

Ongc overview assignment



**ASSIGN
BUSTER**

I did my summer internship in the Infocom Services Division of ONGC situated at Nazira in Assam. During the course of this internship I was allotted 3 main tasks. They were: – 1. To know the history of Infocom Services 2. To identify and know different sections and networking patterns of the Infocom Services. 3. To go to the oil fields surrounding Sivasagar and identify high bandwidth information highways. This internship has helped me in many ways.

First and foremost, it has provided me with a whole lot of information about the practical usage of networking and the equipments used in it. This will help me tremendously in my career ahead. Secondly, this programme has instilled in me a lot of confidence to face work and people alike. Last but not the least, during this internship my personal relationship skill has undergone a lot of improvement. All in all my internship in ONGC has given me a great morale boost and a green signal to surge ahead in my professional life.

ANALYSIS OF ONGC HISTORY OF ONGC 1947 – 1960 During the pre-independence period, the Assam Oil Company in the northeastern and Attock Oil company in northwestern part of the undivided India were the only oil companies producing oil in the country, with minimal exploration input. The major part of Indian sedimentary basins was deemed to be unfit for development of oil and gas resources. After independence, the national Government realized the importance oil and gas for rapid industrial development and its strategic role in defense.

Consequently, while framing the Industrial Policy Statement of 1948, the development of petroleum industry in the country was considered to be of

utmost necessity. Until 1955, private oil companies mainly carried out exploration of hydrocarbon resources of India. In Assam, the Assam Oil Company was producing oil at Digboi (discovered in 1889) and the Oil India Ltd. (a 50% joint venture between Government of India and Burmah Oil Company) was engaged in developing two newly discovered large fields Naharkatiya and Moran in Assam.

In West Bengal, the Indo-Stanvac Petroleum project (a joint venture between Government of India and Standard Vacuum Oil Company of USA) was engaged in exploration work. The vast sedimentary tract in other parts of India and adjoining offshore remained largely unexplored. In 1955, Government of India decided to develop the oil and natural gas resources in the various regions of the country as part of the Public Sector development.

With this objective, an Oil and Natural Gas Directorate was set up towards the end of 1955, as a subordinate office under the then Ministry of Natural Resources and Scientific Research. The department was constituted with a nucleus of geoscientists from the Geological survey of India. A delegation under the leadership of Mr. K D Malviya, the then Minister of Natural Resources, visited several European countries to study the status of oil industry in those countries and to facilitate the training of Indian professionals for exploring potential oil and gas reserves.

Foreign experts from USA, West Germany, Romania and erstwhile U. S. S. R visited India and helped the government with their expertise. Finally, the visiting Soviet experts drew up a detailed plan for geological and geophysical surveys and drilling operations to be carried out in the 2nd Five Year Plan

(1956-57 to 1960-61). In April 1956, the Government of India adopted the Industrial Policy Resolution, which placed mineral oil industry among the schedule 'A' industries, the future development of which was to be the sole and exclusive responsibility of the state.

Soon, after the formation of the Oil and Natural Gas Directorate, it became apparent that it would not be possible for the Directorate with its limited financial and administrative powers as subordinate office of the Government, to function efficiently. So in August, 1956, the Directorate was raised to the status of a commission with enhanced powers, although it continued to be under the government. In October 1959, the Commission was converted into a statutory body by an act of the Indian Parliament, which enhanced powers of the commission further.

The main functions of the Oil and Natural Gas Commission subject to the provisions of the Act, were “ to plan, promote, organize and implement programmes for development of Petroleum Resources and the production and sale of petroleum and petroleum products produced by it, and to perform such other functions as the Central Government may, from time to time, assign to it “. The act further outlined the activities and steps to be taken by ONGC in fulfilling its mandate. 1961 – 1990 Since its inception, ONGC has been instrumental in transforming the country's limited upstream sector into a large viable playing field, with its activities spread throughout India and significantly in overseas territories. In the inland areas, ONGC not only found new resources in Assam but also established new oil province in Cambay basin (Gujarat), while adding new petroliferous areas in the Assam-Arakan Fold Belt and East coast basins (both inland and offshore).

ONGC went offshore in early 70's and discovered a giant oil field in the form of Bombay High, now known as Mumbai High. This discovery, along with subsequent discoveries of huge oil and gas fields in Western offshore changed the oil scenario of the country. Subsequently, over 5 billion tonnes of hydrocarbons, which were present in the country, were discovered. The most important contribution of ONGC, however, is its self-reliance and development of core competence in E&P activities at a globally competitive level. After 1990

The liberalized economic policy, adopted by the Government of India in July 1991, sought to deregulate and de-license the core sectors (including petroleum sector) with partial disinvestments of government equity in Public Sector Undertakings and other measures. As a consequence thereof, ONGC was re-organized as a limited Company under the Company's Act, 1956 in February 1994. After the conversion of business of the erstwhile Oil & Natural Gas Commission to that of Oil & Natural Gas Corporation Limited in 1993, the Government disinvested 2 per cent of its shares through competitive bidding.

