendance, sending out fees reminders, and outreaching to alumni.

One of India's leading logistics businesses, Safexpress has adopted Oracle ERP Cloud to accelerate decision making and better serve its customers. Thanks to the cloud, Safexpress has been able to remove a wide range of administrative burdens, increase visibility, and drive real-time availability for customers. The core benefit of the approach is that Safexpress has been freed to concentrate on its core business without needing to manage and maintain in-house ERP systems. Oracle is also helping the company enhance services for its customers. For instance, the IT team of Safexpress is planning to integrate weather forecasting into its systems to increase visibility into the supply chain and improve fleet management.

Oracle's 'Cloud at Customer' offering provides the opportunity for customers to take advantage of the cloud model behind the customer's own firewall, thereby adhering to data sovereignty regulations. State Bank of India, the country's largest public-sector bank, is one of the first customers for this solution, and Oracle has also started work with the government of Jharkhand.

### Understanding the roadmap of strategic customers

To better understand the roadmap of strategic customers, and increase its share of the wallet, Oracle has a global Key Accounts programme. This team has played a pivotal role in the company making deep inroads into key accounts. Each key account is serviced by a CEO of the account, whose prime responsibility is to deepen the relationship.

Mitesh Agarwal, Vice President – Key Accounts, Oracle India, explains, "Every CEO of key accounts has more than 20 years of experience, and is given a minimum three-year mandate for growing the relationship. These CEOs present to the board of these companies, and try to help these firms grow their business by better use of technology. The CEO's remuneration depends on the CSAT score of the accounts they handle."

Agarwal gives the example of sectors like banking and telecommunications, which are besieged with different problems. "In the case of telecom, we advise telecos on how they can grow their market share in a market that is being dominated by one large telecom player. In the case of banking, which has problems related to NPA, we help them close their books faster, and help them have a more accurate view of their balance sheet."

Additionally, as the whole banking scenario has changed with respect to usage of technology, there is a need for banks to re-architect their core applications. "There is a critical need for modernising the core, as the payments workload has gone up exponentially," explains Agarwal, adding that the key accounts team, through its experience, helps in guiding the customers on their core technology and business roadmap.

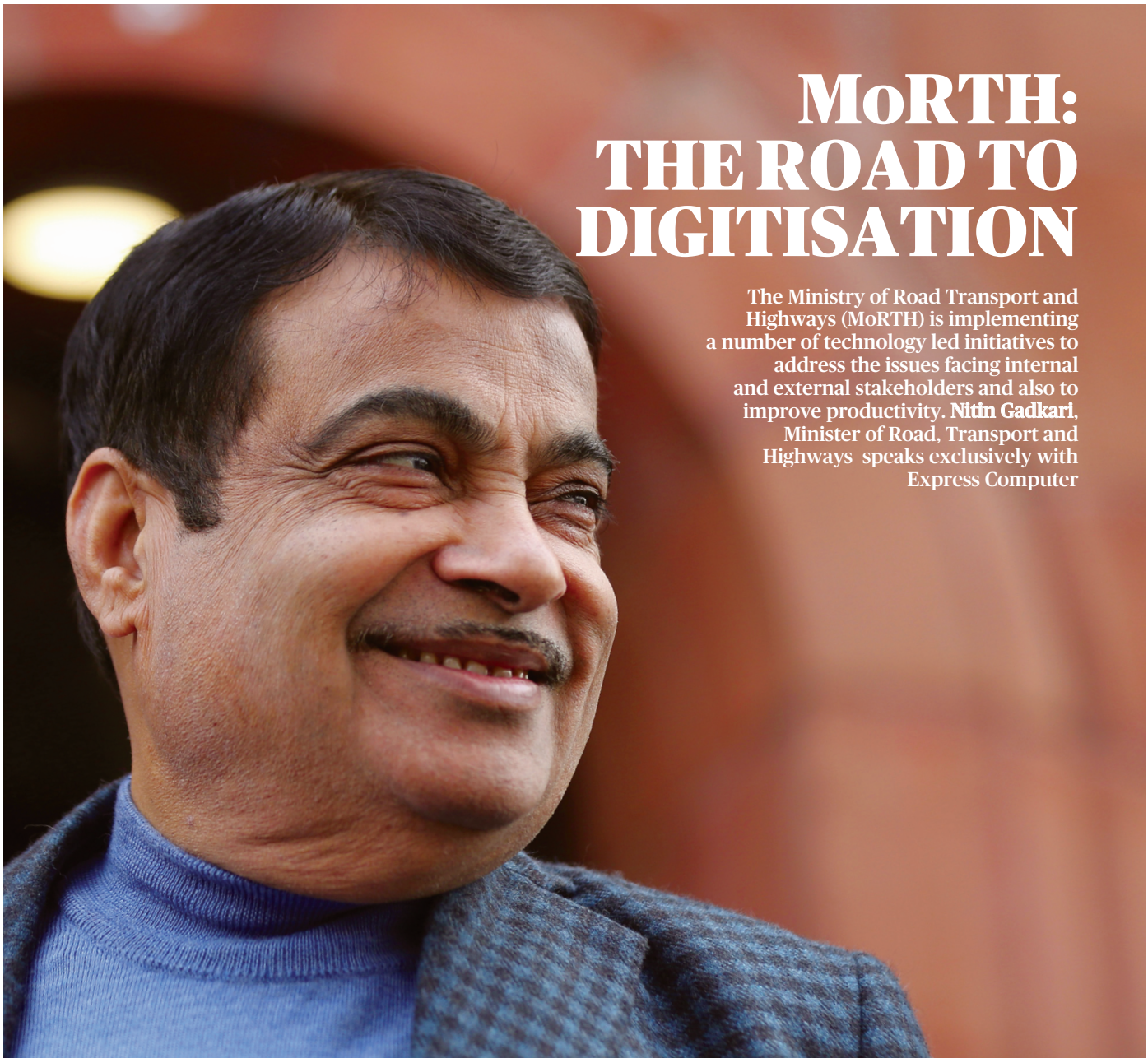
### Growth boost through SaaS

Oracle's ambition is to dominate the Indian SaaS market with an energised team that works efficiently to inspire the customers and win high value transformational deals. Says Prasad Rai, Vice President-Applications, Oracle India, "Oracle is optimistic about its SaaS growth and is well on its way to becoming the largest business applications cloud company in the world. India has been at the helm of this progress with our SaaS business having grown by about 31-32 per cent year-on-year. Our core SaaS solution, Oracle Fusion ERP has witnessed more than 50 per cent YoY growth in the 1H. We are growing 3-4x time the market in SaaS apps, which is a clear indicator that we are taking share from competitors. We are outpacing the market and we want to be the #1 SaaS provider in India. The Indian cloud business is really booming. We are supporting some of the largest transformational deals in India – Taj hotels, Hindalco, Indian Oil, SBI, Adani, Reliance, AU Finance, Transworld, SBI, Bajaj Electricals. We are seeing most traction for Oracle SaaS from companies representing the government, manufacturing, financial services and education sectors."

With a big market share in databases, Oracle already has a foot in the door in most Indian organisations. Cloud is now helping the database major to expand its reach and market share significantly.

## ORACLE INDIA: A BRIEF SNAPSHOT

- Oracle is one of the largest MNC employers in India, employing over 38,000 professionals in the country, across different business units that serve the domestic and international markets
- Oracle has multiple offices in India, 10 India Development Centers (IDC) as well as Indian hubs for it's global support, consulting and financial services operations. The 10th Product Development Center was launched in Gujarat in July 2015
- About 250,000 students and more than 1,200 learning institutions benefit from the Oracle Academy programme annually
- India accounts for the organisation's largest research and development investment outside the US
- The company has been operating in India since more than 25 years
- Oracle India is the only organisation outside Oracle's headquarters in California to represent all divisions including sales, marketing, consulting, support and education operations for domestic and global clients
- Nearly every Oracle product has dedicated teams of engineers and developers in the India centres – database, middleware, business applications, industry applications, Java, cloud, etc.



# MoRTH: THE ROAD TO DIGITISATION

**The Ministry of Road Transport and Highways (MoRTH) is implementing a number of technology led initiatives to address the issues facing internal and external stakeholders and also to improve productivity. Nitin Gadkari, Minister of Road, Transport and Highways speaks exclusively with Express Computer**

**Abhishek Raval**
abhishek.raval@expressindia.com

**What is the role of IT at the Ministry of Road Transport and Highways?**

IT is being used in majority of initiatives undertaken by the ministry. Starting from vehicle registration and driving licenses, monitoring of road construction - all are through one or more IT tools. NIC has been actively involved in many of these. Most popular and widely used are Vahaan and Sarathi. State transport departments are issuing vehicle registration certificates and driving license using these applications.

Some of the new initiatives are Bidder Information Management System (BIMS), Bhoomi Rashi, INAMPRO, INFRACON, etc. The regional officers of this ministry stationed in the capital city of states are monitoring the construction and maintenance of the national highways in the country.

