

# Sri Lanka Connectivity

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# Introduction



- Sri Lanka is located in the Indian Ocean towards South of India.
- Sri Lanka is an island with 65,000 sqkm with population of 20 million people.
- Tea, rubber and coconut are main agricultural products.
- Foreign employment and free trade business are becoming major foreign exchange earnings in Sri Lanka.
- Sri Lanka has become a tourist attraction place, with the recent peace process the number of tourists coming to Sri Lanka has drastically increased.

# Sri Lanka



# Telecom Environment in Sri Lanka.



- There are 7 major operators providing fixed and mobile telephones to Sri Lankans.
- 3 Fixed Operators
  - Sri Lanka Telecom (incumbent operator with 35% shares to NTT Japan).
  - Suntel (51% Telia Sweden).
  - Lanka Bell (99% Milford Holdings Sri Lanka)  
providing well over 1 million fixed telephones
- 4 Mobile Operators
  - Dialog Telekom (87% owned by Telekom Malaysia)
  - Celltel (100% Millicom)
  - Mobitel (100% Sri Lanka Telecom)
  - Hutch (100% Hutchison)  
providing well over 1 million mobile telephones.
- International telephone business is fully deregularized and presently there are around 30 External Gateway Operators who have been licensed.
- Recently the government of Sri Lanka provided 800MHz CDMA frequency band for the fixed operators to roll out their network in a speedy way.

# SLT telecom network



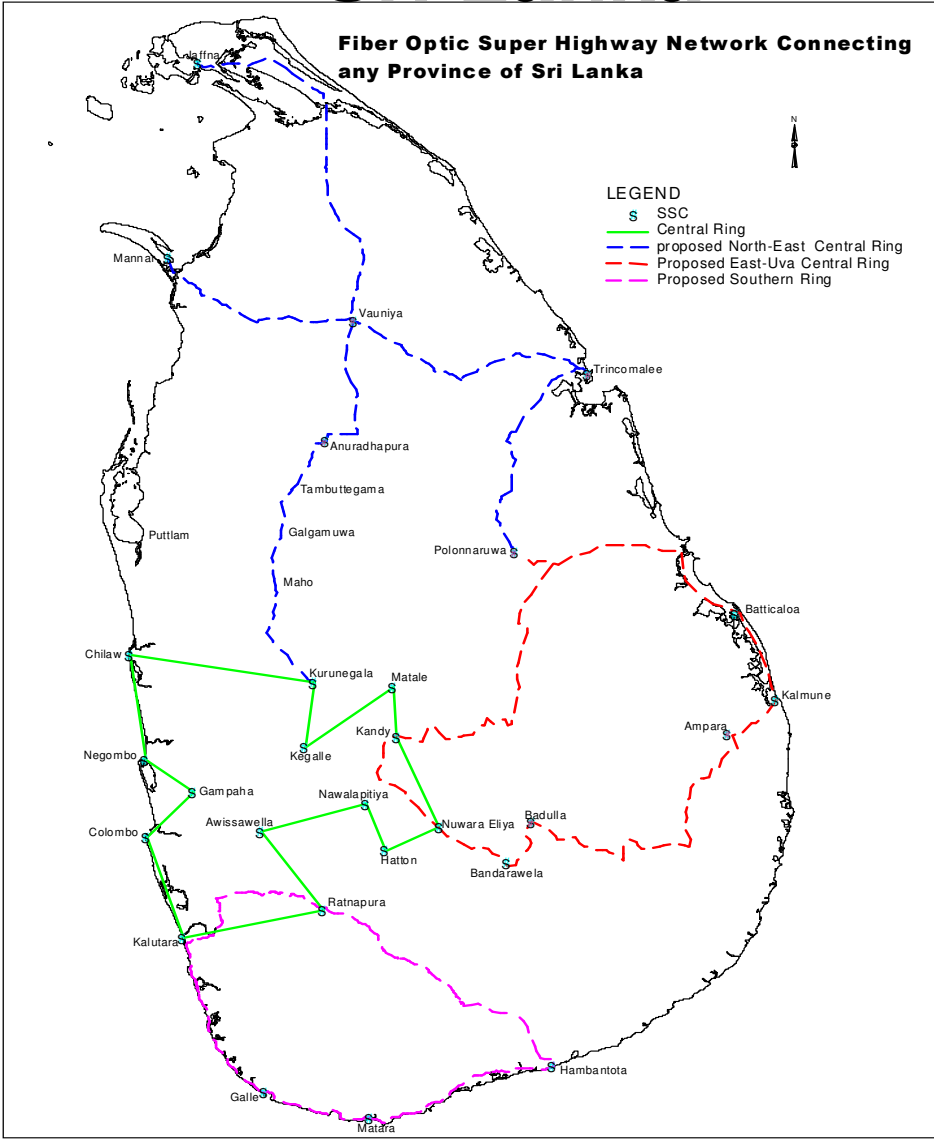
- SLT as an incumbent operator has been responsible for providing both voice and data services, domestic as well as international.
- In the domestic network predominantly access services has been provided by copper pairs while in the transport network all the switches and transmission were digital.
- SLT has introduced ADSL service which has become very popular in Sri Lanka. Still the ADSL service along with copper access has been the major driver of SLT.
- Optical fiber rings already planned to provide Fiber Optic Super Highway interconnecting all the provinces of Sri Lanka. Already certain optical fiber rings have been commissioned while part of the other rings planned to be commissioned by the end of this year to provide optical fiber connectivity for the major cities of Sri Lanka.
- 228 numbers of towers have been deployed on Sri Lanka to provide radio communication to SLT network.
- The provision of CDMA by Sri Lanka Telecom by using the existing towers will help SLT to penetrate much into rural areas, within a short span of time, in a cost effective way.