Subsequently, ONGC expanded its equity by another 2 per cent by offering shares to its employees. During March 1999, ONGC, Indian Oil Corporation (IOC) – a downstream giant and Gas Authority of India Limited (GAIL) – the only gas marketing company, agreed to have cross holding in each other's stock. This paved the way for long-term strategic alliances both for the domestic and overseas business opportunities in the energy value chain, amongst themselves. Consequent to this the Government sold off 10 per cent of its share holding in ONGC to IOC and 2.5 per cent to GAIL.

With this, the Government holding in ONGC came down to 84.11 per cent. In the year 2002-03, after taking over MRPL from the A V Birla Group, ONGC diversified into the downstream sector. ONGC will soon be entering into the retailing business. ONGC has also entered the global field through its subsidiary, ONGC Videsh Ltd. (OVL). ONGC has made major investments in Vietnam, Sakhalin and Sudan and earned its first hydrocarbon revenue from its investment in Vietnam. Vision Statement “ To be a world class Oil & Gas Company integrated in energy business with dominant Indian leadership and global presence. Global Ranking ONGC ranks as the Numero Uno Oil & Gas Exploration & Production (E&P) Company in Asia, as per Platt’s 250 Global Energy Companies List for the year 2007. •ONGC ranks 23rd Leading Global Energy Major amongst the “ Top 250 Energy Majors of the World in the Platt’s List” based on outstanding performance in respect of Assets, Revenues, Profits and Return on Invested Capital (RIOC) for the year 2007. •ONGC is the only Company from India in the Fortune Magazine’s list of the World’s Most Admired Companies 2007.

ONGC is the 9th position in the Industry of Mining, crude oil production.

- ONGC ranks 239th position in the prestigious Forbes Global 2000 and Numero Uno ranking amongst Indian Companies. •ONGC ranks 369th position in Fortune Global 500 list for the year 2006 based on Revenues.
- ONGC retains Numero Uno position from India in terms of Profits with overall ranking of 121st. • ONGC ranks 21st among the top 50 publicly traded Companies in Oil & Gas Industry, based on the year-end (2007) market Capitalisation by PFC Energy Represents India’s Energy Security

ONGC has single-handedly scripted India's hydrocarbon saga by:

- Establishing 6. 42 billion tones of In-place hydrocarbon reserves with more than 300 discoveries of oil and gas; in fact, 6 out of 7 producing basins have been discovered by ONGC: out of these In-place hydrocarbons in domestic acreages, Ultimate Reserves are 2. 29 Billion Metric Tones (BMT) of Oil plus Oil Equivalent Gas (O+OEG).
 - Cumulatively producing 762. 3 Million Metric Tones (MMT) of crude and 440. 7 Billion Cubic Meters (BCM) of Natural Gas, from 115 fields. India's Most Valuable Company “ Biggest Wealth Creator Award” for the period 2000-2006 instituted by M/s Motilal Oswal Securities Ltd. , third time in a row.
 - Ranked as the most respected Company in PSU Category with 13th position in the league of the most respected Indian Corporate.
 - Tops the Business India Super 100 list (among 284 Indian Companies having Sales in excess of Rs500 Crore), based on Sales, Profit After Tax (PAT), Net Fixed Assets and Market Capitalisation (Dec 2006).
 - Topped the visibility metrics in Indian Oil and Gas Sector and the only PSU in the top 10 list of the Indian Corporate Newsmakers. Moody's Investor Services awarded the highest-ever Credit Rating for an Indian Corporate- Baa1 (indicative Foreign Currency Debt rating).
 - CRISIL and ICRA also reaffirmed ONGC the highest credit rating of AAA and LAAA respectively.
- ONGC: The Only Integrated Petroleum Company In India Benchmarking the global business model in petroleum industry, ONGC, the erstwhile sectorial E major, acquired 72% equity in Mangalore Refinery & Petrochemical Limited (MRPL), which has the capacity of 9. 69 MMTPA, around one tenth of total refining capacity.

This along with marketing rights to retail petrol and diesel through 1100 retail outlets, and a 23% stake in Rs 667 cr Mangalore-Hassan Bangalore pipeline (363 km long) to expand the economic supply envelope of value-added refined products in the Karnataka hinterland, made ONGC the only fully integrated petroleum company in India. Increasing Oil & Gas Reserves: In 2004-05 fiscal, ONGC added 6 hydrocarbon finds to its domestic kitty, viz. Vasai (W) in Mumbai Offshore, Chinnewala Tibba in Jaisalmer, Banmali & Laipling Gaon in upper Assam, GS-KW & GS-49 in Krishna Godavari.