**How IT has been used to facilitate simplification of procedures in the road transport and highways sector in India?**

There are a number of applications which are helping in simplification of procedures. The best example of this is Bhoomi Rashi. It is a portal developed by MoRTH and NIC, which comprises the entire revenue data, right down to 6.4 lakh villages. The entire process flow, from submission of draft notification by the state government to its approval by the minister of state for RT&H and publication in e-Gazette, is online. The portal, created for expediting the process of publication of notifications for land acquisition, is now being fully utilised for issuing the notifications, and more than 2,824 notifications have been issued using the portal so far. Bhoomi Rashi portal has been instrumental in reducing the time taken for approval and publication of notifications pertaining to land acquisition. INFRACON and other new initiatives like GIS of land parcel and mobile app for public view of project information and road assets will further simplify the process.

**Motor Vehicles (MVL)**

Two applications, Vahaan and Sarathi, have been conceptualised to capture the functionalities as mandated by Central Motor Vehicle Act, 1988 as well as State Motor Vehicle Rules with customisation in the core product to suit the requirements of 36 states and UTs.

Transport Mission Mode Project – Vahaan (for vehicle registration) and Sarathi (for driving license) – has achieved 100 per cent automation of over 1100 RTOs all across the country. Almost all states and UTs are using versions of the applications developed by NIC. Almost 25 crore vehicle records and 10 crore license records are available in its central repository (National Registry). The consolidated data in State and National Registry act as the base for a large number of online citizen-centric applications and information services. As per the policy of MoRTH, online access privileges have been provided to various government and non-government agencies on the Consolidated Transport Databases:

- Police and security agencies (unlimited, free access)
- Banks, insurance companies (paid access)
- Other agencies (paid, limited data access)
- State governments applications (data access through web-service)
- Citizen (limited information through portal, SMS)

**Transport**

Public transportation serves as an economical and convenient mode of transportation for all classes of society, save fuel, reduce congestion and pollution. This is vital to economic development and social integration of the country. The State Road Transport Undertakings (SRTU) play an important role in public transportation and provide gainful employment. SRTUs are using latest technologies such as GPS/ GSM based vehicle tracking system, computerised reservation/ ticketing system, inter-modal fare integration, passenger information system, etc.

**Please share the latest updates on the ERP system getting designed to integrate all systems and processes across MoRTH, NHAI and NHIDCL?**

eDisha is an initiative which includes design and implementation of ERP system and its integration with multiple legacy systems developed by the ministry and its implementation agencies. There have been nearly 60 applications being used by MoRTH, NHAI and NHIDCL. Fifty per cent of the applications will get either subsumed or integrated with ERP. Post implementation, this platform will provide a single source of information related with projects where it may be in physical progress, financial progress or any project related documents. The project through all of its phases, right from conceptualisation to operation and maintenance, will be managed through this platform. Various dashboards to manage the project are created as part of the project, which will help in better project management.

eDisha is being implemented through a system integrator (SI) and the releases are planned in three waves.

- **Wave 1:** The wave 1 has been nearly completed. This includes integration of multiple Project Management Information System (PMIS) into one PMIS, its integration with Document Management System and Road Asset Management System. As part of Wave 1, one million pages of project documents have been digitised and is now being linked to PMIS for quick online access. Helpdesk is also being set up for users of eDisha.
- **Wave 2:** The implementation of modules is currently in progress. This includes implementation of a comprehensive project system, integrated with PMIS, finance, human resource, materials management, legal case management, RTI, grievances, etc. Digitisation of two million pages of the project documents is also part of this wave. These are being progressively rolled out for all three agencies and are likely to be completed by end of July, 2019.
- **Wave 3:** This includes implementation of business analytics and enhancement of modules implemented in Wave 1 and Wave 2, along with the mobile app. The operational acceptance of the entire system is expected to be completed by February, 2020.

> "Transport Mission Mode Project – Vahan (for vehicle registration) and Sarathi (for driving license) – has achieved 100 per cent automation of over 1100 RTOs all across the country

**Road accident deaths have been a big problem in the country. What steps have been taken using IT to reduce them?**

The Road Asset Management System (RAMS) application has been developed, which has the capability to manage accident data. Going forward, it would be linked to GIS to identify black spots.

**Road Safety Cell**

The MoRTH has taken a number of steps to prevent such road accidents as per details mentioned below:

- The government has launched a mobile app for highway users - Sukhad Yatra 1033 - which enables highway users to report potholes and other safety hazards on national highways, including accidents
- Rectification of identified black spots
- Road safety audits are being carried out at all stages of development of the highway - design, construction and operation stages
- The government has approved a National Road Safety Policy. This policy outlines various measures such as promoting awareness, establishing road safety information database, encouraging safer road infrastructure including application of intelligent transport and enforcement of safety laws
- The ministry has formulated a multi-pronged strategy to address the issue of road safety, based on 4 E's - Education, Engineering (both of roads and vehicles), Enforcement and Emergency Care
- Road safety has been made an integral part of road design at planning stage.

**How many apps launched by the MoRTH are operational and what have been the benefits?**

The m-Parivahan app is primarily meant for common citizens and transport operators who can access various transport related services like payment of road tax, application for various services, appointment with RTO, uploading of document, etc. It will provide a unique feature of virtual driving license and virtual vehicle registration certificate through back-end connectivity to Transport National Register, encrypted QR code and Aadhaar-based authentication – which will allow an option to replace existing physical documents/ cards with the secured, enforceable, digital identities.

The app will also have other informative features such as accident reporting module,

violation reporting module and so on. Beta version of this app has already been released for user testing. The production version is expected to be released by end of January, 2020.

E-challan is an integrated enforcement solution to manage traffic violations through an Android-based mobile app and back-end web application, for use by the Transport Enforcement Wing and Traffic Police. It will help in improving transparency by connecting all stakeholders through a common system. It will also help in easing operations and efficient monitoring through digitisation of records. It will enhance the visibility of offenders, leading to better traffic management.

**Please share the latest statistics on the number of FASTags in use and the money collected**

A total of ₹43.15 lakh FASTags have been issued as on February 28, 2019 with a total of 462 places on National Highways equipped with RFID enabled FASTag infrastructure for collecting fees electronically. Fees collected through FASTags have also increased significantly since inception, with almost 27 per cent fees collected through FASTags in February, 2019.

**Please share data on the realtime Project Monitoring and Information System. How many projects are tracked and what have been the benefits?**

PMIS has really helped in the online monitoring of construction projects. The project's physical progress information is being entered at PIU (Project implementation Unit) level which is further validated by the regional office. All PIUs are instructed to update monthly progress of the project by 10th of next month. Issues faced at ground level which result in delay of projects are identified right in the beginning which has helped us to intervene and avoid delays in project implementation. As part of the eDisha project, one PMIS is now running for all three entities - MoRTH, NHAI and NHIDCL. This is also integrated with DMS where project documents are now stored.

We have more than 2,500 projects at various stages now being monitored through PMIS.

**What are the benefits of INFRACON and InamPro?**

INFRACON is a successful application developed for capturing data of key personnel and companies involved in highway related projects. The portal also serves as the key interface for technical evaluation of all highway related tenders of major government organisations. As the portal is now extensively being used by all government agencies, it has been felt to add more types of projects in the same and some major enhancements are required to make it the principle technical evaluation platform for all highway projects in India. During the last one year, we have incorporated many new features in the portal and many other features are still required to be developed.

Following technical proposal has been prepared outlining the broad requirements and technical solution for the said requirements.

**InamPro+**

In the infrastructure industry, where our country is spending a huge proportion of the budget, various initiatives have been taken up for quicker delivery of services to avoid time and cost over-runs. Since these projects would be executed on ground by private construction agencies through procurement of material/equipment/services from the market, it was felt expedient to ease procurement thereof and made it as easy as possible and for this purpose, the power of IT has been harnessed, as has been done in respect of e-commerce in many other sectors. A comprehensive mechanism for market price discovery and its stabilisation for essential resources like materials, equipment and services have been evolved. The objective is to ensure competitiveness and reflect uniformity/consistency across varying geographical regions by having a real-time information platform where resources, location, availability and prices can be obtained for fast decision making by both government and infrastructure developers almost on a similar manner as e-NAM does.

In this perspective, InamPro+, a platform for infrastructure and material suppliers, has been developed by the MoRTH. It is an 'All under One' store for procurement/listing of essential construction and infrastructure material, machinery and services.

**Situation before the initiative**

In the last decade, cement industry, the backbone for infrastructure development, was affected by cartelisation despite surplus production capacity. Ceiling price mechanism was implemented by InamPro+ by which sellers can sell cement at prices fixed for three years with permitted yearly escalation of maximum 10 per cent. Such price certainty has helped in checking cost escalations and ensuring timely availability. With data points on real market prices at hand, one can easily plan and schedule projects and ensure timely completion.

In addition, the information about appropriate market price of upcoming new technologies was not available which led to continuation of age old techniques for decades, resulting into cost and time over-runs. The evolution of InamPro+ has turned to be a game changer by disclosing price and availability of materials and equipment, thus playing a vital role in analysing prices for cost estimation of public projects. The one and only mode available earlier for such estimation was PWD Schedule of Rates (SOR) which never got updated for years because of the herculean efforts required to collect market data for numerous items every year.

In this backdrop, InamPro+ platform provides real-time information on such material, equipment, services to any user via the digital mode on the click of a button. MSMEs, start-ups and other businesses which may provide same products at lower cost, but could not access the market for want of marketing budgets or digital presence, can make use of InamPro+ portal for promoting their products without any cost. Thus, it also acts as a kind of electronic marketplace.

