

Indian Telecom Industry- Overview, Challenges and Future Scope.

Mrs. Prrachi A. Sasankar¹

¹Asst.Professor, Sadabai Rasoni Women's College, Nagpur-Maha.

Abstract: *Dynamic growth of the present-day telecommunications market makes operators keep looking for new and creative ways to beat increasing competition. The ongoing process of transforming into next generation network; employs an extensive system of modern network elements such as digital telephone-exchanges, mobile switching center, media gateways and signaling gateways at the core, interconnected by a wide variety of transmission systems using fiber-optics or Microwave radio relay network. In this paper we will see some of the main requirements expected to be met by the GIS / Telecom application Industry, How to go for GIS Network Implementation & Challenges faced by these industries in these aspects. Based on these criterion –how to select GIS platform & the future of GIS technologies.*

Keywords: *Indian Telecom Industry, GIS-telecommunication, OSS / BSS Solution, ITU, PSTN, PLMN, Telecom-GIS Challenges*

1. Introduction

Dynamic growth of the present-day telecommunications market makes operators keep looking for new and creative ways to beat increasing competition. The times when that competitive struggle was won by an operator with the largest network are gone for good. What counts today is efficient network management and fast launch of new services rather than having kilometers of cables and hundreds of staff. The battle is not won by those who possess the most but by those who know how to manage their infrastructure more effectively.

Telecom companies face a unique set of challenges that stem from technology trends and customer demands. The convergence of applications, networks or content in this new-age information super highway has become the next path-breaking move in core mass-market technology providing single connectivity and integrated user experience.

2. E-Governance in India

Page Telecommunication has supported the socioeconomic development of India and has played

a significant role to narrow down the rural-urban digital divide to some extent. It also has helped to increase the transparency of governance with the introduction of e-governance in India. The government has pragmatically used modern telecommunication facilities to deliver mass education programs for the rural folk of India.

India's telecommunication network is the second largest in the world based on the total number of telephone users (both fixed and mobile phone). It has enabled by the mega telephone networks and hyper-competition among them.

According to the Internet And Mobile Association of India (IAMAI)

- Indian telecom industry underwent a high pace of market liberalisation and growth since 1990s
- The world's most competitive and fastest growing telecom markets.
- Indian Industry has grown twenty times in just ten years - 37 million subscribers in 2001 to 846 million subscribers in 2011.
- India has the world's second-largest mobile phone user base - 929.37 million users till May 2012
- World's third-largest Internet user-base -190 million as till June 2013.
- One of the lowest call tariffs in the world

Major sectors of the Indian telecommunication industry are telephony, internet and television broadcast Industry. The ongoing process of transforming into next generation network, employs an extensive system of modern network elements such as digital telephone exchanges, mobile switching centers, media gateways and signaling gateways at the core, interconnected by a wide variety of transmission systems using fiber-optics or Microwave radio relay network.

3. Network Planning for GIS

The main title (on the first page) should begin 1-3/8 inches (3.49 cm) from the top edge of the page, GIS based telecom application requires large investment, manpower and time in data creation and deployment. Full benefits of such systems can only be realized when the Telecom GIS system becomes an integral part of the Operation Support System/Business

Support System (OSS / BSS) solution and the organizational work processes are designed with GIS as an essential part of such integrated OSS / BSS solution.

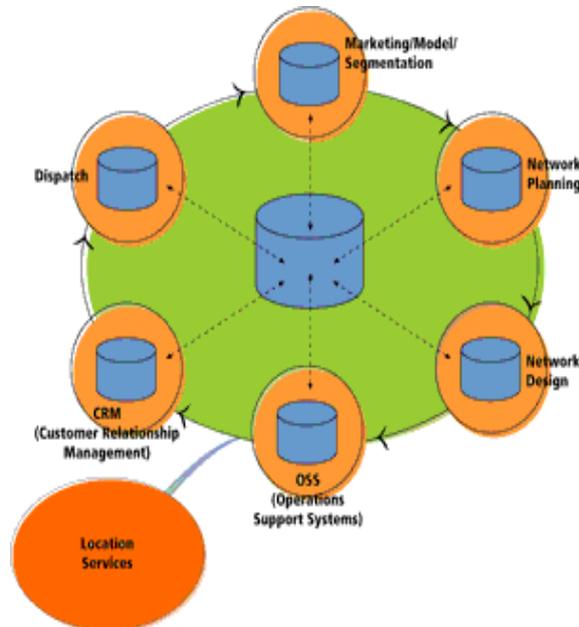


Figure 1. "OSS/BSS Model"

Based on automatic flow-through business processes, such integration provides maximum value addition in terms of

- Single point data entry and elimination of redundant databases,
 - Minimal human intervention in data creation,
 - Improved response to network events,
 - Improved response to customers
- resulting in improved overall efficiency of the enterprise.