The Chinnewala Tibba in Rajasthan is a good prospect, as testing indicated presence of sweet gas with calorific value of around 7100 kcal/m³, compared to 1250-3100 kcal/m³ in nearby field of Ghotaru. During the middle of last year, exploration leads have been obtained in East Lakhbari upper Assam also. Competitive strength • All crudes are sweet and most (76%) are light, with sulphur percentage ranging from 0.02-0.10, API gravity range 26°-46° and hence attract a premium in the market. Strong intellectual property base, information, knowledge, skills and experience • Maximum number of Exploration Licenses, including competitive NELP rounds. • ONGC owns and operates more than 15000 kilometers of pipelines in India, including nearly 3800 kilometers of sub-sea pipelines. No other company in India, operates even 50 per cent of this route length. Strategic vision 2001 – 2020 To focus on core business of E, ONGC has set strategic objectives of: • Doubling reserves (i. e. accreting 6 billion tonnes of O+OEG). • Improving average recovery from 28 per cent to 40 per cent. Tie-up 20 MMTPA of equity Hydrocarbon from abroad. The focus of management will be to monetise the assets as well as to assetise the money. Pioneering efforts ONGC is the only

fully-integrated petroleum company in India, operating along the entire hydrocarbon value chain:

- Holds largest share of hydrocarbon acreages in India.
- Contributes over 78 per cent of Indian's oil and gas production.
- About one tenth of Indian refining capacity.
- Created a record of sorts by turning Mangalore Refinery and Petrochemicals Limited around from being a stretcher case for referral to BIFR to the BSE Top 30, within a year.

Interests in LNG and product transportation business. Sourcing Equity Oil Abroad: The last year saw ONGC's overseas arm OVL being successful in laying footholds in a number of lucrative acreages, some of them against stiff competition from international major oils. OVL has so far acquired 18 properties in 15 countries. The producing field in Sudan is yielding 3MT of sweet Nile Blend crude a year. Besides taking equity in oil & gas blocks, OVL is looking for stakes in E companies. The strategic objective of sourcing 20 million tones of equity oil abroad each year appears to get fulfilled much before 2020.

Driving Deeper Towards Samriddhi: Driven by the strategic goal of sourcing 4 billion tones of reserves from the deep water blocks, ONGC has launched the biggest deep-water exploration campaign ever launched by a single operator, globally. To augment the chances of success, ONGC has adopted up-front technology-alliancing with the companies who are the best in class in this business, globally. Benchmarking Best HR Practices: The Assessment Development Centre (ADC), established to identify in house talents & develop them into future leaders, is a step to align the HR approach of ONGC with the global best practices.

The success of Unnati Prayas, an effort to hone the latent potential in ONGC's experienced personnel, has fuelled the concept of Super Unnati

Prayas to develop managers further to hold responsible positions in future.

Financials & Recognitions: ONGC has posted the highest-ever net profit recorded by any company, entering the virgin Rs 10, 000 cr plus zone. The recommendations of the Group of Ministers (GOM), to substantially reduce the outgo on account of subsidies on Natural Gas, when implemented will help ONGC save more than Rs 1000 cr on annualizes basis and will help sustain the strong earnings growth.

The combined market capitalization of the ONGC group is ruling in the neighbourhood of One Lakh Cr rupees, which has established ONGC to retain its position as the most valuable company in India, for three times in a row. Apart from being ranked as the 2nd (1st in terms of profits) biggest E&P Company, globally, as per the Platt's Energy Business Technology (EBT) survey 2003, ONGC is the topmost Indian corporate in the Forbes 400 & Financial Times Global 500 lists. ONGC is also the only Indian corporate to figure in the global list published by PFC Energy of USA.

ONGC, with the highest market value added of Rs 24258 cr & the fourth highest Economic Value Added of Rs 596 cr, is the only PSE to achieve positive MVA as well as EVA. See appendix 1 for financial results for the year 2007-08 The Road Ahead: ONGC looks forward to become an integrated energy provider, with:

- New discoveries and fast track development
- Equity Oil from abroad
- Downstream Value Additions & Forward Integration
- Leveraging state-of-the-art technology and global best practices
- New sources of energy

INTERNSHIP EXPERIENCE TASKS PERFORMED I did my summer training in the Infocom Services division of O.

N. G. C. I was placed in the Nazira division of Assam. My main tasks in Infocom Services of Assam Asset were 1. To know the history of Infocom Services 2. To identify and know different sections and networking patterns of the Infocom Services. 3. To go to the oil fields surrounding Sivasagar and identify high bandwidth information highways. On the basis of my tasks I have penned down this project report which starts with a brief introduction about the Infocom Services of the Assam Asset and then its various branches and their details.

I have also written about the various networking elements used to connect various stations and oil fields of ONGC. INFOCOM SERVICES OF ASSAM ASSET
ONGC Assam has been harnessing the potential of information technology and state-of-the-art communication systems. Satellite systems, microwave radios EPABX systems have been installed to cater to intra and inter regional voice and data communication needs. To facilitate the users to run IT based applications, a large no. of PCs have been connected with high speed LAN.

The voice and data network has been extended to various production facilities, drilling rigs and other remote sites using various communication system, viz. , Ku-band VSAT and other wireless systems. •A broad network using OFC links has also been created for corporate-wide IT application namely, EPINET, ICE, IINS etc, to achieve the objective of One Organization, One Data and One Information. •There are also different servers used for corporate-wide IT application namely, e-mail server, antivirus server, DNS server, proxy server, etc. Over the years Infocom Services has grown from an era of primitive modes of time consuming wireless communication and tapping on the Morse key to the present state of high bandwidth information

highways with seamless voice and data connectivity across the organization.

