interconnecting emerging National R&E Networks

Partner and participant

Yves Poppe
Director Business Development
IP Services
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
Historical Telecommunications Partner of 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 Inter-operability 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.

2009: provides Europe-India and Europe-Singapore connectivity to Géant.
### 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
- Foreign scholarships - science & engineering

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### GROUP

- **Indian Institute of Science, Bangalore**
- **Tata Institute of Fundamental Research, Mumbai**
- **National Center for the Performing Arts, Mumbai**

### 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

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### 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**
- 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
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/
USA Broadband stimulus package and R&E networking

On March 16th the FCC approved the recommendations from the US R&E community for the UCAN project (Universal Community Anchor Network)

Some key projects mentioned:

- Large Hadron Collider (LHC)
- Laser interferometry Gravity wave Observatory (LIGO)
- International Thermonuclear Ignition Facility (ITER)
- Grid Enabled Neurosurgical Imaging using simulation (GENIUS)
- Cancer Biomedical Information Grid (CaBIG)
- Biomedical Research Institutions Information Technology Exchange (BRIITE)
- Global Ring for Advanced Application Development (GLORIAD)
Some priorities in Canadian R&E networking

- **ATLAS**: Tier 1 site for LHC data
- **Canadian Light Source**: Remote beamline control
- **Compute Canada**: Seven regional HPC consortia
- **Genome Canada**: Bioinformatics
- **Montreal Neurological Institute**: Brain image database

Canarie perspective
Global investments in subsea cables 2006-2008

Source: Terabit Consulting

After 2008 focus shifts to India-Europe and Africa
Investments in subsea cables: peak in 2010

The current wave peaks in 2010 but is equivalent to 2001 capacity wise!
Number of subsea cables entering service
Insatiable demand for more bandwidth seems to continue

Who dares to extrapolate?
Global Transmission: Largest Submarine Cable Network in the world

Ownership of one the most advanced, seamless global transmission networks

OWN
- TGN-Atlantic
- TGN Western Europe
- TGN Northern Europe
- TGN-Pacific
- TGN-India Asia

CONSORTIUM
- SMW-3
- SMW-4
- SAFE/SAT-3
- APCN-2
- ...

NEW BUILDS
- TGN-Eurasia
- TGN-Intra Asia
- IMEWE
- SEACOM
- Other Africa
Recent evolution of high capacity connectivity for emerging NREN’s

High level of activity in South Asia, Middle-East and African East coast

- 10 gig connection KAUST to Netherlight
- TEIN3 : 2.5 gig Madrid-Mumbai and Mumbai-Singapore, extensions to Nepal and Sri Lanka
- Tenet : 10 gig South Africa to Europe on Seacomm cable. Projects to connect Kenyan and Tanzanian R&E communities.
- Upgrade of PERN Pakistan – Singapore connection to 10 gig.
Africa
East Africa: finally not the missing link anymore

**FLAG NGN**
- Full capacity: 2.56Tbps
- RFS: ??

**EASSY**
- Full capacity: 320Gbps
- RFS: mid 2010

**TEAMS**
- Full capacity: 320 Gbps
- RFS: oct 2009
TGN Eurasia-SEACom Cable System

- **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**

- **RFS:** up 2H2009
SEACom final configuration
VLBI astronomy: MeerKAT and ASKAP

Meerkat is located in a remote part of Northern Cape Province. 10gig connectivity to the Cape Town control centre on Infraco Broadband infrastructure through SANREN (Oct 2009). One gigabit via TENET to Europe to start. A seven dish KAT-7 prototype array went live, will be extended to 80 dishes.
And on the African West Coast: WACS is coming

The WACS consortium comprises eleven companies that signed the WACS Construction and Maintenance Agreement: Angola Telecom, UK-based Cable & Wireless, Portugal Telecom, SOTELCO (Congo), Telecom Namibia, Togo Telecom, India's Tata Communications and four South African firms - Broadband Infraco, Telkom SA, MTN and Vodacom.

3.84Tb design capacity, RFS sept 2011
US$600 million investment
April 2009: contract awarded to Alcatel
Other West African projects: MainOne, Glo-1, ACE

Main One: RFS mid 2010 1.2Tb design
Glo-1: Lagos –London : RFS oct 2009
ACE: France Telecom initiative RFS 2011
Subsea Capacity Situation in 2011 if all goes according to plan
Middle East
South East Asia–Middle East–Western Europe 3 (SMW3)

- Operational since 2000
- Longest system in the world (39,000Km)
- Current capacity of 505Gbps, or 3,232 STM1s
- SMW 3 lands in 39 points in 33 countries
IMEWE

Connectivity from Europe to India and other MENA countries

- Expected Length ~ 14,000km
- Landing Stations
  - Mumbai Landing - BKC
  - Marseille Landing – FT
- City-to-City Connectivity in Europe & India
- Full Range of Service Offerings including
  - E-1, DS-3, STM-1 through STM-64
  - Protected and Unprotected (via other systems)
  - Ethernet Services
- Expected RFS: 3Q2010
CORPORATE EIG (Europe India Gateway)

17 co-owners including du, STC, Omantel, TE, BSNL

Design capacity: 3.84 Tb

Expected RFS date: end 2010
Current Cable Connectivity in the Gulf

- Kuwait-Iran
- Qatar-UAE
- TW-1 Pakistan-UAE
- FOG

FLAG, SMW3 and SMW4 have Fujairah landings

Maps: Telegeography
TGN Eurasia and Gulf extension

Partners include BIX Bahrain, QTel, Etisalat, Nawras (Oman), Mobily, Tata Communications
Gulf Bridge International

Planned RFS: Q2 2011
Design capacity: 2.56 Tb

Partners include ITPC Iraq, Batelco, Vodafone Qatar, du UAE, STC, TIC Iran
Owner: Orascom
Design capacity: 5.76 Tb
Planned RFS: late 2010
TE North

Owner: Telecom Egypt

10.24TBps design capacity, initially lit 640G

RFS: mid 2010
Al Khawarizmi: Gulf and Red Sea R&E logical Connectivity
Al Khawarizmi: Logical External Connectivity
In conclusion

A mutual interest in R&E networking

- Reflects the Tata Group philosophy of sharing and distributing knowledge and closing the digital divide especially in the emerging world.
- Provides the Research Groups of the various Tata Group companies and the R&E institutions bearing the Tata name, access to and participation in fundamental research through grid computing and data mining, remote access to instruments and test facilities, collaboration and high quality tele-education tools in their respective fields of activity.
- Investments in cable capacity in the region and the growing capacity should put downward pressure on the prices and make very high speed overseas connectivity affordable to the R&E community.
- High quality and state of the art connectivity is essential to develop a knowledge based economy.
Thank You for your attention