The number of products and suppliers have rapidly increased from 136 and 36 at the time of launch to 10824 and 273 respectively and is capable of scaling up for wide variety of services and suppliers. Infact, the idea of GeM originated from the study of this portal.

The benefits from InamPro+ have been many. Cement being the main material which got transacted over the platform so far, the prices fixed have been ` 40 to ` 80 per bag, lesser than the price fixed by state governments in their SORs. Considering average savings of ` 50 per bag, the total committed stock of 27 million tonne on INAM-Pro+ is likely to result into savings of at least 2,700 crore from the cement industry.

The INAM-Pro+ platform is currently being used by more than 1,200 business houses of India. More than 270 sellers have listed about 1,000 products till February 2018 in a short span of nine months since its launch in June, 2017. At present, more than 950 buyers have registered themselves on the platform. InamPro+ has been quite instrumental in encouraging the online transaction to reap the benefit of Input Tax Credit in the post-GST scenario.

**Adaptability**

The platform is developed on the lines of existing e-Commerce portals being in vogue these days but with the uniqueness that the B to B transactions getting facilitated by Government. User Interface is a very critical factor in adoption of any e-Commerce website. The Buyers find the Sellers more trustworthy and Sellers become sure of the Buyers while transacting through INAM-Pro+ being facilitated/backed by Government. A series of instructional videos for buyers and sellers have been uploaded on YouTube channel about the operation of the platform.

Schedule of Rates (SOR) is a document used by Govt. engineers throughout the country for price discovery/cost estimation of public projects. These SORs do not get updated every year because of high physical input in market surveys and lack of administrative capacities. State PWDs have started using INAM-Pro+ for updating SORs of their department. They do so by inviting the local material and equipment sellers to list their products on INAM-Pro+ platform for conducting real time transactions. INAM-Pro+ thus has started helping Engineers to update Prices in SOR every year without going for extensive market survey physically. Such efficient and easy method for updating SORs is bound to save taxpayers from faulty cost estimation of the projects, thereby saving money and time.

**What kind of IT interventions have been taken for the State Road Transport Undertakings (SRTU) such as GPS, GSM, etc?**

The ministry has a scheme namely "Strengthening ITS in Public Transport System" to provide financial assistance to state governments for use of latest technologies such as GPS/ GSM based vehicle tracking system, computerised reservation/ ticketing system, inter-modal fare integration, passenger information system, etc for services covering inter-city and mofussil areas and to provide financial assistance for preparation of total mobility plan for the entire state. The ministry provides one-time financial assistance to the tune of 50 per cent of the project cost to the states and UTs for IT related projects.

**Transport for London has partnered with the ministry for development of the sector. What is the kind of IT usage programmes suggested by them?**

To create a sustainable and effective public road transport ecosystem in the country, an MoU has been signed between this Ministry and with the 'Transport for London' (TFL). The 'Transport for London' is a statutory Body established under the Greater London Authority Act, 1999, and is tasked with the delivery of mobility in London. The MoU will help to promote digital transaction and induction of high capacity diesel/ electric vehicles in India.

**With which countries is the ministry actively engaged for the development of the road, port and shipping sector? Please discuss the technology transfer?**

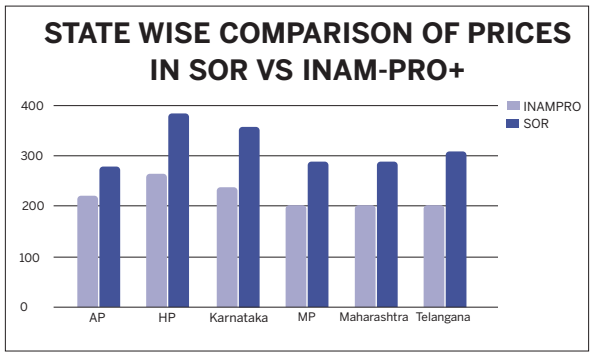
This ministry in the recent past had taken major initiatives for international cooperation. Details of MOUs signed in past few years are :

Between India and Nepal - construction of new bridge over river Mechi.

Between India and UAE for promoting increased investment in infrastructure development and logistics efficiency.

Motor Vehicles Agreement between India and Afghanistan for enhanced regional connectivity via land route.

New bus service on Kolkata – Dhaka route.




**SAVINGS AFTER INAM-PRO+ IMPLEMENTATION**

| Cement Stock on INAM-Pro+ (in MT) | Saving/MT (in ₹) (1MT = 20bags) | Total Savings (in ₹) |
|---|---|---|
| 270 lakh | 50 x 20 = 1000 | 2700 crore |

FEATURE

# Cybersecurity is the fundamental enabler of the digital economy

**CERT-IN HAS LAUNCHED** Cyber Swachhta Kendra, which is the Botnet Cleaning and Malware Analysis Centre. It is based on a public-private partnership model and they work alongwith the industries, ISPs, and the academia

**Salvi Mittal**
salvi.mittall@expressindia.com

The world has moved towards the cyber-physical biological space which is globalised, and in this globalised era, international trade, investments, and technology are connected inseparably within the global supply chains. Globalisation of trade and investments means that no state can manage its economy independently. Internationalisation of culture and communication using technology is encouraging the development of mass disruption and commodification. In the 80s and 90s, there were separate global economy and cyber space which later started to merge in.

"Today, the cyberspace is overlapping the social, technological, psychological and economic domains. The intersection of these four domains demands availability and accessibility and at the same time, safety and security," Sanjay Bahl, Director General, CERT-In asserted at the recently held Express Technology Sabha, in Kochi.

Today, the majority of data resides with private organisations. Bahl defined the ecosystem as volatile, uncertain, and ambiguous. However, it is important to consider what that means from a security perspective. "It is volatile, because there is a large attack surface, there is an emergence of vulnerabilities with no patches available. It is uncertain as the users have no idea – where do the assets and data reside. Implementation of new technologies in the existing infrastructure is creating complexities. The capacity building, the skills required in building this new digital era – will we be able to provide those skill sets or create new digital divides," remarked Bahl.

By 2020, the value of personalised data will be 1 trillion Euros, he quoted from a research by Europian Commission. As this trend grows, there will be an increasingly growing conflict between the value of data and individual privacy.

Cybersecurity is the fundamental enabler of the digital economy and hence there is a need to have trust and confidence on the digital infrastructure and devices. Bahl points out that India is transforming itself as a digital economy built on three key areas – digital infrastructure as the utility for every citizen, governance and services on demand, and digital empowerment of citizens. Since the country is dependent on digital infrastructure and devices, which are under sophisticated attack every day. These cyber attacks have evolved from being the disruption to destruction.

The attacks erode the user's trust, and the cost of attacks have increased by 50 per cent in the last few years. "Considering the last quarter of 2018, victims paid an average of over US$ 6,700 as ransom, and it is assumed that these ransomware attacks will happen in every 14 seconds in 2019. The global damage that is caused by cyber attacks is estimated at three trillion dollars annually. Whereas, the aggregate damages caused by natural disasters like hurricanes, floods, etc., all put together are estimated at US$ 306 million," he said.

Bahl further highlighted statistics from a recent report; 34 per cent of business executives perceive information security as the key driver to competitive advantages, and 32 per cent of businesses perceive it as the enabler of business efficiency.

As CERT-In responds to cyber incidents in a rapid fashion, it monitors and prevents organisations, issuing vulnerability alerts, etc. "We provide cyber assurance, which is the fundamental process required to manage the operational risk and technical safeguards. We are offering cyber intelligence at a macro level," he said.

In a world with diminishing geographies, the industry needs collaborations and co-operation to move forward in this cyber journey. He continued to discuss the challenges that CERT-In faces with high volumes and pressures. In 2015, CERT-In was looking at co-ordination and response activities in every 10 minutes; whereas, now it is in every two-and-a-half minutes, he explained.

CERT-In conducts table-top activities, where they give hypothetical situations and request the participants to react as the situation unfolds. The organisations are given a situation where they have to co-ordinate within and outside their ecosystem. They also organise awareness programs for the board members, in order to educate them on cybersecurity and how they can support their CISOs and the organisation from a security perspective.

He further said that CERT-In is also looking at situational awareness, in order to detect and respond to intrusions to digital infrastructures. CERT-In has launched Cyber Swachhta Kendra which is the Botnet Cleaning and Malware Analysis Centre. It is on a public-private partnership model and they work along the industries, ISPs, and academia. Under this centre, CERT-In identifies the devices which can be affected with botnets and provides the free tools to clean up the systems.

> Today, the cyberspace is overlapping the social, technological, psychological and economic domains. The intersection of these four domains demands availability and accessibility and at the same time, safety and security
>
> **Sanjay Bahl,**
> Director General, CERT-In

Since CERT-In is only aware of the IP, and doesn't know who is sitting behind botnets, ISP alerts the organisation about the infection. The industry provides free tools to clean the system and academia provides the research on the new cybersecurity trends. Today, they have over 200 organisations connected on Cyber Swachhta Kendra. They have also introduced National Cybersecurity Coordination for situational awareness, which is providing a detailed or macro level view for agencies to work together on the same platform.

Thus, the role of the government is to provide a widespread of e-governance services which can defend from attacks, safeguard the social and cultural fabric of the society, incentify the industry for cyber practices and understand the risks associated with the technologies and improve the services.