- Infocom Services of ONGC Assam has been accredited with ISO 9000: 2001 quality certification for its entire gamut of activities. 1) IT (Information Technology) IT section of Infocom has got its sub-divisions: a) Wide Area Network (WAN) b) Local Area Network (LAN) c) Different types of servers along with their advantages and disadvantages.

WAN (WIDE AREA NETWORK): A WAN is a data communication network that covers a relatively broad geographic area and that often uses transmission facilities provided by common carriers, such as telephone companies. WAN technologies generally function at the lower three layers of the OSI reference model: 1. The physical layer 2. The data layer 3. The network layer

LAN (LOCAL AREA NETWORK):

- LAN is the data network that connects computer together in offices and hospitals.
- LAN does not suffer the voice quality degradation common with Internet because the network is designed to handle the necessary load and has fewer “ hops”. Since LAN is based on software, access software solutions are often compatible with it.
- Advantage of LAN is that it opens up telecommunication access into the world of computer access, which offers many more tools such as speech synthesis, speech recognition, conversion of signal tones into screen flashes and alternative keyboard.
- Information Technology related services include 100 mbps Ethernet Local Area Network (LAN) using Optical Fiber and UTP cabling and other hardware.
- All the corporate-wide IT activities viz. IMMS, UFSO, EPINET, IINS, SHRAMIK etc use the same LAN and connected to other work centers through dedicated WAN links. In LANs, computer and devices are located within same campus, spread over a few miles apart and connected

using owned channels (generally cable) working at the speed of 1 Mega bits per second (Mbps) to 400 Mbps. BRIDGES: •Bridges are more complex and expensive devices that can be found within personal hubs. •Bridges filter packets between LANs by making a simple forward/don't forward decision on each packet they receive from any of the networks to which they are connected. •It is also defined as a device which connects and passes packets between two network segments that use the same communications protocol. ROUTER: These are more complex internetworking devices that are also typically more expensive than bridges. They use network layer protocol information within each packet of route it from one LAN to another. •It is a physical device deployed primarily at edge and end sites that route network traffic from source to destination. The router connects LANs to the MNT, which is a Wide Area Network. Router operates on network layer information and participates in running one or more network layer routing protocols. •A router is a computer networking device that forward data packets toward their destination through a process known as routing.

Routing occurs at layer 3 (Network layer of the SI seven-layer model).

•Router strips off the outer layer of Ethernet or Token-Ring data before they send a packet from one LAN to the other, so they reduce the total no. of bits going across the inter-LAN communications link. LOCAL AREA NETWORK IN ONGC, NAZIRA: •The block diagram has described about the LAN inter-networking of ONGC, Nazira. •It also describes a WAN communication between the local areas through Radio system. •At Nazira there are 60 channels Radio Trucking which is WAN communication with Sibsagar, Galeki, and Lakwa and also at Jorhat and Silchar. If we are supposed to

communicate with other sites like Sibsagar, Galeki from Nazira, the data will transfer from user end through switches and backbone of fiber optic cable (FOC) to router. Then the router will transmit the data packet through digital radio system. And the same process has been done by other sites like Geleki, Sibsagar, Jorhat. Some of the important servers used at workstation of ONGC Nazira over the Network are:- 1) Proxy Server 2) E-mail Server 3) Firewall Server 4) DHCP Server 5) DNS Server 6) Websense Server 7) Network Management Server 8) Antivirus Server WORKSTATION OF ONGC NAZIRA OVER THE NETWORK:

Server: A server is just like a person who serves you, like a waiter at a restaurant. A server is software that runs on a larger computer to serve many requests from user or client machines. Client-Server is the usual name for this arrangement. It relies on a protocol. For example an HTTP server runs the HTTP protocol to create what you see as a website on your computer. We can also define server as a computer that handles requests for data, e-mail, file transfers, and other network services from other computers. The server relays information to a client upon the client sending it a request.

The server usually connected to workstations that share the main system's resources. Servers come in many forms: •Application servers •Web servers •Database servers, etc. APPLICATION SERVER: •An application server is a server in a client-server network which runs one or more applications that can be shared by client stations and which also shares the data processing burden with client stations. This shared application and shared data processing model contrasts with the model used for other servers, such as file servers, which simply sends, receive, and store files, requiring client

stations to run all applications and process all data. An application server is a server computer network dedicated to run certain software applications (as opposed to e. g. a file server or print server). •The exact role of the application server depends on the architecture of the application it is serving. WEB SERVER: •A web server is a computer that manages and shares web based applications accessible anytime from any computer connected to the internet. •It is also a computer on the World Wide Web (connected to the internet backbone) that stores HTML documents that can be retrieved via a web browser. Every web server has a IP address and possibly a domain name. •For example, if you enter the URL <http://www.pcwebopedia.com/index.html> or any other URL in your browser, this sends a request to the server whose domain name is pcwebopedia.com. the server then fetches the page named index.html and sends it to your browser and then you can serve the page. DATABASE SERVER: •Database server basically stores data and manages data queries. •A database server is specifically configured to run database software.

