EU-IndiaGrid
# A Bridge across
European and Indian Grids
2006 - 2009
EU-IndiaGrid2
Sustainable e-infrastructures across
Europe and India
2010-1012

www.euindiagrid.eu

euindiagrid
इउभारतग्रिड

THE GRID: DRIVING INNOVATION AND DEVELOPMENT IN GLOBAL SCIENCE

Projects towards a Worldwide Computing Grid in the European Commission Research Infrastructures Programme

KnowARC
BalticGrid
DEISA
eGee
TeraGrid
OSG
EUMedGrid
SEE-GRID
EUChinaGrid
NAREGI
EU-IndiaGrid
EELA
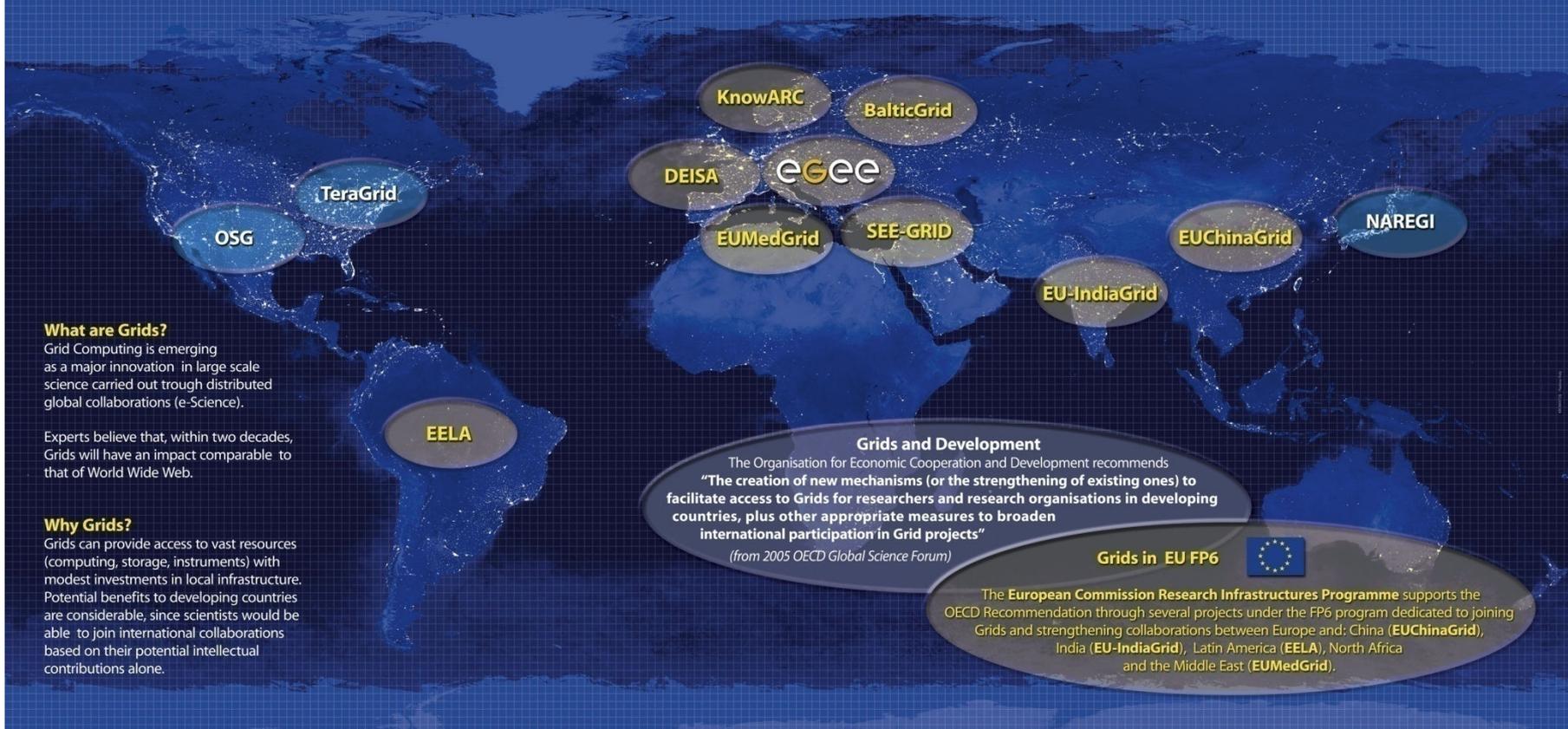
What are Grids?
Grid Computing is emerging as a major innovation in large scale science carried out trough distributed global collaborations (e-Science).