The role of telecommunication has evolved from that of plain information exchange to a multi-service field, with Value Added Services (VAS) integrated with various discrete networks like PSTN, PLMN, and Internet Backbone etc. However, with decreasing ARPU and increasing demand for VAS has become a compelling reason for the service providers to think of the convergence of these parallel networks into a single core network with service layers separated from network layer.

The hyper-competition in telecom market, which was effectively caused by the introduction of Universal Access Service (UAS) license in 2003 became much tougher after 3G and 4G competitive auction. Telecom operators found the Next Generation Network (NGN) model advantageous, but huge investment requirements have prompted them to adopt a multi-phase migration and they have already started the migration process to NGN with the implementation of IP-based core-network.

Some of the main requirements expected to be met by the GIS / Telecom application are:

- Plan, design and engineer Network and expansion
- Modeling of (OutSide Plant) OSP and (InSide Plant) ISP items up to port level
- Placement of Trenches, Cables, Structures and facilities in the OSP
- Facility layouts, equipment placement and port-to-port connectivity
- Inventory management including equipment assignment.
- Repository of As Built and survey data
- Provide network data to OSS / BSS systems
- Answer service activation / provisioning queries
- Cable fault localization
- Several Sales, Marketing and Service fulfillment related functions .

3.1. How to go for GIS Network Implementation

GIS provides a common platform for integrating your information across departments. With GIS, you can examine work processes while incorporating external data such as demographics and market trends. Tools for quantitative analysis and visualization help you systematically model, measure, and visualize issues in your network planning and engineering, marketing and sales, and customer care departments.

3.1.1. GIS in Telecommunication management

The use of GIS in the telecommunication network management is informed by -

- Rapid expansion of telecommunication infrastructure in the urban environment.
- Increasing dependency of social and business transactions on information communication technologies.
- Need for effective management of the infrastructure.
- Increased market competition
- Need for efficient and effective service provision

3.1.2 Fibre Optic in Network Implementation

- The fixed wired technology is particularly useful for provisioning of high-speed data services.
- This is because it is implemented using the fibre optic technology which is not affected by weather conditions.
- The high-speed data network is composed of fibre optic cables which forms the backbone of the network.
- It connects major cities and allows the network to function as a unit.
- Fibre optic cables are also used within the city in linking MDF's.

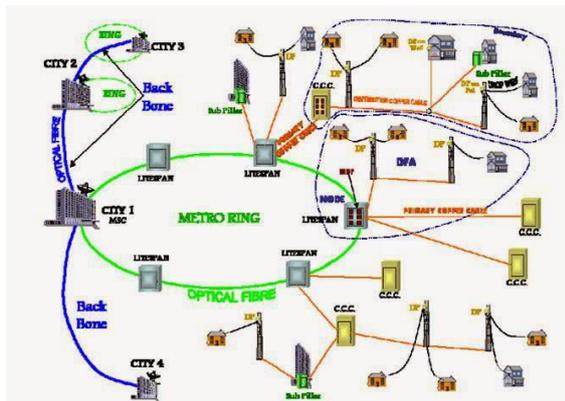


Figure 3 “Telecom Network”

4. Challenges in Implementation

Efficient network management acts as a necessary tool in attaining GIS networking goal. This, however, is not possible without a powerful network inventory system.

Until recently, one had to collect network structure information from various functions to check whether it was possible to provide a given service at a specific location. This required both time and people. Therefore, it became clear that, without a seamless inventory system, one could not think seriously about any process automation, which is key to long-term profitability of any operator.

Telecommunications ("telecom") is a general term for a vast array of technologies that transmit and receive voice, data, and video information over varying distances through electronic means. This includes lines, circuits, and data "pipes" used to access both terrestrial and wireless networks. The utilization of these networks and technologies varies greatly from organization to organization and may include -

- Local, long distance, and toll free voice traffic
- Internet access
- Video conferencing
- LAN's and WAN's
- Call centers
- Converged networks (voice, data, wireless)

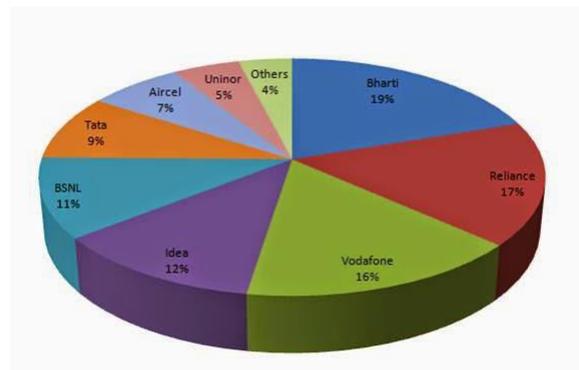


Figure 2 “Telecom Network Inventory”

4.1 Road Client Challenges

Success in a business environment depends on the ability to adapt to the changing profile and higher user expectations and a rapidly changing technology environment.