Typically, a company uses a database server combined. 1) PROXY SERVER:

- Proxy server is a server that acts as an intermediary between a workstation user and the internet cloud so that the enterprise can ensure security, administrative control, and caching service. A proxy server is associated with or part of gateway server that separates the enterprise network from outside intrusion. •The proxy server is installed on a dedicated computer in an organization, and the organization's connection to internet is directed through proxy.

This means that every user's internet connection passes through the proxy.

- Proxy servers also perform the functions of caching (keeping in the main memory all the web pages can be sent when there are repeated requests for the same page from different users). That is when a user requests for a web page, the proxy checks if it is already available in its memory cache, and if so, it serves the user's request.

2) E-MAIL SERVER:

- E-mail server is an application that controls the distribution and storage of e-mail messages. Mail correspondence between user and client over the network and internet has used E-mail server i. e. Electronic mail system.
- The world's first E-mail application server is XMs. It is one of the fastest SMTP email server on the market.
- It is 100% stream based and asynchronous, and it can run as a 64 bit application.

3) FIREWALL SERVER:

- A firewall is a hardware or software solution to enforce security policies.
- In the physical security analogy, a firewall is equivalent to a door lock – it permits only authorized users such as those with a key or access card to enter.

A firewall has built-in-filters that can disallow unauthorized or potentially dangerous material from entering the system.

- Firewall is a dedicated gateway machine with special security precautions on it typically used to protect a network when it is connected to an outside network, especially the internet.
- Firewalls are usually placed between the users of a LAN and the Internet. All messages entering or leaving the intranet pass through the firewall, which examines each message and blocks those that do not meet the specified security.

4) DHCP SERVER: DHCP (Dynamic Host Configuration Protocol) is a communication protocol that lets network administrators centrally manage and automate the assignment of Internet Protocol (IP)

addresses in an organization's network. •DHCP contains IP addresses, lease duration, and associated TCP/IP configuration information. The DHCP server listens for client requests and processes them. •Using the Internet Protocol, each machine that can connect to the network needs a unique IP address which is assigned when a network connection is created for a specific computer. Without DHCP, the IP must be entered manually at each computer in an organization and a new IP must be entered each time a computer moves to a new location on the network. •DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network. 4) DNS SERVER: •The Domain Name System or DNS is a system that stores information about hostname or domain names in a type of distributed database on networks. Many types of information that can be stored, most importantly it provides a physical location (IP address) for each domain name. •Short for Domain Name System (or Service), an Internet service that translates domain name into IP address. Because domain name are alphabetic, they are easier to remember. •The internet however, is really based on IP address. Every time you use a domain name, therefore, a DNS service must translate the name into corresponding IP address. For example, the domain name www. example. com might translate to 198. 105. 232. 4. •The practical operation of the DNS system consists of three players. The DNS resolver, a DNS client program which runs on a user's computer and generates DNS requests on behalf of software programs. 6) WEBSense SERVER: •WEBSense server filters the web and protects organizations, employees who use the internet from a growing no. of threats. •WEBSense server provides an integrated web security solution that blocks spyware and

unauthorized websites as well as other web-based threats. 7) NMS

(NETWORK MANAGEMENT SERVER): •Network management can be defined in general terms as the ability to have single point of control to accomplish the activities required to manage a network. Network Node Manager

provides an integrated tool for the network manager to control and manage multiple networked system and applications from a single graphical

representation of network. •NMS can reduce downtime of network systems

and devices. 8) ANTIVIRUS SERVER: •An antivirus server is a server that has

to identify and remove a known or potential computer virus through software program designed. •The server refers to detecting and blocking computer

viruses. ADVANTAGES AND DISADVANTAGES OF SERVER: Advantages: 1)

Servers are easy to Deploy, Manage, and Use.) Efficient, secures networked

computing and also secure connected infrastructure. 3) It is reliable, used for higher availability, provides better scalability. Overall, servers are faster with

upto 140% better file-system performance as well as significantly faster

performance for Active Directory, XML Web services, Terminal Services, and

networking. 4) Windows Server 2003 provides many technical advances that

help organizations lower Total Cost of Ownership (TCO). 5) Servers create

dynamic Intranet and Internet Web Sites, provides enhanced security 6)

Access, resource and data security are controlled through the server.)

Server increases document protection and availability via intelligent file

storage. 8) With the help of server it is easy to find, share, and reuse XML

Web Services. 9) With the help of server new technology can be easily

integrate into the system. 10) Any element can be upgraded when needed.

Disadvantages: 1) The major disadvantage of the server is that when server goes down, operations will cease across the network. 2) Servers are

sometimes harder to build. 3) Servers are less stable. 4) It is susceptible to network load. 5) It is difficult to debug and also difficult to test.

LINE COMMUNICATION: Objective: To provide effective line communication facilities at various offices and colony accommodation in Assam Asset, to improve work efficiency and productivity. Salient Features Of The

Exchanges: •RISC based processor •Enhanced capacity •Easy scalability for future capacity enhancements •Networking for voice •Multiparty conference •Use of STD/ISD network wide through Auth. code •ISDN compatibility •Value added features like voice mail, unified messaging system, call pick up, wake up call, call forward, etc. •Caller line ID even analog phone

COMMUNICATION FACILITIES: Integrated EPABX systems at Nazira, Sibsagar, Lakwa and Galeki. All subscribers can communicate through exchange.