Experts believe that, within two decades, Grids will have an impact comparable to that of World Wide Web.

Why Grids?
Grids can provide access to vast resources (computing, storage, instruments) with modest investments in local infrastructure. Potential benefits to developing countries are considerable, since scientists would be able to join international collaborations based on their potential intellectual contributions alone.
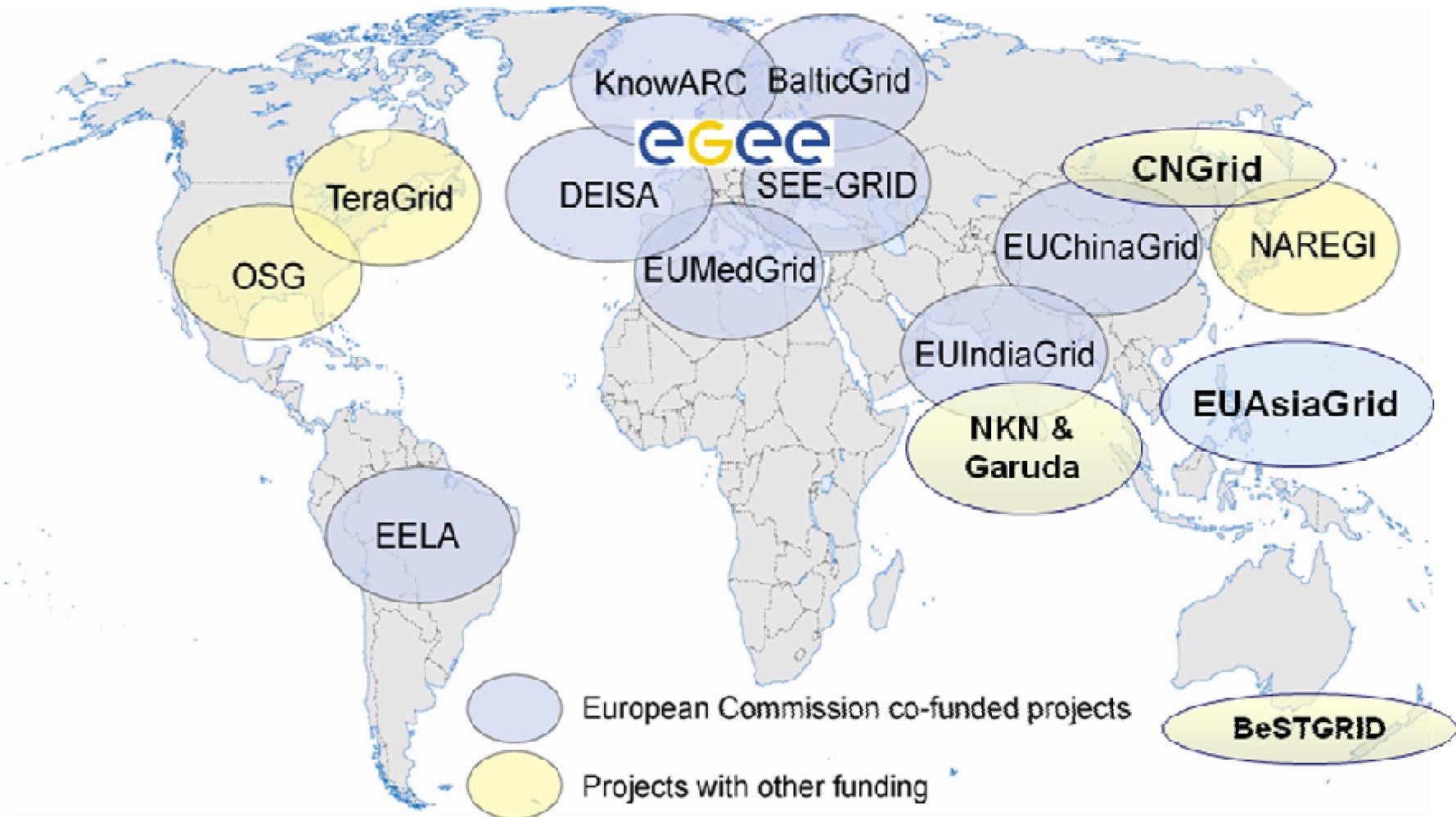
Grids and Development
The Organisation for Economic Cooperation and Development recommends **"The creation of new mechanisms (or the strengthening of existing ones) to facilitate access to Grids for researchers and research organisations in developing countries, plus other appropriate measures to broaden international participation in Grid projects"**
(from 2005 OECD Global Science Forum)
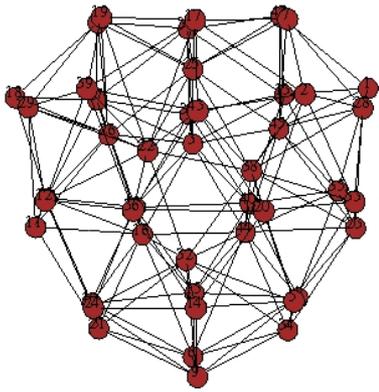
Grids in EU FP6
The **European Commission Research Infrastructures Programme** supports the OECD Recommendation through several projects under the FP6 program dedicated to joining Grids and strengthening collaborations between Europe and: China (**EUChinaGrid**), India (**EU-IndiaGrid**), Latin America (**EELA**), North Africa and the Middle East (**EUMedGrid**).