# What made Nagpur smart city retain top spot for eight months?

**THE NAGPUR SAFE AND SMART CITY PROJECT,** worth ₹520 crore has been completed and it kept Nagpur out of reach for other smart cities to catch up with, eight months in a row, in the smart city rankings

**Abhishek Raval**
abhishek.raval@expressindia.com

The Nagpur Safe and Smart city project implemented by the Nagpur Smart and Sustainable City Development Corporation (NSSCDCL) ensured that Nagpur stayed on the top position for eight months, in the smart city ranking released by the Ministry of Housing and Urban Affairs (MoHUA). The city was at the number one position until February 2019, however March onwards, Ahmedabad has taken over Nagpur after implementing waste to energy project worth 1,200 crore. As this is being written, Ahmedabad is ranked No 1 with 367.96 points and Nagpur is ranked No 2, a little behind with 360.21 points.

The Nagpur Safe and Smart city project is worth ` 520 crore, of which ` 140 cr is spent on operations maintenance for a period of five years.

L&T Smart World & Communication was awarded the Nagpur Safe & Smart City project which encompassed the vision of evolving Nagpur into an eco-friendly city that connects governments, businesses, people and spaces electronically.

Nagpur is one of the shortlisted cities for the smart city initiative under Ministry of Urban Development, Government of India. NSSCDCL adopted the vision of evolving into an eco-friendly, education city to co-create a clean, green, safe, prosperous and inclusive ecosystem.

Directorate of Information Technology (DIT), Maharashtra has taken steps to strengthen the initiative by implementing ICT based smart interventions for Nagpur, along with Nagpur Municipal Corporation (NMC), Nagpur Police Department and other city administration bodies. Nagpur has adopted implementation of pan-city initiatives in a phased manner.

The initial phase involves implementation of city network backbone, city Wi-Fi, city kiosk and city surveillance including mobile surveillance vehicles and drones. It also involves pilot implementation of few of the smart components on 5.6 km of smart strip i.e. parking, solid waste management, street lighting, adaptive traffic control, smart transport solution.

Ernst & Young is appointed as project consultant and Larsen & Toubro — Smart World and Communication is selected as system integrator for this initiative.

NSSCDCL was acting as bridge to connect all stakeholders in a single platform for quick decision making and approvals in the project.

**Infrastructure created in Nagpur safe & smart city**

Net work Backbone: With technology being a key driver for implementation of smart city initiatives across Nagpur, a robust network is one of the key foundational requirements on which future ICT based smart initiatives shall be designed and built. Accordingly, NMC has decided to establish a city-wide network backbone infrastructure that shall act as the backbone for effective implementation of smart city initiatives across the city.

A total of 1,200 km of fibre based city-wide network connectivity (including approximately 650 km of ducting) has been established. Network Operations Center is developed ensuring connectivity, security, privacy, resilience, efficiency and scalability from the network.

Under Nagpur Safe and Smart City project, a total of 3,600 CCTVs have been deployed. "The Intelligent Traffic Management System (ITMS) is ready; a Facial Recognition System (FRS) is also operational for detection and control of crime. The system analyses the CCTV footage and detains or arrests the culprits. The Command Centre has provided 500 recordings from the CCTV footage in cases of murder, kidnapping, eve-teasing, road accidents, hit-and-run cases, and chain snatching. These recordings have helped resolve over 507 cases so far," says Ramnath Sonawane, Chief Executive Officer, Nagpur Smart and Sustainable City Development Corporation.

With Automatic Number Plate Recognition (ANPR) and Red Light Violation Detection (RLVD) cameras, the Nagpur police has issued challans to about three lakh offenders.

Under the project, kiosks have been installed for the citizens to file complaints. "At the same time, 840 Wi-Fi access points are provided at 140 locations in Nagpur, wherein citizen to government communication is not charged. A total of 53 Variable Messaging Systems (VMS) and the same number of Public Announcement Systems (PAS) have been deployed. Whereas, 10 environmental sensors have been deployed to monitor the air quality." informs Sonawane.

The targeted audience benefited by Nagpur Smart City Project is as follows:

- Nagpur Municipal Corporation
- Nagpur Police
- Nagpur Traffic Department
- Nagpur Transport Department
- Electricity Department - MSEDCL/SNDL
- Hot Mix Department
- Citizens of Nagpur

LIDAR Survey was carried out in more than 700 junctions in two months and over 5000 edge devices covering Nagpur horizon which supports exact location identification for asset mapping and seamless installation of Pre-Engineered Precast foundation, Poles and Junction Box.

Physical execution of the project is mostly complete, respective hardware and software of all the components are installed and they are made operational at City Operation Center.

"Project consultant and NMC consultant are continuously monitoring project progress and operations under the direction and guidance of User Departments i.e. Nagpur Municipal Corporation and Nagpur Police. Representatives from above mentioned entities are jointly verifying various subsystems of implemented by L&T for Nagpur Smart City Projects and so far we have inspected more than 90 per cent line items," says Sonawane.

It is to be noted that parallel field works are taking place in Nagpur by other development agencies like Nagpur Metro, road concretisation agencies, electricity distribution companies, OCW and private telecom operators. So at few places where other infrastructure works are ongoing, the smart city execution team is facing site access related constraints and those locations can be executed once the site clearance is obtained from other agencies.

### PROJECT ADVANTAGES

The following are the benefits and utilisation of the project to all stakeholders and citizens of Nagpur :

- **Monitoring** and maintaining law and order situation in the city
- **Live** monitoring of city entry points, exit points and strategic locations by Nagpur Police City through CCTV surveillance systems
- **Red Light** Violation Detection System and issuing e-challan to citizens for traffic management
- **To detect** stolen vehicles through Automatic Number Plate Recognition (ANPR) system
- **To monitor** and control any emergency situation by Nagpur Police
- **Ensuring** safety of the citizens during crucial events and VIP movements
- **Extracting** useful video footages and evidences for an efficient surveillance and the successful crime investigations for nabbing the criminals speedily and effectively
- **Monitoring of traffic** movement and enforcement of traffic discipline by traffic department
- **Use of Mobile** Surveillance Vehicle and drones for monitoring crowd, public gathering and important areas
- **Use of Public** Announcement System for addressing public gathering and traffic management

### PROJECT SUMMARY

- **1015 km** of fiber network backbone is created
- **699 junction** covered under city surveillance and more than 3600 cameras are Installed which are made live for monitoring at COC by police and traffic department. representatives
- **More than** 30 junctions are equipped with ANPR and RLVD Systems
- **56 units** of Public Announcement System is installed; 49 units of Variable Messaging System are installed across the city
- **136 hotspots** are covered in City Wi-Fi System in which more than 840 Wi-Fi access points are installed
- **10 units of Smart** Environmental Sensors are installed at 10 locations
- **383 units of Smart** Lights are installed at Smart Strip of 5.6 kms
- **10 junctions** are covered with Adaptive Traffic Control System at Smart strip 227 Nos of buses are equipped with smart transport infrastructure
- **69 four** wheeler Smart Parking system is being setup near Diksha Bhoomi
- **10 locations** on Smart Strip are equipped with 20 Smart Bins under ICT based solid waste management

# How Piramal Group is leveraging technology for being future-ready

**AS ONE OF INDIA'S** leading diversified global business conglomerates with interests in pharma, financial services, information management, real estate and glass packaging, the Piramal Group has effectively leveraged technology to support its accelerated growth

**Srikanth RP**
srikanth.rp@expressindia.com

Valued at US$ 10 billion, the Piramal Group is a global business conglomerate with diverse interests and a global brand presence in more than 100 markets and over 30 countries. In three decades of its existence, Piramal Group has pursued a twin strategy of organic and inorganic growth. For example, anticipating the potential of financial services in India, the group built a single-window platform to provide end-to-end innovative financial solutions for its spectrum of stakeholders. Similarly, in 1988, the group saw an opportunity in the pharma space, and acquired Nicholas Piramal. In a short span of time, the pharma business rose through the ranks to be amongst the Top 3 in the market.

Evolving with the dynamic environment, the group realised the need to invest in information technology to support its strategic business needs. In 2015, the group laid out a blueprint for its IT strategy – ASPIRE (Aspire to be Strategic Partner through Innovative solutions for Rapid growth Enablement) and brought onboard a talent pool of technology professionals as well as upgraded skills of the existing team that would add the necessary expertise to its various functions and businesses.

Subsequently, the IT function started playing a key role as a strategic business partner. Accordingly, a three-year roadmap was prepared with the objective to strengthen the core foundation including IT infrastructure and core IT applications, aiding scalability across businesses. Realising the importance of domain expertise, the IT team was restructured as per the diverse business verticals i.e. pharma, financial services and real estate. This was supported by a team handling global IT infrastructure and allied applications.

**Fostering a culture for IT**

Viral Gandhi, Group CIO, Piramal Enterprises, realised the importance of fostering a culture for technology, and positioned it as a strategic business partner within the group. "To create an appetite for latest technology within businesses, we initiated a few key programmes for employees across ranks. For the leadership team, we conducted executive briefing sessions with top technology leaders and thought leaders in the industry, to acquaint them with futuristic technology solutions that could be leveraged by businesses in their growth journey. We also launched 'Piramal TechFest' this year, a platform that provides employees an experiential walk-through of new-age technology at their workplace, for businesses to adopt and replicate," says Gandhi. Simultaneously, Centers of Excellence focusing on different technologies and processes were also created, such as Robotic Process Automation (RPA), digital technologies, etc.