•Mobile and WLL communication. •BSNL facility •Level DID •ICNet-integrated with the exchanges. Each subscriber can reach the facility through operator also. •Fax through ICNet and BSNL. EXCHANGE: It is a system through which you can communicate to other people through switch.

ONGC uses Definity with Exchange. DEFINITY: The DEFINITY ECS is digital voice communications switch that processes and routes telephone calls and data communications from one endpoint to another.

All the endpoints are external to the system. The voice and data signals going to the endpoints enter and leave the system through part circuits. The system makes high-speed connections between analog and digital trunks, data lines connected to host computers, data-entry terminals, personal computers (PCs), and Internet Protocol (IP) network addresses. The system converts all incoming (external source) analog signals to internal digital

signals. Incoming (internal or external source) digital signals are not converted. Inside the system, voice is always coded digitally.

Outgoing digital signals from the system are converted to analog signals for the analog lines and trunks. System Components The basic system component is the Part Network (PN), consisting of part circuits connected to internal buses that allow the circuits to communicate with each other.

Processor Part Network (PPN) The required PPN contains the Switch Processing Element (SPE). The SPE is a computer that operates the system, processes calls, and controls the PN containing the port circuits. Expansion Port Network (EPN) An EPN (optional) contains additional parts that increase the number of connections to trunks and lines.

Center Stage Switch (CSS) A CSS (optional for 3 PNs or less) in the DEFINITY ECS R9r is the central interface between the PPN and the EPNs. The CSS consists of 1, 2, or 3 switch nodes (SN). One SN can expand the system to up to 29 EPNs. Three SNs can expand the system to up to 43 EPNs. NOTE: The number of EPNs that can be connected with 2 or 3 SNs may be less than the numbers given, depending on the internal SN-to-SN traffic. ATM Switch (Not available with Category B) The Asynchronous Transfer Mode (ATM) switch is a replacement option for the CSS.

Several Avaya ATM switch types can provide DEFINITY ECS port network connectivity. Non-Avaya ATM switches that comply with the ATM standards set by the European Union can also provide DEFINITY ECS port network connectivity. Cards used in Definity: a) Power supply module/card: DC power of -48 volt is used, +48 is grounded. b) Processor card: All facilities provided

by the exchange are programmed in processor card. c) Tone generator: It generates different tones for different purpose. d) Subscriber line card: Connection is provided to the subscriber through subscriber line card.) Junction line card/CO (Central Office) card: Normally it is a private exchange and the communication can be done only between the subscribers. But if it is required to communicate to a person who is not a subscriber, then communication is done using Junction Line Card/CO (Central Office) card. BSNL is providing this facility to ONGC. f) Tie Line Card: It ties up all the definity in such a way that all the subscribers can communicate directly without use of any code. For e. g. subscriber in Nazira can communicate to subscriber in Sibsagar directly without using the code of Sibsagar. To call outside, code is required.) E1/DSI card: It got 30 channels in a card. It is a digital communication. 30 subscribers can use at a time. It is a type of Tie Line Card. SATCOM HISTORY IN ONGC •Satellite communication started in ONGC with 3 earth stations at Uran, Bhn and Blq — in 1983-84. •Nazira Earth Station added in OPSNET — in 1986 •First major milestone achieved with the commissioning of the TELNET — in 1993 •Total no. of Earth Stations in satellite network grew to 14. •Second major milestone achieved with the commissioning of ICNET — in 2000 •Total no. of Earth Stations in the network now — 26.

POINT TO POINT RADIO LINKS •Nazira-Sibsagar (2*E1 Capacity) •2 MBPS for MUX (1 MBPS Data + 4FXO & FXS) •2 MBPS for EPABX VOICE (E) Salient Features Of Satcom •Facilitates (UFSO) users to access the server at Dehradun using high speed 448 Kbps digital pipe line. •Uses state of the art DAMA Technology. •Connects IMMS Regional server with the central IMMS

server at Dehradun using high speed 448 Kbps digital pipe line. •Integrates Regional IMMS servers at Sibsagar, Cinnamara and Silchar using 128/64 Kbps data channels. ? POINT TO POINT RADIO LINKS: ? POINT TO POINT DIGITAL RADIO LINKS: NAZIRA – GALEKI (4*E1 Capacity) •NAZIRA – SIBSAGAR (2*E1 Capacity) •NAZIRA – LAKWA (4*E1 Capacity) ? Group provides highway communication links for Voice and Data 1) Satellite communication links for Voice and Data to 20 nos. of ONGC Installations/Offices. 2) Provides Digital Microwave Radio Links for Data and Voice Communication. 3) Optical Fiber Cable Links Satellite Earth Station at Nazira ? ICNET DAMA Channels: 14 ? ICNET DATA Channels: 04 (UFSO, Cinnamra, Silchar, EPINET) Point to Point Radio Links ? Nazira-Lakwa (4*E1 Capacity) ? 4 MBPS for MUX ? 2MBPS for EPABX Voice Spare Capacity: 1 E1 FIELD COMMUNICATION: Field communication is a branch of infocom which provides both data and voice communication in the fields of ONGC. Communication is provided in fields using: •C-band •Wireless In Local Loop (WILL) •Mobile-GSM (Global System for Mobile communication) •Very High Frequency (VHF) •Time Division Multiple Access (TDMA) •Radio Trunking System (RTS) C-Band: The C-Band is that portion of the electromagnetic spectrum between 500 MHz and 1000 MHz. The C-band is a portion of the electromagnetic spectrum in the microwave range of frequencies ranging from 4 to 8 GHz.