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EU-IndiaGrid2 (RI-246698) Framework Programme 7 (2007-2013) Research infrastructures projects

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Project Highlights
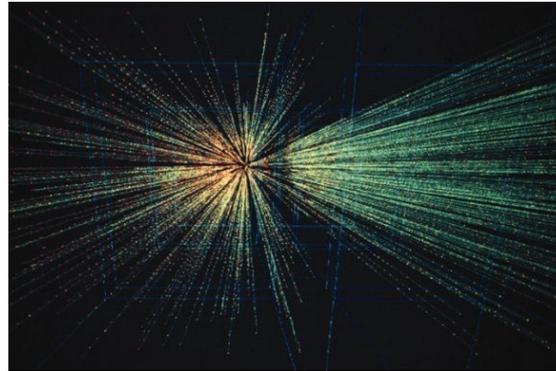## Joining European and Indian grids for e-science

- Support improvement of Indian network infrastructure both at National and International Level

- Support to establishment of Indian National Certification Authority => access to grids worldwide for Indian Researchers

- Excellent Collaboration with Indian National Grid Initiative, GARUDA, now entering phase three, and with Department of Atomic Energy Grid Project (WLCG-GRID)

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Project Highlights

Promoting Grid technologies relying on pilot applications

Earth and Atmospheric Sciences

RegCM3

Material Science

High Energy Physics

ROMS

12:00:00
28 Feb 2000
6 of 36

Biology

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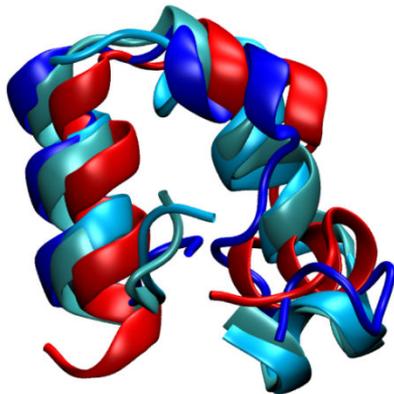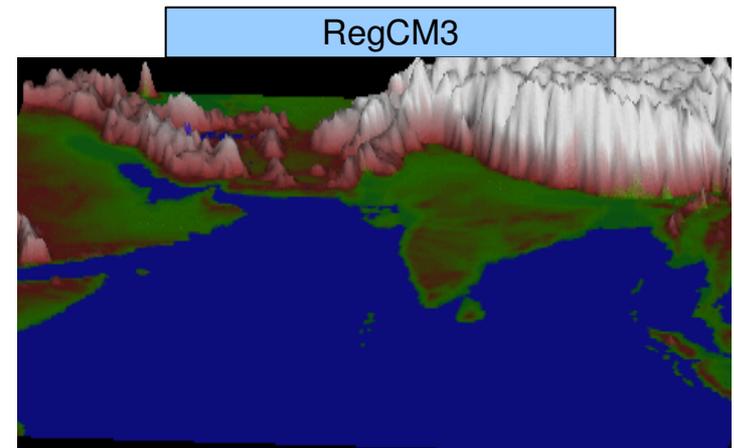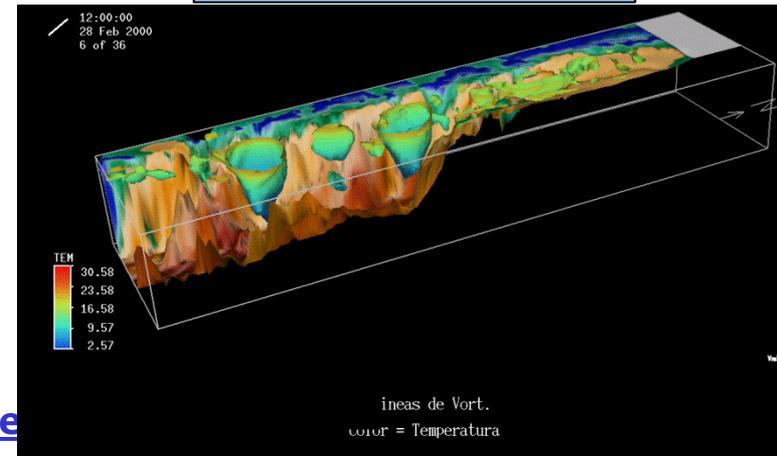
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eu india grid
इंड

डॉ. अनिल काकोडकर
Dr. Anil Kakodkar

अध्यक्ष, परमाणु ऊर्जा आयोग
व
सचिव, परमाणु ऊर्जा विभाग
Chairman, Atomic Energy Commission
&
Secretary, Department of Atomic Energy

