Member of the Tata Group

125-year old largest private sector group

$62.5 billion in revenues

Acquired VSNL in February 2002
  ▪ VSNL acquired Tyco in Nov 2004
  ▪ VSNL acquired Teleglobe in Feb 2006

Teleglobe, Tyco, VSNL and VSNL International became Tata Communications on February 13th 2008

Tata Consultancy Services (TCS)

Major shareholder in Neotel
High speed transmission circa 1870
Cable landing stations back then

Mess Quarters, Aden Cable Station circa 1905

Suez - The Eastern Telegraph Company Ltd

http://www.atlantic-cable.com/
From undersea telegraph to undersea voice

In the 1950s new technology put cables ahead of radio. Small vacuum tubes that could operate under water for 20 years or more meant that amplifiers could be buried at sea with the cable. This boosted the cable's information capacity to the point that it could even carry telephone signals.

Small vacuum tubes like this could be buried at sea with the cable for years. They helped to increase a cable's information-carrying capacity by more than a thousandfold.

Borrowed from: The Underwater web, Smithsonian Institute
http://www.sil.si.edu/Exhibitions/Underwater-Web/uw-credits.htm
From undersea voice to the internet: the first decade of subsea fiber optics

- 1986: First international subsea optical cable between U.K. and Belgium
- 1988: TAT-8 becomes the first transoceanic optical cable
- March 1992: TAT-9 with 565mb capacity
  Late 1992: TAT-10 goes on-line, another 565mb capacity.
- 1993: TAT-11 (2x565mb), the first gigabit level transoceanic cable!
- Oct 1994: Cantat-3 with 5gig!
- Who needs all that capacity?

A decade later:
terabit cables are the norm
Circling the world on Tata Communication owned Submarine Cable

<table>
<thead>
<tr>
<th>New Cables</th>
<th>Connecting</th>
<th>Ownership</th>
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<td>TGN-Intra Asia</td>
<td>Singapore Hong Kong, Japan, Vietnam, Philippines</td>
<td>Majority Owner</td>
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<tr>
<td>TGN-Eurasia</td>
<td>India to France via Egypt</td>
<td>Majority Owner</td>
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<table>
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<tr>
<th>Capacity Purchase</th>
<th>Cable Name</th>
<th>Connecting</th>
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<td>IMEWE</td>
<td>India, Middle East, Egypt, Italy, France</td>
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<td>SEACOM</td>
<td>India, Egypt, South Africa</td>
<td>Initial Capacity Owner</td>
<td></td>
</tr>
</tbody>
</table>
Historical Telecommunications Provider to the R&E Community

1995: Teleglobe provides first NGI connection for the Brussels G7 Summit: 155mb
Teleglobe provides the capacity to Canarie and co-represents Canada in the GIBN (Global Interoperability of Broadband Networks)
As a member of Canarie Technical Advisory council, Teleglobe encourages creation of Starlight in Chicago.

2001: Teleglobe sets up the first trans-oceanic lambda linking SURFnet to Starlight (2.5 gbps) 1st lambdagrid workshop in Amsterdam

2002: iGrid2002 Amsterdam, Tyco provides 10gig connection between Netherlight and Abilene in NY through the IEEAF Foundation.

2003: creation of GLIF at the 3rd lambdagrid workshop in Reykjavik. Tyco provides the Pacific and Atlantic connectivity for Gloriad. Teleglobe had provided the predecessor project Naukanet.

2005: VSNL acquires Tyco Global Network, Gloriad expands with a Tyco/VSNL 10 Gbps link between Korea and US

2006: VSNL acquires Teleglobe, VSNL provides short term STM4 to support CHEP06 event in India

2007: VSNL provides multiple 10G to CERN

2008: Tata Communications providing > 10 x 10G in Atlantic and Pacific routes and access to the commercial internet for various R&E initiatives and groups.
66% Equity of Tata Sons in Public Trusts

**Sir Dorabji Tata Trust**

**Sir Ratan Tata Trust**

**ACTIVITIES**

- Endowments for Creation of National Institutions:
  
  (1911) Indian Institute of Science
  
  (1936) Tata Institute of Social Sciences
  
  (1941) Tata Memorial Hospital
  
  (1945) Tata Institute of Fundamental Research
  
  (1966) National Centre for the Performing Arts

- Development assistance in water harvesting, medical research, microfinance, bio-diversity

**Tata Council for Community Initiatives**

**Facilitating Role for companies’ CSR activities**

- Triple Bottom-line Global Reporting Initiative
- UN Global Compact
- Tata Index for Sustainable Development

**COMPANIES**

- **Annual Spend ~ USD 85 Mn:** Social Welfare Expenditure budgeted before preparation of P&L account
- **Commitment to adjacent communities incorporated in company Articles of Association**
- **Active volunteering programme:** over 10,000 volunteers
- **Company Examples:**
  