Telecom service providers are facing tremendous challenges on improving profit margins, falling ARPU's, high customer churn, fierce competition, customer experience, maintaining QoS, demand for new services and bundles, and heavy investments for network transformation.

At the same time, fast-paced innovation, advent of next generation wireless technology (LTE/Wimax), converged networks, competition from new entrants and demand for end-to-end managed services from service providers is putting immense pressure on telecom equipment vendors.

5. Selection of GIS Platform & Telecom Application

- Technical evaluation of all existing out-of-box packages must be done with one week hands-on experience wherein ease of learning and operation, efficiency of CAD functionalities etc. must be tested by operators.
- Detailed technical discussions involving client functional capabilities, RDBMS, version management of the GIS platform must be carried out.
- Ease of data conversion, telecom feature modeling and other functions must be evaluated. Efforts in customization, after sales support etc. should also be considered.
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 - Detailed analysis of productivity expected work volume, licensing cost must be made and optimum solution arrived at.

6. Ahead of GIS in Telecom

The need for information sharing within companies and interoperability between systems has been recognized by the telecommunications industry for a long time. Originally founded in 1865 as International Telegraph Union, the International Telecommunications Union (ITU) promotes standards in equipment that guarantee generalized interconnection between communication systems. To improve interoperability, ITU has developed the Telecommunications Management Network (TMN), a method of standardizing business organization. This hierarchy of support systems specifies interoperability through the use of industry-standard protocols. Geospatial applications need to support this same level of interoperability if GIS is to work well within this TMN-structured environment.

Geotechnology Adoption Pathways				
Discipline	Mapping Legacy	Entry Applications	Initial Ownership Groups	Extended Applications
Natural Resources	Considerable paper map legacy involving discrete spatial objects primarily polygons (e.g., land cover, elevation)	Forest inventory and mapping (RS, GIS, GPS)	Inventory and Planning (Research)	- Visual exposure analysis - Surface flow analysis - Wildfire modeling
Facilities Management	Considerable paper map legacy involving discrete spatial objects primarily points and lines (e.g., valves, utility lines)	Inventory and recordkeeping (GPS, GIS)	Engineering and Maintenance	- Routing and siting - Off-line impacts/response - Multimedia mapping
Public Health	Minimal paper map legacy involving discrete spatial objects, primarily points and polygons (e.g., counties)	Reporting and communications (GIS)	Publications and Extension (Research)	- Environmental monitoring - Disease vector modeling - Spatial correlation analysis
Business	Negligible paper map legacy involving discrete spatial objects, primarily polygons (e.g., sales districts)	Desktop and online mapping (GIS)	Sales and Real Estate	- Competition analysis - Customer segmentation - Sales prediction
Agriculture	Negligible paper map legacy (e.g., soil maps)	Yield mapping and farm records (RS, GPS, GIS, ID)	Producers and Consultants (Research)	- Fertilization optimization - Planting decisions - Organic/Genetic tracking

Figure 3 "Adoption Pathways"

7. The Future for GIS in Telecommunications.

With businesses now reliant on fast and efficient telecommunications infrastructures, the coming years are likely to see continued investment in telecommunications projects around the world. While even the smallest companies are likely to use GIS for automating localized tasks such as network design and planning, the larger telecommunications operators will increasingly be looking to gain strategic advantage by standardizing information throughout their organizations. Thus, marketing staff will be able to use the same data to map customer distribution as the engineers use to design fibre networks. All data will be held in a structured database with seamless interfaces to separate systems used by individual departments. The ongoing trend towards privatization is likely to be the driving force behind this, although the speed at which this happens looks set to vary from country to country. As new technologies such as broad bandwidth and fibre-

optics become the way forward for telecommunications operators, countries with little or no existing networks may find themselves at an advantage compared to countries with well established networks. Just as the countries with simple networks will be able to install the new technologies from scratch, so companies that have not yet automated their information management procedures will be able to adopt enterprise-wide GIS without the burden of legacy systems.

8. Conclusion

This paper has presented analysis on the use of available GIS technology for telecomm utility. The GIS Technology has capability to calculate and project the affected zones on map geographically. Telecommunication has emerged as a key driver of economic and social development in an increasingly knowledge intensive global scenario. This segment is playing an important role in the industry by making itself available in the rural and semi urban areas where teledensity is the lowest. Sustained adoption of technology offers viable options in overcoming developmental challenges in education, health, employment generation, financial inclusion and much else. Today, India is one of the fastest growing telecom markets in the world. It is recommended that, there is need for greater awareness of GIS technology for establishment of GIS systems in the city spatially for telecommunication utilities. Various other modules can be developed to improve the data. Telecommunications with GIS in India is facing many challenges. With proper selection of GIS network base, Technologies, Medium of transfer the challenges in GIS can be overcome Information Technology, has greatly accelerated the growth of the economic and social sectors and will continue to do so in future.

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