भारत सरकार
Government of India

No: 45 - 2008

February 25, 2008

Sub: EU – India Grid – enabling enhanced e-Infrastructure

Dear Ms. Reding,

India is effectively participating in the major international experimental programmes in Europe such as LHC, ITER and others. DAE scientists have a major role in these programmes from the Indian side. We would therefore like to support consolidation of accomplishments so far and their further enlargement through a mature cooperation on Grid interoperability and middleware developments between Europe and India.

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EU-IndiaGrid Achievements

डा. आर. चिदम्बरम्

भारत सरकार के प्रमुख वैज्ञानिक सलाहकार
एवम्
डी. ए. इ. होमी भाभा प्रोफेसर

Dr R. Chidambaram
Principal Scientific Advisor to Govt. of India
&
DAE-Homi Bhabha Professor

भारत सरकार
Government of India
भाभा परमाणु अनुसंधान केंद्र
Bhabha Atomic Research Centre

जय हिन्द

Ref: RC/PSA/161/09

November 9, 2009

Letter of Support

Dear Dr. Alberto Masoni,

I am happy to learn about the second phase Eu-IndiaGrid2 project - Sustainable e-Infrastructures across Europe and India. The first phase has benefited immensely a variety of scientific disciplines including biology, earth science, materials science, and the Indian collaboration for the Large Hadron Collider (LHC).