# The role of Optical fibers in the domestic Network



- When a country develops the people will not be satisfied only with basic telephony. In Sri Lanka we experience the same. Provision of ADSL has led SLT customers to surf Internet much faster and the demand has been very much spread outside of Colombo.
- SLT has devised plans to provide 100,000 ADSL customers in the major cities of Sri Lanka.
- To interconnect major cities to provide ADSL the existing radio transmission system found to be not suitable and to expand the same is not cost effective. Hence the deployment of Optical fiber along with associated electronics to reach the major cities of Sri Lanka to provide ADSL is underway.

# Optical Fiber Super Highway in Sri Lanka.



# Information Explosion Era



- We are living in an information explosion era. Mass media has already exploded by using cost effective satellite systems. No governments are in a position to implement any barriers to retard this development.
- The explosion in the personal communication era is ongoing. Access to documents, movies, sending video clips, high fidelity music, people need to access at their will. This too by regulation cannot be stopped.
- Service providers, network operators should gear to provide this in a cost effective way.
- How to provide? The domestic network should have capability of provisioning of wide band throughout the day to customers. This wideband should be available to be extended to internationally to any country.
- In order to carry out this the optical fiber networks plays a vital role. Once we achieve this we are reaching the global village concept.

# Role of Optical fibers in the International Network

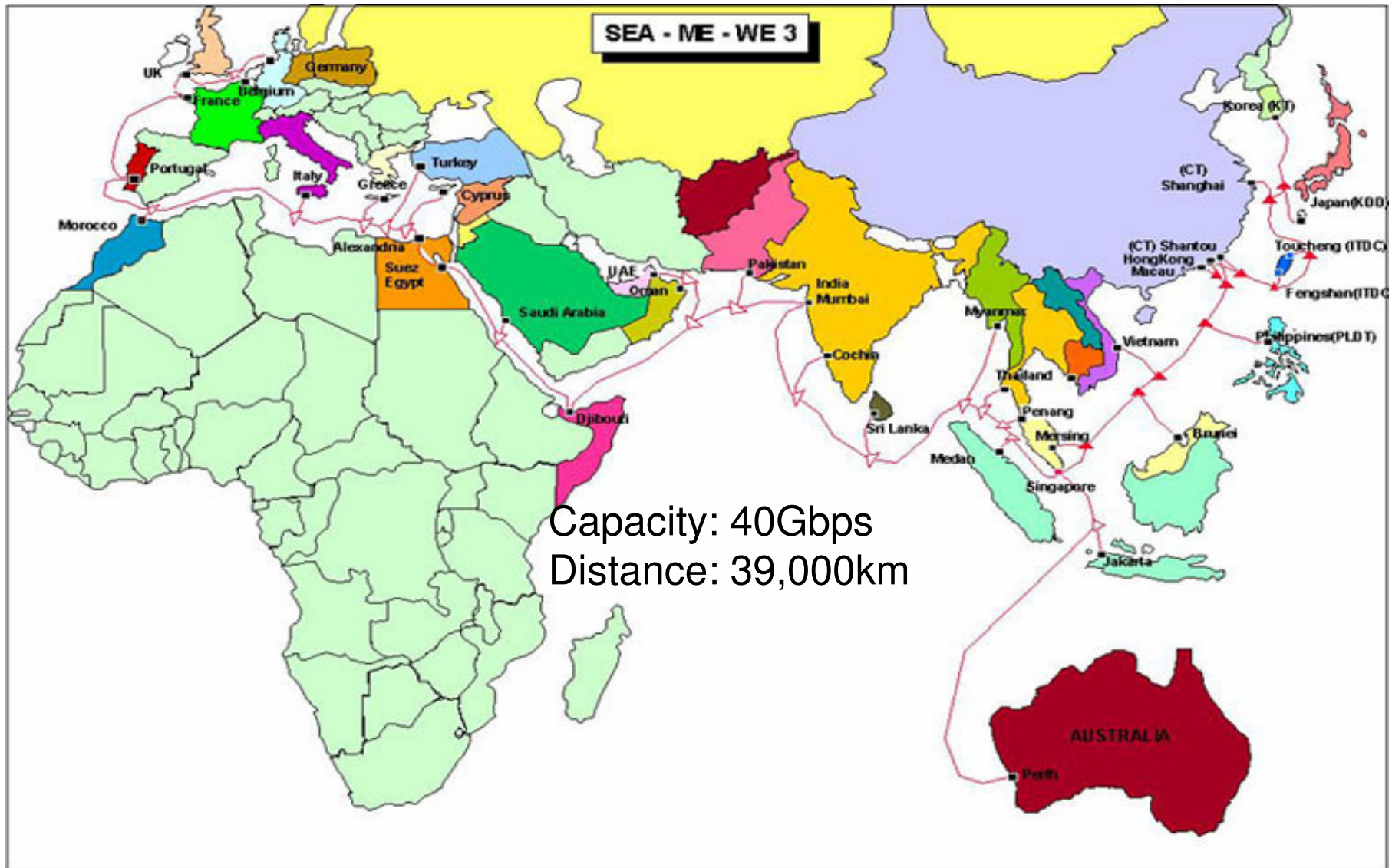


- Interconnecting countries through optical fiber cables will be of vital importance. In Sri Lanka too SLT has identified the need and already has invested in optical fiber submarine cables to interlink Sri Lanka with the outside world. These cables are listed below.
  - SEA-ME-WE 2 cable
  - SEA-ME-WE 3 cable
  - SEA-ME-WE 4 cable
- Other than these submarine cables Sri Lanka has the international connectivity through Intelsat satellite systems and intends to gradually phase out to optical fiber submarine cables due to the high bandwidth demanded.