An IT Academy has also been set up to create a future-ready team. The academy is an integrated platform that addresses individual technology-capability needs, and expands domain knowledge by providing access to a multitude of learning offerings for every IT employee. The group also leverages the support of external thought leaders to guide the IT team. Regular meetings are held with industry experts on technology-led strategy initiatives, architecture and methodologies. For business technology leaders, a balanced scorecard based dashboard has been implemented for enabling effective governance.

**Using emerging tech to accelerate growth**

The group realises the strategic value of investing in emerging technologies, and therefore partners with technology specialists to improve processes. For example, Piramal Glass has leveraged IoT for real-time visibility into its line manufacturing operations, and to analyse production-line losses at various stages. This has resulted in improved production efficiency and cost reduction of up to 70 per cent, as compared to a glass industry Manufacturing Execution System (MES).

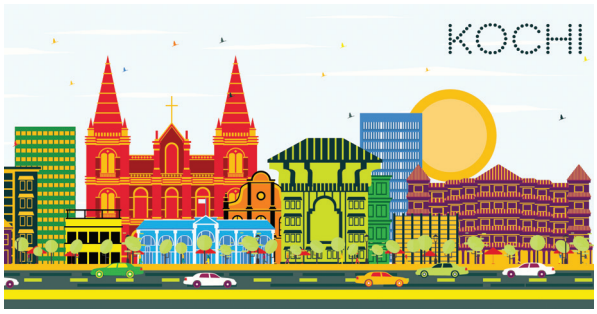
> For the leadership team, we conducted executive briefing sessions with top technology leaders and thought leaders in the industry, to acquaint them with futuristic technology solutions that could be leveraged by businesses in their growth journey
>
> **Viral Gandhi,**
> Group CIO, Piramal Enterprises

Similarly, for improving process efficiencies, the group has adopted RPA in different processes such as deal verification, CIBIL report generation and in material, area and price master for new launches in the real estate sector. The group is also creating chatbots for invoice management, pharma co-vigilance, employee self-service and quality processes. Understanding the critical importance of data privacy, the group has recently launched a project that helps build an Enterprise Data Privacy Management Framework.

In the long-run, Gandhi believes that the right mix of cultural transformation, continuous learning and leveraging emerging technologies will provide businesses with the desired technology-led transformation, to propel growth and become future-ready.

# Kochi to be one of India's first integrated smart cities

**THE KOCHI SMART CITY MISSION** will have an investment of ₹1500 crore. Kochi Metro Rail has an overall investment of ₹9000 crore, which also includes, the soon to be launched Kochi Water Metro. The plan is to have an open data initiative, wherein smart city, metro rail, feeder vehicles and water metro will run in absolute alignment




**Abhishek Raval**
abhishek.raval@expressindia.com

A total of ₹700 crore of work is already tendered and under construction, under the Kochi Smart City Mission. The work is underway in areas of Intelligent Traffic Management System (ITMS), Integrated Command and Control Communications Centre (ICCC), Smart Poles, roads, solar rooftops, e-governance programmes, public bicycle sharing system and sewerage management.

The data is collected and pooled from the ITMS and ICCC to devise digital solutions for the benefit of citizens. A mobile app has been launched and the digital solutions are made available on it.

Data from the 10 departments of the Municipal Corporation will be collected at the ICCC, over a dashboard. Decisions will be taken with proactiveness on the basis of technology enabled alerts. For e.g. in case of a street light in a particular ward, which is shut since the last one hour, can be tracked and resolved as soon as it is reported. Citizens can also complain to the ICCC. For instance, in case of a water leakage on the road, citizens can lodge a complaint on the mobile app and immediate action will be taken by the water department. Currently, there are cases of local people and councilor complaining about similar instances. Different departments of the corporation can closely co-ordinate and operate as one unit, instead of operating in silos. The ICCC is under primary stage of construction.

IT interventions are also being used for multi-level car parking. The e-health project is under implementation. It's a medical health advisory based IT intervention. The smart poles are not just used as an energy tower, but they also serve as a mobile tower.

Every station of the Kochi Metro is Wi-Fi enabled. Additionally, every ward located around the backwaters will have Wi-Fi hotspots. There are over 100 open Wi-Fi hotspots that are operational.

### Kochi Smart City Innovation Lab

The lab was inaugurated in December 2018 by the German Ambassador to India Dr Martin Ney. The Fraunhofer Institute from Germany, one of the agencies behind implementing the Kochi Smart City Mission, will provide the intellectual support for the projects. "They will identify certain sectors and associate with Kochi. After the sectors are identified, the data collection is done with the help of national agencies, post which the projects which are viable, bankable and technically feasible are also identified. Subsequently, they can be opened to either private or public sector / multilateral funding. The intellectual work for document identification from across the globe for adding best practices for the relevant projects is being done by the Fraunhofer Institute in association with the National Institute of Urban Affairs (NIUA), Delhi. It's done under the auspices of the Kochi Smart City Innovation Lab," informs APM Mohammed Hanish, Additional CEO & Managing Director, Smart City Kochi and MD, Kochi Metro Rail Corporation.

The Fraunhofer Institute is based in Leipzig, Germany. They have showcased a few of the cities in Germany as boutique cities. The Indo-German co-operation is developing three cities in India, viz. Bhubaneswar, Kochi and Coimbatore.

The work in the following areas is in a primary stage: Disaster management, energy security, sewage management. The documents, prepared in Germany have been exchanged after December 10 and the operational work will begin soon.

The smart city mission has spent close to ₹250 crore on smart roads. The work will begin soon. It's scheduled to be over by March 2020. The smart roads include adequate walking space on both sides, including gardens, smart poles, underground water, electricity, telecom lines, etc.

### IT Interventions in Kochi Metro

Kochi Metro runs on an open data format and it's the first metro in the country to do so. Open data helps citizens to plan the journey, identify the exact position of the trains to predict the exact time of arrival at a particular station. "We have implemented big data and analytics to pick trends of passenger preferences. Accordingly, more trains can be plied in certain sectors where the demand is more. As a consequence, a complementary increase in feeder vehicles can also be scheduled. It will result in seamless travel for the passenger," says Hanish.

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The passengers are issued with an Automated Fare Collection Card (AFC) for the Kochi Metro. These cards are either personalised or general, based on the customer preferences. The cards have been issued in association with Axis Bank. The same cards will also apply for the soon to be launched Kochi Water Metro. Kochi Water Metro is an integrated water transport project in Greater Kochi region proposed by Kochi Metro Rail.

A mobile app has also been made available to the passengers. It has the information about the train schedules, the nearest station from the location where the passenger is located in the city. The intention is also to integrate it with the feeder vehicles that will work in consonance with the Kochi Water Metro and Autorickshaw Society (15000 autos). The Kochi Metro Rail has formed a society of autos that will serve as feeder vehicles in the form of share, hire or on-call auto. Moreover the buses have also been embedded with GPS system. They are also included in the feeder vehicle ecosystem and the smart card can be used for all modes of transport: One city, One card for all modes of transport. There are over 600 CCTVs deployed at the 16 Metro stations. The operations of the Kochi Metro is done through the Operations Control Centre (OCC), headed by Director - Systems and GM - Operations and Maintenance.

The French financial agency AFD - Agence Française de Développement has funded the Kochi Metro and the coaches are manufactured in Indian from Alstom Transport.

# How Telangana plans to use emerging technologies

**THE STATE HAS** identified blockchain, AI, IoT, cloud, 3D printing, VR/AR, robotics and big data for use

**Abhishek Raval**
abhishek.raval@expressindia.com

Telangana is one of the first states in India to focus on leveraging emerging technologies for delivering citizen services, enhancing the efficiency of the overall functioning of the government and also to explore ways to increase the government's exchequer. The government has created a vertical for emerging technologies and the objective is two-fold. One is to develop the ecosystem required for the industry and the other is to make the government departments leverage or adopt emerging technologies. "We have identified eight key emerging technologies such as blockchain, AI, IoT, cloud, 3D printing, VR/AR, robotics and big data that could impact the government and businesses," says Rama Devi Lanka, Director - Emerging Technologies, Officer on Special Duty (OSD), ITE&C Department, Government of Telangana.

The government has come up with specific policies for IoT, cyber security, data analytics and is currently working on bringing out policies for drones and blockchain.

Rama Devi Lanka is anchoring the emerging technologies vertical for the government under the guidance of Jayesh Ranjan, Principal Secretary - IT, Telangana. and applying them.

### Strategy: Emerging technologies

Rama Devi decided to hold multilateral dialogues with Meity, SEMT department and other government departments, and the industry as a whole, in trying to understand the challenges faced and which technologies can plug the gaps. She also studied how other countries are solving governance related issues using technology. After concluding the study, a set of eight technologies were identified.

Telangana is currently working on policies specifically on blockchain and drones. Another important part of the strategy was to sensitise the department personnel with the required capacity building. "We have conducted workshops with various government departments on cloud computing. The state is moving to consuming cloud services and it's important for employees to understand cloud computing," says Rama Devi.

