In recent years, information and communication technology has played a crucial role in speeding up the flow of information from the government to citizens, transforming the way the two parties interact and communicate. Government bodies have shifted or are in the process of shifting from a traditional paper-based system to a fully automated set-up, with the aim of enhancing transparency and accountability. Telecom tools are being increasingly used in the governance process, not only to perform key functions, but also to provide information in a structured manner. The most important aspect in this regard is e-governance, an IT-enabled route to achieve good governance, as it integrates people, processes, information and technology to enhance the delivery of basic services. For utilities, IT brings resource efficiency gains by managing information flows and analysing data. Thus, utilities involved in the water, power, piped gas, liquefied natural gas and waste disposal segments are banking on telecom for the effective delivery of services.

At present, government bodies as well as utilities are looking forward to the adoption of new technologies to achieve business goals more readily and cost effectively. They are focusing on strong broadband networks for supporting advanced applications and communication. The announcement of the Digital India Initiative by the government reaffirms the government's commitment to creating an enabling platform for the delivery of education, health care, entertainment and e-commerce services to citizens. Apart from connecting rural India through broadband services, the initiative will work towards building a digital governance framework to equip local governments to ensure improved administrative ability, as well as lend transparency to administrative work.

The telecom networks for the government and utility agencies are generally based on IP-wide area network (WAN) connections. Their triple-play service ability makes them a suitable choice for government agencies and utilities, as they provide access to voice, data and broadband on a single platform. They facilitate information flow, support the use of spatial and geospatial technologies, and facilitate the use of remote sensing satellite images for inventory and mapping of resources. They also support technologies such as geographic information systems (GIS). Of late, government organisations have also started deploying ISDN, IP-VPN, Ethernet WAN and multi-protocol label switching (MPLS) services, aside from IP-WAN.

Over the past few years, the benefits of private MPLS-based IP-VPNs have been realised by many different users in the state and local governments, educational institutions, and business enterprises. MPLS offers control and monitoring functions, network security features and an enhanced quality of service. Social service providers have started deploying MPLS within their

optical core and edge networks to transport and deliver IP and internet services. This has enabled their networks to act as WAN transport networks, but with enhanced efficiency.

Further, many web-based applications, along with audio- and videoconferencing, are now being used by organisations. Various utilities depend on technologies like optic fibre cable and radio frequency in order to connect with their end-users. With the enhanced operation complexity of the utilities, the use of IT- and software-based applications has also increased. The most commonly used applications in public sector organisations include enterprise resource planning (ERP), customer relationship management (CRM), supply chain management (SCM) and supervisory control and data acquisition (SCADA). Given their unique requirements, these agencies require an integrated system for financials, procurement, tax and revenue management, and customer and stakeholder portals. Their IT solutions are augmentation of traditional ERP and CRM applications, with specific functions like compliance, security and fiscal accountability. SCADA applications have also played an important role in monitoring and controlling industrial and infrastructural processes of various utilities in the country. With such applications, utilities can effectively manage power transmission, civil defence, communications, and air-conditioning and space systems, which function round the clock.

Since the offices and branches of many government organisations are located in remote areas, the deployment of enterprise-wide mobility software applications has helped utilities and government offices to optimise technology, and enabled employees to access real-time information and manage transaction processes across the organisation in a time-efficient manner. Moreover, mobility applications have facilitated communication with consumers who expect correspondence through digital channels, like email, web portals and social media.

However, for key agencies for governance and the provision of social goods, heavy dependence on IT infrastructure for running daily operations can make their data susceptible to virus attacks and hacking. Therefore, the security of their web applications and software is a key concern for these organisations. In order to ensure round-the-clock surveillance of assets, organisations including gas, water, city gas distribution and energy utilities have deployed security solutions such as multi-site video surveillance, campus monitoring, traffic management and control, public site monitoring, and perimeter security. In addition, to safeguard their telecom networks, government agencies have deployed antivirus and firewall security.

In 2013, the Maharashtra government initiated the first government cloud in the country with the objective of reducing software development centre cost, while increasing the IT capacity, with maximum flexibility and scalability. Many states use remote tools to identify new groundwater supplies to provide drinking water to villages. A project called Space Based Information Support

for Decentralised Planning has been initiated by the National Remote Sensing Centre, to strengthen various aspects of district-level planning through the creation of a digital database.

The government and utilities are expected to significantly increase their IT spending over the next few years. According to industry reports, the central government and the state governments are projected to collectively spend $6.4 billion on IT products and services in 2014, marking an increase of 4.3 per cent over the expenditure in 2013. These government organisations will hence transform their businesses to become more customer-centric and information-driven, and therefore more sustainable and profitable.

tele.net surveyed various government organisations and utilities in the power, water, and oil and gas sectors to assess their telecom requirements and solutions, and the key challenges faced by them. The future plans and expectations in the field of IT were also discussed. The following questions were asked in the survey:

- What are the typical IT/telecom requirements of government organisations/utilities?
- What is the status of the IT/telecom infrastructure of your organisation?
- What additions have you made to your IT/telecom infrastructure in the last one year? How have your business processes improved with the addition/upgradation? What are the targets for the next year in this regard?
- What are the various applications (in terms of ERP, CRM, SCM, SAP, Business Intelligence, etc.) that your company is currently using? What new applications are you planning to deploy in the near future?
- Are you using cloud computing services? If yes, what is the level of adoption and if no, what are your plans in this regard?
- Has your organisation tied up with a managed services provider (MSP) to meet its IT/telecom needs? If yes, elaborate on the scope and involvement of the MSP in your operations.
- What are some of the key issues and concerns faced during the management and upgrading of IT/telecom infrastructure? What steps have you taken to ensure data and network security?
- What are you plans in terms of upgrading IT/telecom infrastructure, investments for telecom needs and the deployment of new technologies?