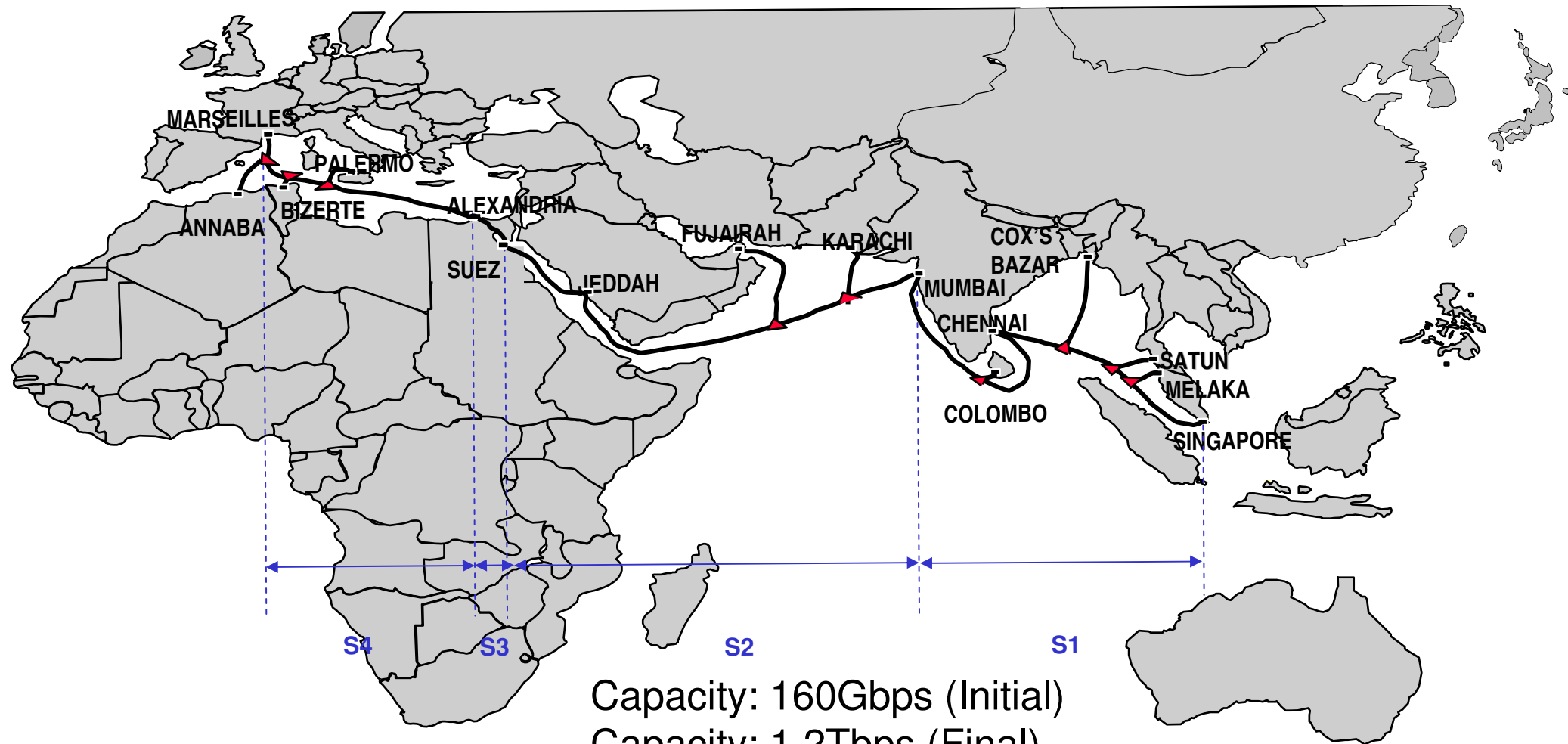
# SMW2



# SMW3



# SMW4



Capacity: 160Gbps (Initial)  
Capacity: 1.2Tbps (Final)  
Distance: 20,000km

# Optical Fiber vs Radio/Satellite System

- The deployment of domestic radio systems is easier and much faster whereas satellites systems will be more complicated and it has its own demerits.
- The radio systems work on a scarce resource of frequency.
- In addition to the equipment cost the radio systems will have an additional recurrent cost of frequency charge to be paid to the government.
- It further has constraint on the capacity and is more vulnerable for interference. Hence optical fiber bandwidth is becoming more and more cost-effective than comparable radio bandwidth.