The objective of using emerging technologies was to solve certain challenges, pain points, improve service delivery, enhance citizen experience and improve internal efficiency of the departments. The use cases were identified to solve either of some of these objectives. The initiatives were also selected on the basis of short term and long term vision.

A Project Management Office (PMO) is being set up for co-ordinating project implementation. The intent is also to create a single window system for vendor empanelment for implementing projects.

### Big data & analytics

The Road Transport department has increased its revenue for registering the second vehicle. The vehicle buyers tamper with their names in order to evade tax on buying the second vehicle, which is higher than buying the first vehicle. The multiple databases residing within various departments have been consolidated. This helps in picking up any identity manipulation attempts. In a year's time, the department has increased tax collection from ` 14 to ` 21 crores.

The Commercial Taxes department has also increased the amount of taxes collected by using big data. Commercial establishments evade taxes by registering themselves as residential entities, which is subject to lesser tax slabs. The department has seen a rise in establishments registering themselves as commercial and not residential.

### Blockchain

- **Land records:** During land transactions, it's difficult to ensure whether the buyer is transacting with the rightful owner of the land. The Government of Telangana (Department of Registration and Stamps) is bringing all the land records on blockchain. The advantage of the technology is its immutability and the ability to keep the records intact with hardly any scope for manipulation. Once the data is uploaded, it can be changed only after consensus with the relevant stakeholders. IL&FS is implementing the project in Telangana, in which, initially in Phase 1, the core business services will be fulfilled and in Phase 2, the entire land transaction process will be brought on blockchain.

> I have personally visited a pilot conducted in a village in Nalgonda district. The farmers were really happy after applying these technologies, which saw the yield increase in the farms
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> **Rama Devi Lanka,** Director - Emerging Technologies, Officer on Special Duty (OSD), ITE&C Department, Government of Telangana

- **Education:** Fake certificates are used by students and employees to get admissions / jobs. Telangana is running a pilot in IIIT, Hyderabad, on uploading all educational certificates on blockchain.
- **Chit funds:** The T-Chits project involves increasing transparency and ease of doing business using blockchain. ChitMonks, a startup company from T-Hub, is running the project.

### Loans for SHGs

The Department of Rural Development runs the Stree Nidhi Credit Cooperative Federation, under which, various SHGs are disbursed loans. Currently, the government receives loan repayments from the groups, but is not able to track the individual payments from the women in these groups. "We are running a pilot using blockchain. It will enable us to keep track of the repayment from each of the SHG members. The objective is not to keep tabs and track the repayments of the individual members. The intention is to create a credit history and accordingly the members can avail loans from the mainstream financial institutions. Currently, it's absent, because of the absence of any credit history, which is exactly what blockchain ensures for these women," says Rama Devi.

- **Drug counterfeiting** For the Department of Health, Medical & Family Welfare (Drugs Control Administration), blockchain will be used to separate out counterfeit drugs. This project is still in the initial stages. Some solutions are being explored.
- **Blockchain District:** The plan is to make Hyderabad a blockchain capital of the world. The state has partnered with Tech Mahindra, IIIT Hyderabad and many start-ups to create an ecosystem for blockchain.

### Artificial intelligence

There are a couple of chatbots being worked upon. In the initial stages, they will answer factual questions and later on, will move to a conversational mode. This is currently being done for the department of tourism and road transport.

A CoE has been set up for AI in Telangana, in partnership with NASSCOM, which is also the implementing agency. IIT Kharagpur has already started a research wing in AI in Hyderabad.

- **Drones & AI Integrated Crop Management Solution:** For the department of agriculture, a pilot is being run in precision agriculture using drones. Data from the satellite, water availability, climatic conditions and drone data about the crop characteristics, helps in releasing advisory to farmers on when and which crops to sow. "I have personally visited a pilot conducted in a village in Nalgonda district. The farmers were really happy after applying these technologies, which saw the yield increase in the farms," says Rama Devi.

In future, Drone, IoT and AI will be used to track and issue advisories on crop. Drones and IoT will capture the data and AI will be used to recommend action to be taken.

- **Drones:** An Expression of Interest (EoI) has been floated for using drones in the mining sector. "We have received 20 responses, to which 18 vendors have been shortlisted. Drones will be used to measure the area of land that is mined vis-a-vis the area approved by the Government; the total amount of material mined, etc. A policy on Drones is also in the works. A draft policy has been prepared and shared with the industry for their inputs. A Drone corridor is also being planned. It will be a one-stop-shop for all drone related infrastructure." says Rama Devi

### Cyber Security

Center of Excellence (CoE) has been setup in the area of Cyber Security, in partnership with the Data Security Council of India (DSCI), which is also the implementing agency for the state.

The plan going forward is to use a combination of emerging technologies. "The convergence of Blockchain, cognitive capabilities, IoT, etc will change the way economies and businesses will function. This will be our priority," concludes Rama Devi.

# The role of emerging tech for governments of the future

**CONTINUING ITS PIONEERING** legacy of bringing leaders of e-governance on a single platform to share their success stories and chart out the future, the 25th edition of Express Technology Sabha, held in Kochi, dived deep into the use of emerging technologies making a difference in citizen service delivery and optimising processes

Inauguration and lamp lighting ceremony

M Sivasankar, Secretary, Electronics & IT Dept, Govt of Kerala

Dr Sanjay Bahl, Director General, CERT-In

Palashendu Bhattacharya, Head – Commercial Sales, Red Hat India/SA

Joel Sequeira, Technology Specialist, SUSE India

Naga Subramanian, Sales Engineer, Avaya India

Sanjay Gaden, Head, State e-Governance Mission Team (SeMT), Gujarat

Sandeep Bandhu, Commissioner – Income Tax, Nagpur

Vikrant Sethi, Country Leader, Presales – India, HPE

Power discussion by Red Hat

Digital Icon Award given to Dr Sanjay Bahl, Director General, CERT-In (left)

P Srinivas, Joint Secretary (eGov), ITE &C Department, Telangana

N Bala Subramanyam, CEO – e-Pragati Authority

**Mohd Ujaley**
mohd.ujaley@expressindia.com

The 25th edition of India's premier e-governance forum, Express Technology Sabha, kicked off on February 14, 2019 at Le Meridien, Kochi with a special keynote speech by M Sivasankar, Secretary, Electronics & Information Technology Department, Government of Kerala. The two-day conference, held from February 14 to 16, 2019 witnessed leading IT decision-makers from the government sector deliberate on various facets of e-governance. In his address, Sivasankar provided an overview of e-governance in the state. While highlighting the importance of technology intervention in the government space, Sivasankar said that Kerala has undertaken tremendous work under the Akshaya project for improving e-literacy in the state. He advised that different states should learn from each other on the implementation of technology as every state has some unique projects that have shown exemplary results on the ground.

"There is no need to reinvent the wheel again, we can learn from each other and implement technology for the people," he said. Talking about the future roadmap of the state, he said that the government is looking to imbibe emerging technologies like AI, machine learning and blockchain, among others to take the government service delivery to the next level. He stated that young startups have bigger role to play in the proliferation of new technologies in the government.

### Tech in governance

During his keynote address, Dr Sanjay Bahl, Director General, CERT-In, Government of India, touched upon various issues related to cyber security in the age of Digital India. Highlighting the emerging nature of modern day technologies, he stated that both cyber and physical are merging closely, creating cyber security challenges that have never been witnessed before. Dr Bahl said that with the proliferation of e-governance, a huge amount of data is generated everyday which can become an asset if the country can meaningfully use it for creating conducive policies for social good. According to him, however, this could be misused by anti-social elements, therefore the privacy and security of data must be key priority for both governments and corporates across the world.

Citing a report of EU, he said value of data will be huge in future, so the privacy of this data will become a huge concern. He emphasised that the Government of India is committed to provide world class cyber security to India's IT infrastructure. To enable this, he said the government is constantly partnering with private companies and international organisations to share threat reports.

Speaking on the topic, 'RFP3.0: Differentiating procurement approaches in the governments for statewide large technology projects', Sanjay Gaden, Head, State e-Governance Mission Team (SeMT), Gujarat, stated that government organisations face lots of challenges while procuring products and when the products or solutions are procured. The department has to ensure optimal usage and accountability. According to him, this challenge could be addressed if a proper and modern procurement best practices are incorporated in the system while procuring products or services.

Giving the example of the Gujarat government's RFP3.0, which is the advance version of rate contract or earlier version of procurement software, he said , "RFP3.0 has fully automated the procurement process in the state, leading to improvement of efficiency and de-duplication of the work. The state government is using the RFP3.0 to place order from small to large projects in the state inducing state Wi-Fi and other key e-governance related projects."

In his session titled, 'Use of Emerging Technology in CPC TDS 2.0', Sandeep Bandhu, Commissioner, Income Tax, Nagpur, explained the existing CPC TDS system and provided a holistic view on how the income tax department is mulling to take big steps in imbibing emerging technologies like AI, machine learning, and blockchain, among others. He said, "Every year, the number of tax payers is increasing significantly. About 100 crore rows of tax details and roughly one crore of CPC TSD are processed every year. Since the beginning of CPC TDS, the compliance has also increased. But now, we are moving to the new version of CPC TDS, because as the technology progress, there is also redundancy in technology, so we need to opt for new technologies that can offer us more visibility and allow us to learn more. The new version of CPC TDS 2.0 will give an enhanced experience to tax payers and our commitment of non-adversarial and non-intrusive service oriented tax administration."