It was the first frequency band allocated for commercial ground-to-satellite communications. A typical C-band satellite uses 3. 7-4. 2 GHz for downlink and 5. 925-6. 425 GHz for uplink. C band is primarily used for open satellite communications, whether for full-time satellite for TV networks or raw satellite feeds, although subscription programming also exists. C-band is

highly associated with TVRO satellite reception systems, commonly called “big dish” systems since small receiving antennas are not optimal for C-band systems. Typical antenna sizes on C band capable systems range from 7. to 12 feet (2. 5 to 3. 5 meters) on consumer satellite dishes, although larger ones also can be used. C band variants: Slight variations of C band frequencies are approved for use in various parts of the world. Wireless In Local Loop (WILL) Introduction: Till around mid 80’s in India, a local loop or an Access Network (AN) used to consist a pair of copper wires connecting the subscribers at home or office to the nearest exchange. The local loop length in urban areas would be typically as large as 6 to 8 km and the copper gauge used was 0. 5mm to 0. 6mm.

The loop was designed to carry 4 kHz voice and was difficult to maintain, with almost 85% of all faults found in the local loop. Above all, it was expensive, difficult and time consuming to deploy. With the rising cost of copper and cost of digging increasing every year, if one had continued in such an approach, the per line local loop cost itself would have been Rs 40, 000 to Rs 50, 000 and would have amounted to over 85% of the total cost of putting a telecom network. Fortunately, an uncelebrated but major technological innovation changed the Access Network from mid 80’s onward.

The Access Network now consists of a fiber from an exchange to a RLU/RSU and a typically 3-4 km copper loop from the RLU/RSU to the subscriber premises. The signals carried on fiber is time multiplexed digital voice and signaling. A RLU typically serves 1000 to 4000 subscribers, and the signal from RLU to exchange consists of 4 to 16 E1 [1]. The copper used now is only 0. 4 mm and the costs are down considerably. Wireless in Local Loop

System: Wireless in Local Loop (WILL) is meant to serve subscribers at homes or offices. The telephone provided must be atleast as good as wired phone.

Its voice quality must be high — a subscriber carrying out long conversation must not be irritated with quality; one must be able to use speakerphones, cordless phones and parallel phones. The telephone must support fax and modem communications and should be connectable to a Public Call Office. Ability to provide atleast medium rate Internet access is a must. Further, the traffic supported should be reasonably high – at least as high as 0.1 E per subscriber. Besides, ability to support a large number of subscribers in an urban area (large teledensity) with a limited frequency spectrum is required.

Finally, for the systems to be of use in developing countries, the cost of providing this wireless access should be less than that required for wired telephone. Air-time charges are totally unacceptable. Cell radius Cell radius is perhaps the most important factor governing the spectrum utilization in a wireless system. Let us take a simple example. Let there be N independent channels available for use in a cell phone of radius r . Let us also assume that the traffic per subscriber is e Erlangs. Therefore the number of subscribers that can be served in the cell works out to N/e and Subscriber Density (SD) $SD = \frac{N}{e \cdot \pi r^2}$. Thus subscriber density is inversely proportional to the square of cell radius. Therefore, cell radius plays the dominant role in determining the subscriber density given a certain frequency spectrum. In other words, a smaller cell radius is the key to efficient use of spectrum and one may have to use cell radius as small as 500m, if one desires a reasonable subscriber density. Mobile – GSM (Global System For Mobile

Communication): In late 80's emerged the second generation mobile systems. These systems were digital and mostly used TDMA.

GSM [8], [9] was the most prominent amongst these and used 13.6 kbps voice coding. Initially designed for 900 MHz operation, the systems are now available in 1800 MHz and 1900 MHz in the name of DSC1800 or DSC1900. The GSM system is by far the most dominant system used in the world today. GSM: Enables 8 channels each with 13 kbps payload using 200 kHz of spectrum. Obviously, $M_{32}(\text{GSM}) = (8 \times 13 \text{ kbps}) / 2000 \text{ kHz} = 0.52 \text{ bps/Hz}$
 GSM Capacity: GSM uses 13 kbps voice communication. In 20MHz of total spectrum (paired spectrum of 10 MHz each way), 400 channels are available.