# High capacity cost effective networks



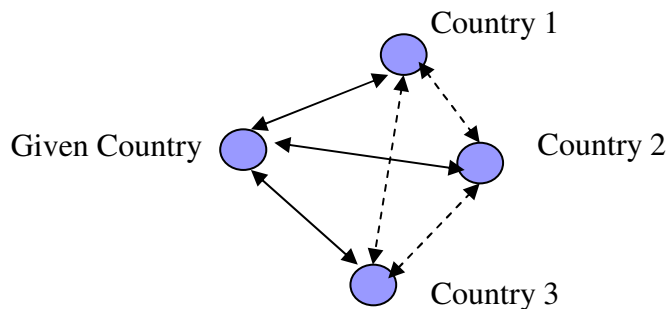
- In order to provide high bandwidth to customers the most cost-effective way is to provide by optical fiber cables.
- When the connectivity to be realized among countries optical fiber submarine cables find wider applications since most of the countries are separated by oceans.
- How to satisfy the growing demand for high bandwidth by customers with the information are requested from different countries. Hence the topology or networking of the optical fiber systems to be designed in a cost-effective way.

# Topology of Cables

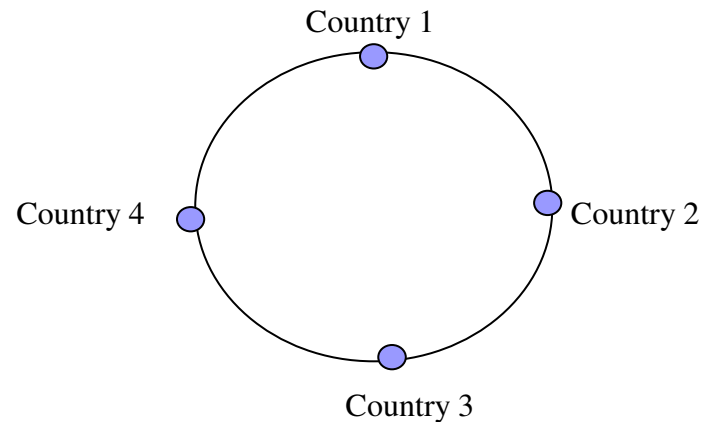


- Optical fiber connectivity from one country to another country is needed in order to develop relationships among the nations.
- According to the cultural and social status certain countries have formed various socio-economic groups.
  - European Union (EU)
  - Association of South East Asian Nations (ASEAN)
  - South Asian Association for Regional Cooperation (SAARC)
  - Gulf Cooperation Council (GCC)
- Connectivity of optical fibers among groups will help to develop their relationship.
- How to connect?
  - Mesh network
  - Ring network

# Topology of Cables contd.



Mesh Network



Ring Network

- Certainly, the ring network will be cost effective as against a mesh network
- The number of links needed to connect one country to all other countries connected to that network is very much more in the mesh network while it simplifies to one connection in the ring network.
- Sometimes a ring network can not be achieved but the concept of having one cable system interconnecting all the respective countries will be more close to the approach of a ring system.
- A direct cable from one country to another will be costlier and only with special reasons such cables may be laid.

# Consortium cables



A group of countries can join together with the intention to provide optical fiber connectivity among those countries. In order to carry out such a project the following major phases maybe helpful to follow

- a. MOU to be entered about the intentions of laying the cable. In the MOU, more attention will be paid for the following major areas:
  - i. Cost sharing of the cable (ex: no subsidization)
  - ii. Guidelines on sharing of ownership of the cable
  - iii. Guidelines on provision of service at each country to the co-owners of the cable (ex: open access).
  - iv. Principles of management of meetings and the participations by the parties. The cost involved and how to share the cost.