Panel discussion: Technology for transforming government and public sector

Panel discussion: Tech talk from leaders who have set the benchmarks for e-governance

A S Dinesh Kumar, MD, AP State Fibernet

Ashok Srinivasan, Director, Technical, India & SAARC, Commscope

The e-Pragati initiative of the Andhra Pradesh government has set a benchmark e-governance in the country. Sharing the vision, strategy and achievements of e-Pragati, N Bala Subramanyam, CEO, e-Pragati Authority, shared a story about an old woman from Anantpur who had to walked 76 kilometres to the district magistrate office to prove that she was alive to get her old age pension. He said it was completely inhuman. Hence, in 2016, Andhra Pradesh rolled out a digital platform which ensures that old age pension goes to the doorstep of the citizens. He said that Mori became the first AP village to get this facility.

He informed that the government has delivered ₹4.3 million pension across the state at the doorstep of citizens. Bala Subramanyam also shared that until 2016, it is used to take 79 days to get the vehicle registered and the person had to visit RTO office with numerous documents, but that has been changed with the help of technology. Now they can do eKYC with Aadhaar. Sharing about the e-Pragati platform, he said, "e-Pragati has been setup to take many of government services online and provide integrated services to citizens. This digital initiative is helping connect the citizens to 34 departments, 336 autonomous organisations and over 745 services."

Elaborating on how technology is transforming governance in Telangana, P Srinivas, Joint Secretary (eGov), ITE & C Department, Telangana, said the department is working with all heads of the departments to ensure that government services are delivered on time and smoothly. He said different platforms and applications have been built to enable this. Giving an example of the police department, he said that there are many technology driven projects like CCTNS, e-Challan, Hawk Eye, Cop Connect, Veryfast and integrated traffic management system, among others. Srinivas said that, similarly, other departments are implementing various technology projects. Giving an example of e-Seva, he said that this project has successfully delivered large number of government services to citizens and have eased the pain of citizens.

The vision of AP State Fibernet is to provide highly qualitative and affordable digital services to

Recipients of Technology Sabha Awards

Recipients of Technology Sabha Awards

households, government offices and private agencies on demand. In a session titled, 'AP State Fibernet's triple play, the present and future', A S Dinesh Kumar, Managing Director, AP State Fibernet, said this endeavour can truly transform Andhra Pradesh as 'Digital AP' in the direction of realising the dream of Digital India. He said, "APSFL aims to promote digital inclusiveness by providing affordable, high-speed broadband connectivity to households, deepening the reach of internet in rural areas. The project throws immense possibilities for enhancing the quality of life of the people. The services from AP Fibergrid System can effectively be utilised in education, health, agriculture and allied sectors and also open up new vistas in e-governance and enable delivering citizen-centric services in an efficient and transparent way. So far, 6000 household have been reached and the government wants to reach 10 million households with this project."

**Transforming governments and the public sector**

The panel discussion on 'Technology for transforming government and public sector', broadly covered the various opportunities offered by emerging technologies like cloud, artificial intelligence, mobility solutions for government organisations and how states are leveraging them. In his opening remarks, Srikanth RP, Group Editor, Express Computer and CRN India, asked the panellist how they are using technologies like AI to improve governance.

Participating in the panel discussion, Sourabh Gupta, DDG, NIC, said that as far as AI is concerned, Uttar Pradesh has developed a complete configurable dashboard for monitoring various schemes of the government. As many as 238 services have been directly integrated in the system and this is helping in improving monitoring.

Sharing his views, Pankaj Dikshit, Senior Vice President (IT), GSTN, said that 37 states and union territories and the central government had different methods of collecting commercial taxes, so when GSTN was envisaged, the challenge was that there was not business rule to follow. He said, "We created a 400-page RFP and put business rules in it as per the best of our ability. Since its beginning, GSTN was envisaged in such a way that it can scale as per the need. There was not too much attraction to big names of the world of storage, ERP. Our complete stack is open-source, barring a couple of tools. It has a scalable architecture which has really helped us."

Golok Kumar Simli, Chief of Technology, Passport Seva, Ministry of External Affairs, said that MEA is now focusing on CX aspect of Passport Seva. He stated, "We have shown how government service delivery could be completely overhauled. We are looking at improving the user experience by implementing new technologies and processes and taking it to our global offices for the Indian diaspora across the globe."

Agreeing with Simili, Vikrant Sethi, Country Leader, Presales – India, HPE, said that Passport Seva has completely brought the a 'wow' factor in government service delivery. Sethi said that technologies like AI will play a defining role in how government services are delivered to citizens in the future.

**Tech talks by leaders**

Another panel discussion titled, 'Tech talk from leaders who have set the benchmarks for e-governance', focused on the social facet of technologies and how it can be used for social benefits. Participating in the panel discussion, N Bala Subramanyam of e-Pragati Authority said that there are only about 600 staffs who are processing 30,000 applications everyday at RTA. Such a mismatch in manpower increases the workload, so the staff must be supported by technology.

Sharing his views, Sandeep Bandhu said that even for the Income Tax department, it is important to have the right technology and right data in place to serve the people. "There is no point of asking details from a tax payer, if it is already available with any government organisation. An architecture that enables this will improve efficiency and people's experience with the government," he stated.

Agreeing with Bandhu, Sarvesh Singhal, Special Secretary, Department of IT, Government of Jharkhand, said that government organisations need to understand the nitty-gritty of technologies before implementing them. "A large number of government projects is unable to fetch the anticipated outcome, because those are not properly planned. To make a technology project improve people experience, we must put efforts end-to-end," he said.

While sharing his experience of technology adoption in Uttar Pradesh, Dr Rakesh Varma, Special Secretary, IT & Electronics, Government of Uttar Pradesh, said, "All types of technologies are available, but we need good collaboration between government organisations and private companies who are implementing the project on the ground. Many a times, it was found that people assigned for government projects were not upto the mark, leading to either delay or non-performance of the project."

**Innovative solutions**

Speaking on building smart IT infrastructure, Joel Sequeira, Technology Specialist, SUSE India, highlighted the top technology trends for 2019. He said that every organisation is looking at what these technology trends can do for their businesses. He emphasised, "Whatever technology you may choose; if you carefully analyse, most of them are open source-based. This shows that big technology innovation is coming from the open source community. With millions of open source innovations going on, the question is what you are going to choose and why you are going to choose. You have to ask how and where do you start. What do you leverage from the open source community for your organisation to achieve its business outcome. Businesses must also ask if these are enterprise grade, and what would be the five-year roadmap for that open source technology."

GJoel pointed out that SUSE is known for its enterprise-grade software based on open source. He informed that now SUSE has completely transformed itself beyond operating system. "We try to build infrastructure that is software defined. We make sure that it is consistent with existing IT environment as the world of IT is going to be hybrid," he said.

Highlighting the various achievements of Avaya over the years, Naga Subramanian, Sales Engineer, Avaya India, in his session on 'Transforming Government for the Digital Age, informed that the company is the market leader in unified communications (UC) and contact centre (CC) management space. He said that Avaya is working with large number of government organisations across the country in their journey of digital transformation. According to Subramanian, state governments such as Uttar Pradesh, Bihar, Madhya Pradesh, among others are using Avaya technologies for distress and emergency calls management. He said that with the evolution of emerging technologies like AI and machine learning, the company has embedded these futuristic technologies in all products to offer next-gen services to customers.

In a session on 'Intelligent Storage', Vikrant Sethi, Country Leader, Presales – India, HPE, focused on the importance of Intelligent Storage and new experience for data centres. He said that huge of amount of data is being created by different sources and with the proliferation of IoT devices, this will be further increased significantly. According to him, there is need for processing, storing and making sense of this data in a meaningful way. He said that data could only become a vehicle of digital transformation if insight could be drawn and action could be taken on the basis of it. He informed that HPE offers cutting-edge storage and data centre solutions that can provide government organisations an intelligent edge to understand, evaluate and make sense of the data. He informed that HPE solutions and platforms are AI-ready and government organisations can used it as BI-as-a-service.

Ashok Srinivasan, Director, Technical, India and SAARC, Commscope, in his session titled, 'Smart Connectivity - Meeting the Needs of Today and Tomorrow', said that there has been immense focus on AI, machine learning and other technologies and applications, but they all need connectivity to function. He said, that is what Commscope focuses on. He informed that Commscope is focusing on four market areas including data centre networks, commercial building networks, wireless networks, and wireline networks. He said in all these areas, the company has been a pioneer and now it is doing exemplary work in the area of 5G. During his presentation, he explained the benefits of two solutions including powered fibre cable system and automated infrastructure management. He said that these solutions are industry-ready and packed with intelligent technologies that both government and enterprises can useto catalyse their digital journey.

CASE STUDY

# Rajasthan is in the making of Pink City to 3D City by 2020

**THE GOVERNMENT OF RAJASTHAN** and RajCOMP Info Services (RISL) have initiated Jaipur 3D City Solution project to provide the city, its own model in 3D which would assist the authorities in effective planning and development of the city

**Sandhya Michu**
sandhya.michu@expressindia.com

The Rajasthan government is on a technology overdrive for its e-governance projects to streamline government services to its citizens and also provide a robust IT infrastructure till the last mile. In its journey of transforming Rajasthan to DigiSthan, the state has introduced e-governance initiatives at the city level to undertake computerisation till the last mile offices to ensure electronic delivery of high volume resident-centric services at the district level.