For the government organisations and utilities surveyed, the main motivation behind greater IT adoption is achieving efficiency in business processes. Most of these organisations have upgraded their legacy infrastructure and established robust telecom systems. A study of the connectivity infrastructure of these organisations reveals that technologies such as IP-VPN, MPLS and VSAT are being widely used. This marks a move away from the traditional use of

digital subscriber line (DSL) as a data access and transfer technology. It was also observed that many government organisations and utilities are increasingly deploying or planning to deploy optic fibre cable (OFC) and wireless connections for last mile connectivity.

For instance, the Himachal Pradesh State Electricity Board (HPSEB) uses 10 Mbps MPLS link nodes sourced from Bharat Sanchar Nigam Limited (BSNL) for data transfer. It has also deployed OFC and Wi-Fi as its data access technologies. Tata Power Delhi Distribution Limited (TPDDL) has an extensive fibre network, which consists of a mix of leased fibre from service providers, an OFC network, and an optical ground wire system. It has over 180 locations connected through optic fibre, radio frequency, and GSM and GPRS technologies. Most of government organisations surveyed have sourced leased lines from public telecom service providers such as BSNL and Mahanagar Telephone Nigam Limited (MTNL).

For most companies in the power sector, the thrust towards IT adoption has been brought about by the Restructured Accelerated Power Development and Reforms Programme (R-APDRP). The project mandates the use of GIS mapping for data collection, automated data logging, and the use of SCADA-DMS/EMS, for which a robust telecom infrastructure is a prerequisite. Most utilities are at advanced stages of implementing the programme, and have integrated SCADA networks into their state load despatch centres to improve monitoring and compliance with grid standards. They have replaced legacy power line carriers with OFC networks and have deployed GIS technology for mapping sites. GIS helps power, water and gas utilities alike, in the mapping of their networks, in order to efficiently operate and maintain their assets. For instance, Haryana Vidyut Prasaran Nigam Limited has deployed SCADA-EMS, which supervises, controls, optimises and manages its transmission system. Similarly, HPSEB has an automated meter reading system in place, which transmits data to the data centre using GPRS. This has been made possible with the use of OFC and wireless connectivity, which these utilities have rolled out on a large scale.

For government organisations, a slightly different motivation is driving IT adoption. Most of organisations surveyed are dependent on the National Informatics Centre (NIC) for their bandwidth and data centre requirements. The NIC has been at the forefront of promoting e-governance applications down to the grassroots level, and providing digital opportunities for sustainable development. In addition to providing IT infrastructure support to these organisations, the NIC also offers IT services and consultancy to government departments, supports capacity building, and consistently undertakes research and development activities. However, this dependence has hindered the development of in-house talent in the surveyed organisations. There were also concerns regarding insufficient budget allocations for IT needs. For instance, the management of the Central Social Welfare Board was concerned that the NIC had approved a budget that was lower than what they had applied for.

Service providers and vendors

Based on their requirements, these organisations avail of IT and telecom services from various service providers and vendors, such as BSNL, Tata Communications, Bharti Airtel, MTNL, Reliance Communications, Tech Mahindra, IBM, Asterisk and Sify Technologies Limited. While the choice of network provider depends on parameters such as network availability and uptime, resolution time, and disaster recovery, the choice of partner for providing application services is dependent on factors such as experience level and post-deployment training and support.

Key issues and concerns

Most organisations still face issues such as downtime with respect to their networks. In addition, the managements of some companies grapple with the problem of a lack of qualified IT staff to oversee the day-to-day IT operations. The integration of multiple technologies, timely upgrading of systems and increasing cost of technology are also cited as concerns faced by many organisations.

Mobile and enterprise applications

The companies surveyed are using a number of enterprise applications, the most common of these being ERP. Given that ERP implementation is one of the key features of the R-APDRP, most of the power utilities surveyed have already implemented ERP modules for functions such as payroll management, finance and accounts, fleet management, and data warehousing. Apart from ERP, software such as SAP for consumer interface is also being widely used. Some companies such as BSES have in-house modules for performing these activities. Delhi Transmission Corporation Limited has implemented modules for ERP, SAP and business intelligence for the efficient management of the day-to-day activities of the utility. TPDDL has put in place SAP-ISU (industry specific solution for utilities) and ERP modules like financials and control, plant maintenance, materials management, project system, and human capital management.

Network redundancy and security

The government and utilities use firewalls, security audits, security operation control centres, leased lines and data archiving for backup and data recovery. Further, securing their communications networks figures as a priority for most respondents. Some commonly used platforms in this regard are firewalls, built-in server security, antivirus software and password protection.

The way forward

While these organisations are fast adopting IT in a major way, not many respondents felt confident about investing in new technologies such as big data analytics, machine-to-machine technologies and cloud computing. They cite the lack of specialised providers and technology obsolescence as the primary reasons for this. At the same time, most respondents are planning to expand or upgrade their IT infrastructure by investing in hardware and software applications. Many organisations have recently expanded their fleet of desktops and laptops, and many others plan to add to them in the near future. With most government organisations being based on the NIC, their decision to adopt IT is not independent. However, this has its upside, since their dependence on the NIC ensures continuous support from IT experts.

IT enablement helps utilities in the power, gas and water distribution sectors to move to a paperless environment, and ensure improved connectivity and increase operational efficiency. Going forward,

R-APDRP requirements for power utilities and the need for operational efficiency will drive IT deployment in this sector.

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