# Consortium cables contd.



- b. Implementation of the MOU
  - At least two task groups under a management committee have to be formed.
    - i. Procurement Group(PG) - to analyze the technical implementation
    - ii. Investment and Administration Group(I&A) - to further develop policies and procedures for the investments, drafting of Construction and Maintenance Agreement (C&MA).
- c. Signing of C&MA
  - When all parties are agreed on the conditions of management, operation and maintenance of the cable the C&MA will be signed by all parties.
  - The Management Committee will form many groups to monitor the implementation, operation and maintenance of the project both technically and financially.
    - For successful commissioning of the project
      - Procurement Group (PG)
      - Financial and Administration (F&A)
    - For commissioning and maintenance of the system
      - Operation and maintenance (O &M)
      - Assignment Routing and Restoration (AR&R)

# Consortium cables contd.



## d. Signing of Supply Contract

- The PG will liaise with the prospective contractors to obtain the latest state-of-the-art technology to be deployed in a cost effective manner for the proposed cable system. In general, the PG has to address the following important points

### Technically

- There are 2 major parts to this cable system.
  - i. submerged plant - The submerged plant consisting of optical fiber cables, repeaters and branching units etc, has to be of very high reliability, since the lifetime of the cable is more than 15years. The submerged plant will be equipped to cater for the ultimate capacity of the cable system so that any upgrades, modifications/additions to this plant are not required. Example SEA-ME-WE 4 cable submerged plant is equipped to 1.2 Terra bits per second.
  - ii. Terrestrial plant - The terminals will be equipped to cater for the existing demand and can be upgraded at any given time without interrupting on live traffic. The cost of upgrading is becoming cheaper due to reduction in the prices of electronics. As at present SEA-ME-WE 4 is equipped with 160Gbps and the upgrading cost appears to be very low compared to the initial investment.

# Consortium cables contd.



## Commercially

- Tax on the installation of terminal equipment pertaining to that country will be borne by the consortium.
- There are 2 types of taxes i.e.
  - Non recoverable tax
  - Recoverable tax.

The treatment of this taxation has to be viewed carefully in order to obtain the maximum benefits to the consortium. Another complicated recoverable tax component will be 'Withholding tax' where different tax regulations will be applicable to different countries. Settlement of these taxes may lead to delay the settlement of final accounts while the system is in operation. Hence tax component has to be treated separately after the commissioning of the project.

- When entering in to Supply Contract by the consortium the liability of the payment to the suppliers can be made individually as against 'joint and several liability', so that the burden of non payment by any party to the other parties in the consortium will be a minimum

# Consortium cables contd.



- e. Major tasks during pre-commissioning of the system
  - Immediately after the signing of the C&MA and Supply contract, major tasks such as preparation of financial procedures and appointment of agent/party to carryout billing, collection and settlement of invoices has to be formulated.
  
- f. Activities after commissioning of the system
  - The following groups along with the Management committee will shoulder successful management, Operation and Maintenance system. Generally these groups are expected to be convened once a year meetings. MC, PG, O&M, AR&R, F&A. PG maybe convening quarterly meetings up to final acceptance certificate of the system. Other group such as I&A maybe convened on a higher time span if required. Preparation of the following documents will lead to a healthy operation of the cable system.
    - Financial and Administrative procedures after commissioning
    - Joint System Maintenance Document (procedures laid down for the maintenance of equipment).
    - Formulation of Restoration Procedures

# Conclusion



A consortium cable ownership maybe changing from time to time but the physical landing points will not change. Selling of capacities to external parties and the transfer of ownerships etc may lead to complications unless properly analyzed and agreed in the C&MA. Many cable consortiums are operating successfully in the world in a very cost effective way providing connectivity from one country to many other countries, shrinking this world to one village.

THANK YOU