One of the most talked about is the Jaipur 3D City Solution project. This would make Jaipur have its own model in 3D which would assist the authorities in effective planning and development of the city. This is the first time in India that a project of this scale and accuracy has been initiated. The project is likely to be completed by mid-2020. Through aerial and other survey technologies, engineers are aiming to recreate a virtual model of the Pink City.

Government of Rajasthan and RajCOMP Info Services (RISL) initiated Jaipur 3D City Solution project and awarded the ₹189 crore contract to Aurionpro Solutions for development and implementation of 3D City solution for Jaipur. As the project involves aerial survey, terrestrial survey and 3D city model development, it has subsequently contracted the 3D modeling work to Genesys International Corporation, a pioneer in the Geographical Information System (GIS) and geospatial engineering domain.

Genesys International Corporation has been entrusted to create the most accurate and realistic 3D model of each and every structure in the Jaipur Development Authority. Genesys will collect data using all the available latest techniques including aerial, mobile and backpack sensors, and process this data with more than 350 experienced engineers. For the first time in India, hybrid aerial camera systems having Nadir, oblique and Lidar sensors are being used for the project.

Jaipur Development Authority has more than one million structures, spread over 3,000 sq kms. Accurate models of each structure will be the bed-rock of this path-breaking project. These 3D datasets, which will depict the buildings 'as is', will be used by the City Management Platform which will aid in planning, development, and management of the city.

**Project complexity**

This is one of the most complex projects to be undertaken in the industry worldwide and makes Rajasthan the first state in the country to launch the 3D smart city model in geographic information system (GIS) environment. Continuing its tradition of conceptualising and building innovative smart solutions for municipalities and urban local bodies (CitySCAPE, InfraSCAPE and WaterSCAPE), Genesys is leveraging its two decades of experience in acquiring, processing and integrating different types of geospatial data, to create realistic scale-to-fit 3D models of the Jaipur city. The complex process of generation of the 3D City covers planning, processing and integration of geo-data acquired using aerial and terrestrial platforms. Along with effective city planning and development, 3D city will be supporting various government authorities with a wide range of applications including emergency/disaster management, traffic management, infrastructure project monitoring, etc.

Speaking to Express Computer, Om Hemrajani, Principal, Genesys International Corporation, says, "The world is three-dimensional. However, even in this day and age, we manage the 3D world based on data, which is usually 2D or flat. To overcome this, Jaipur Development Authority and Department of Technology and Communication (DoITC) of the Government of Rajasthan have initiated this project to create a three-dimensional model of the city, including Greater Jaipur, which spans over 3,000 sq km of area, making it one of the biggest projects in the world. Under this project, Genesys has been mandated to create accurate data sets of the entire city, including all the existing structures in the city. This would provide Jaipur its own virtual model in 3D, which would assist the authorities in effective planning and development of the city."

Genesys' role includes the creation of a precise 3D model of one million widespread structures present in the city. This would require the company to create three-dimensional images in Level of Detail (LOD) 3 – this means not only creating the building model, but also models that reflect the doors, windows, terraces and all the architectural facades 'as is', digitally in 3D. The project is likely to get completed by mid-2020. Along with effective city planning and development, 3D city will support various government authorities with a wide range of applications, including emergency/disaster management, traffic management, infrastructure project monitoring, etc.

"In our experience of working with multiple government bodies, we would like to mention that the Government of Rajasthan is highly supportive and is a leader in the usage of technology," adds Hemrajani.

**Technology behind 3D project**

As part of the project, Genesys has started an aerial survey of Jaipur. The flight mounted with state-of-the-art technology flies over the city every day – subject to clearance from Air Traffic Control of Jaipur. For the first time in India, a hybrid aerial sensor, capable of acquiring vertical and oblique aerial photographs, along with LiDAR technology simultaneously, is being used by for the project. In addition to this, LiDAR backpack sensors are being used to map the narrow lanes of the city. This is one of the most complex projects to be undertaken in the industry worldwide and makes Rajasthan the first state in the country to launch the 3D smart city model in GIS environment.

Government of Rajasthan, in a statement states, "Now Jaipur is being converted into a 3D city. We are in the process of taking our GIS-based implementation to the next level. This will make Jaipur the only city in India to have advanced technology LIDAR scanning, converted as a 3D model. End-to-end city surveillance with advanced technologies and detailed analysis of the team deployed is currently underway. We have deployed multiple initiatives to not just ensure smart cities, but also smart villages, smart localities, and a smart state altogether, expanding from rural to districts, to cities. Soon, Rajasthan will become the fastest state to implement the smart cities mission not just in all its major cities, but also in rural areas."

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# Moving towards next generation public service delivery

**MOVING FROM SYSTEMS** to ecosystems holds the key, says **J Satyanarayana**, Chairman, UIDAI

**Abhishek Raval**
abhishek.raval@expressindia.com

In the space of eGovernance, from a technology perspective, one can never be complacent and think, enough has been done. The emerging technologies are fast evolving and so too the application areas. "It's important to widen the scope from system to ecosystems and have a global thinking," says, J Satyanarayana, Chairman, UIDAI. Followed by having an enterprise architecture, which aligns both the business and technology at the enterprise level. It has to absorb the various emerging technologies in a seamless way without disturbing the underlying base. This is followed by fixing digital service standards. For any business or Government, quality of service getting delivered to the end user is of importance. It can be either through the partner or service provider. The last aspect is to have teams which will have the necessary ethos to deliver a superior digital experience.

### Systems to ecosystems

Over the last few decades, many new systems have been launched in a variety of sectors like digital ID, digital payments, health, education, smart cities, eBiz, Jobs, logistics, etc. GSTN is a classic example of an ecosystem. It has been built with API based architecture, wherein the platform is connected with multiple entities at the same time. The time has come to ponder and think, is it good enough ? "It's required we think of these sectors, to convert them into ecosystems and what can be done to do so. They have organic growth and permits expansion horizontally and vertically on its own without any effort," says Satyanarayana.

### Need of national ecosystems

Aadhaar is the platform, which is built as an ecosystem. It can seamlessly interoperate with other systems. So is the case with digital payments. Both are horizontal in nature. They are not restricted to specific business verticals but applies across businesses.

> It's important to widen the scope from system to ecosystems and have a global thinking
>
> **J Satyanarayana,**
> Chairman, UIDAI

In the area of health, Ayushman Bharat is being built as an ecosystem, "I have had the fortune and privilege working with the Ministry for Ayushman Bharat, on how can it be build as an ecosystem," says Satyanarayana. Likewise, it applies to the primary sector. The attempt of the central Government is to double the income of the farmers, which can only be made possible by creating an ecosystem, without which it will take a long time to achieve the target, i.e by 2022.

Ease of Doing Business (EoDB) is also an area, where ecosystems can be applied to make sure there are no delays and the business is done without any hiccups, thereby multiplying the volumes. This will increase the GDP and add to economic growth. Jobs is another sector, where an ecosystem can provide employees with the required skillsets and create match between the employees and employers.

### Pre-requisites for ecosystems

What does it take to create an ecosystem ? At a very high level, it requires a set of architectures, a coupling of business processes and technology to deliver the vision followed by open standards to allow for interoperability and networking of systems with utmost ease.

Once open standards are adopted, it further facilitates open data, subject to rights of security. Opening up the data makes the ecosystems thrive, when a number of service providers will design applications using the data. Each of these ecosystems need to have their respective business models, in the absence of which, they will not develop and survive. The last pre-requisite is, regulating the data. The open data will have Personally Identifiable Information (PII), which will have to be protected.

### India Enterprise Architecture Framework (IndEA)

In order for the Government to work as one entity and not thousands of departments running in silos, the IndEA has been designed. It's not an architecture in itself but a guideline, set of principles, reference models applicable for the ministries of the GoI, states and UTs, PSUs, that fulfills about 60 percent of the work to design the architecture and the rest can be completed by the architecture itself. "I was the head of the working group that designed the IndEA. It is under consideration before the Ministry of IT and soon will be notified," says Satyanarayana.

There are eight reference models of IndEA. It starts with public service: Efficiency, quality and KPI followed by the applications that will deliver the services; the data, security, technology architecture and making sure that how the system falls into place correctly inspite of having a federated structure.

### Digital service standard (DSS)

Any digital service has to be developed for rich user experience. It's important to keep the digital experience as lean as possible. The citizens are already accessing a number of websites online. Thus it's imperative to have a short learning curve of accessing the digital services. A digital service lifecycle has been created which is divided in four parts: define, realise, measure and governing the digital service. "I am also chairing the working group created by the Ministry of IT to put in place the digital service standards. It's a sixty page document. Even if a particular government has already designed such a DSS, they can compare their DSS with ours with the help of a digital service standard matrix," suggests Satyanarayana. This will help in self assessment on where the government stand and how far or close are they towards delivering efficient digital services.

J Satyanarayana also showcased ePragati, the egovernance platform created by Andhra Pradesh, which inherently has the ecosystem characteristics. The value proposition provided by ePragati is to deliver citizen centric services with having a ONE Government approach and which supports the sustainable development goals (SDGs).

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