When using non-sectorised cells, at best a reuse efficiency of 0.33 is possible. This implies, about 400×0.33 or 135 channels per cell implying a trunking efficiency of about 0.85. Thus the number of subscribers per cell works out to be approximately 766. For a cell radius of 10 km, 3 km and 1 km, of the subscriber density served given by $766 / (r^2)$ will be 2.4, 27 and 245 subscribers per sq. km, respectively. Using three sector development with 120° sectors, the reuse efficiency will be closer to 0.2 per sector per cell. This would give 400×0.2 or 80 channels per sector giving a trunking efficiency of 0.8. This works out to be $80 / 0.15$ or 425 subscribers in each sector of a cell. Therefore for cell radius of 10km, 3km, and 1km, the subscriber density supported is $425 / (r^2)$ or 4, 45 and 410 subscribers per sq. km, respectively. Very High Frequency: VHF is the radio frequency range from 30 MHz to 300 MHz. It is also known as the meter band or meter wave as the wavelengths range from ten to one meters. Frequencies immediately

below VHF are denoted HF, and the next higher frequencies are known as Ultra High Frequency (UHF).

Common uses for VHF are FM radio broadcast at 88 – 108 MHz and television broadcast (together with UHF). VHF is also commonly used for terrestrial navigation systems (VOR in particular), marine communications and aircraft communications. VHF propagation characteristics are ideal for short distance terrestrial communication, with a range generally somewhat farther than line-of-sight from the transmitter. Unlike High Frequencies, the ionosphere does not usually reflect VHF radio and thus transmissions are restricted to the local area (and don't interfere with transmissions thousands of kilometers away).

VHF is also less affected by atmospheric noise and interference from electrical equipment than low frequencies. While it is more easily blocked by land features than HF and lower frequencies, it is less bothered by buildings and other less substantial objects than higher frequencies. Time Division Multiple Access (TDMA): TDMA is a technology used in digital cellular telephone communication that divides each cellular channel into three time slots in order to increase the amount of data that can be carried.

TDMA is used by Digital-American Mobile Phone Service (D-AMPS), Global System for Mobile communications (GSM), and Personal Digital Cellular (PDC). Each of these systems implements TDMA in somewhat different and potentially incompatible ways. An alternative multiplexing scheme to FDMA with TDMA is CDMA (Code Division Multiple Access), which takes the entire allocated frequency range for a given service and multiplexes information for

all users across the spectrum range at the same time. TDMA works in

- Demand Assigned Multiple Access system (DAMA) Pre Assigned Multiple Access system (PAMA) DAMA: It allows a no. of subscriber to access the common speech channels whenever they need a call. PAMA: It allows fixed or timed channel assignment. TDMA digital voice concentrator system allow call connections between the base station and subscriber station, from one subscriber to another and from home subscriber to the subscriber of a foreign system. FDMA: The oldest technique used in wireless access, especially in mobile communications, is Frequency Division Multiple Access. Here the available frequency spectrum is divided in a no. of orthogonal frequency channels and these channels are assigned to the user on demand. FDMA can be used both for analog as well as a digital communication. This simple technique used extensively in first generation analog mobile system, however, had poor reuse and the same channels can be reused only once in 14 or 21 cells. One way to increase reuse efficiency is by employing sectorized or directional antennas at the cell site. Even with sectorisation, say 3 sectors per cell the best planning gives a typical reuse of once in 7 cells [4], implying reuse factor of $1/7 = 0.143$ per cell. CDMA:

Late in the 80's emerged a multiple access technique referred to as Direct Sequence, Code Division Multiple Access (DS-CDMA). Based on spread spectrum techniques used extensively in defense applications for over 20 years, this technique enables definition of near-orthogonal channels in code-space. CDMA enables multiple channels to use the same frequency and time slots. Each bit to be transmitted by or for a user is uniquely coded by spreading the bit into 64 or 256 or even 1024 chips. The receiver separated

the data of a user by a decoder which correlates the received signal with the code vector associated with that user.

On correlation, the interference from other users would become nearly zero and add only a small amount of noise, whereas the desired signal will be enhanced considerably. The technique is useful in exploiting the inherent time-diversity from multipath delay-spread, especially if the spreading is significant (chip time of 0.1 sec to 1 sec). The only problem with the technique is that as completely orthogonal codes are not possible, especially on the uplink, the total bit-rate supportable from all users using this technique is significantly less than the total bit-rate supportable with TDMA and FDMA technique using the same frequency spectrum.

Radio Trunking System (RTS): Traditional radio equipment works because all parties involved in the communication agree on what frequencies they will utilize. Traditional radio scanners work by scanning for and then listening to those frequencies. Trunking radios, on the other hand, constantly renegotiate the frequencies utilized for the conversation. This allows for more efficient utilization of limited frequencies because each conversation does not require a dedicated channel.

However, it also makes it very difficult to scan trunked conversations because you do not usually know what frequency the next portion of the conversation will appear on. Trunked radio systems utilize one or more “Control” or “Data” channels. The data passed via the control channel instructs each radio in the system which frequency to switch to in order to remain on the selected channel. Several utilities are available to monitor and decode

some of the common trunking protocols: APPENDIX 1 APPENDIX 2

Organization chart of ONGC