  - **Tata Steel:** HIV / AIDS Programme - Global Business Council winner
  
  - **Tata Consultancy:** Adult Literacy Programme
- Founded in 1945 located in Mumbai
- Developed TIFRAC, the first Indian computer in 1956
- Obtained full university status in 2003
- Focus on mathematics and natural sciences
- Very active in High Energy Physics and astronomy
  - Connectivity with CERN
  - e-VLBI connectivity for NCRA in Pune
- ERNET, India’s R&E network connects around 1500 institutions
- GARUDA project connects 45 institutions at 100mbps
India and radio astronomy

The NCRA (National Centre for Radio Astronomy) is part of TIFR and operates the GMRT (Giant Meter Wave Radio Telescope) located 80 km from Pune. Intercontinental lambdas are needed for vLBI.

http://www.ncra.tifr.res.in/
high speed communications is essential for effective collaboration

- **Belle Experiment at KEK, Japan**
- **The CMS Experiment at CERN**
- **D0 experiment at Fermilab**
- **Grapes Experiment, Ooty, India**
- **High Energy Gamma Ray Observatory, Panchmari and Hanley (Ladak), India**
- **India Neutrino Observatory (INO)**

[http://www.tifr.res.in/~dhep/](http://www.tifr.res.in/~dhep/)
• European Union funded.

• Tein3 aims to connect Bangla Desh, Bhutan, India, Nepal, Pakistan and Sri Lanka to the global R&E network infrastructure.
• Results of the tender expected to become public very soon.

• Tein 3 is a milestone in South Asian R&E networking and should provide a leap in capacity for R&E connectivity within the region and between the region and the world.
Global investments in subsea cables 2006-2008

Source: Terabit Consulting

With US$2.4 billion in cable projects ongoing Africa could go from 2% to 20% of investments during next 4 years.
Investments in subsea cables: extrapolating to 2011

Telegeography sees the current wave peak in 2010. Reasonable assumption but any surprises in store as BB access continues to expand furiously?
Insatiable demand for more bandwidth seems to continue

Who dares to extrapolate?
Diverse Connectivity to and from India

Comprehensive Cable Redundancy into India

New cables in 2009 and 2010
- TGN-EurAsia: RFS 2H2009
- IMEWE: RFS 1Q2010
- SEACom: RFS 2H2009

Tata Indicom Cable
- 100% TCL Owned and Operated

Other out of India cables planned:
- EIG, MENA, Reliance China-India terrestrial cable

SMW4
- Network Administrator
SMW3 & SAFE
- Landing Party in India

NLD Backbone
- 40,000 Route Km covering 300 major cities
- Pan India Coverage
- Mesh Architecture for resilience

MAN Network
- Fiber in 32+ cities

WIMAX Network
- Deployed in 110+ towns
I-ME-WE as currently under construction

Expected Length ~ 13,000km
3.84 Tb capacity on 3 fiber pairs
Target RFS: 2H2009

9 parties connecting 8 countries and 10 landing points

- India
  - Mumbai (Bharti and Tata Telecom)
- Pakistan
  - Karachi (PTCL)
- UAE
  - Fujairah (Etisalat)
- Saudi Arabia
  - Jeddah (STC)
- Egypt
  - Suez and Alexandria (Ogero Telecom, Telecom Egypt)
- Lebanon
  - Tripoli
- Italy
  - Catania (Sparkle)
- France
  - Marseille (France Telecom)
TGN – EurAsia

Tata Communications Joint Build for an express route cable from India to Europe

- Expected Length 9,000km
- Planned for 2 fiber pairs
- Day One Capacity: 160 Gbps
- Design Capacity: 1.28Tbps
- Design Life ~ 25 years
- Cable Builder: Tyco
- Landing Locations: Mumbai, Egypt – 2 landings, Marseille
The Gulf Cable Project

Connecting Gulf Countries To the Rest of The World

Kuwait
KSA
Bahrain
Qatar
UAE
Oman

Mumbai

Gulf – Mumbai Cable

for discussion purposes only
In addition to FLAG, SMW-3 and SMW4, the upcoming IMEWE, TGN-EA, Orascom s MENA and the planned new FLAG cable will provide the region vastly increased South Asia – Middle East – Europe capacity and diversity.
SEACom Cable System
First Cable system connecting E. Africa to S. Africa, India and Europe

- Length: 13,000km Cable
- Locations:
  - South Africa (Mtunzini)
  - Mozambique (Maputo)
  - Madagascar (Toliary),
  - Tanzania (Dar es Salaam)
  - Kenya (Mombasa)
  - India (Mumbai)
  - Djibouti (Djibouti)
  - France (Marseille)
- Ultimate Capacity: 1,280 Gbps
- City-to-City Connectivity onto the Tata Communications Networks in Europe, India, & USA
- Full Range of Service Offerings including:
  - E1, DS-3, STM-1 through STM-64
  - Lease and IRU Contracts available
- Expected RFS: 2H2009
« These days all competitive advantages are fleeting. So the smartest companies are learning to create new ones – again and again and again »

Robert D. Hof, Business Week,