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e-Infrastructure Vision:
integrating network, grid and data infrastructures
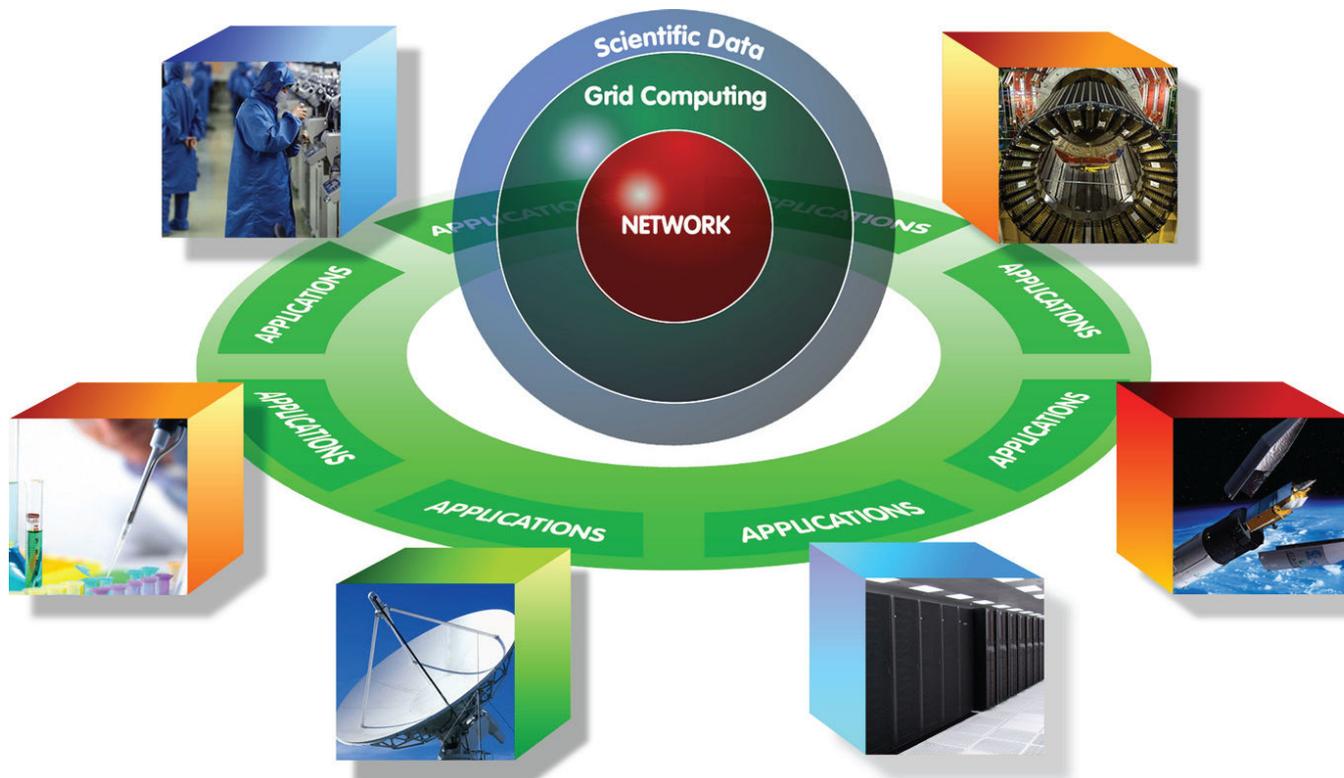
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Worldwide LHC Computing Grid in India

- CMS TIER2 centre TIFR Mumbai

- ALICE TIER2 centre Saha-VECC Kolkata

KOLKATA TIER-II on Monalisa

- Central Pb-Pb Hijing events on LHC GRID
- Analysis carried out using AliEn
- One Hijing event display for ALICE Muon Spectrometer

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TIER 2(INDIA-CMS) Network Connections
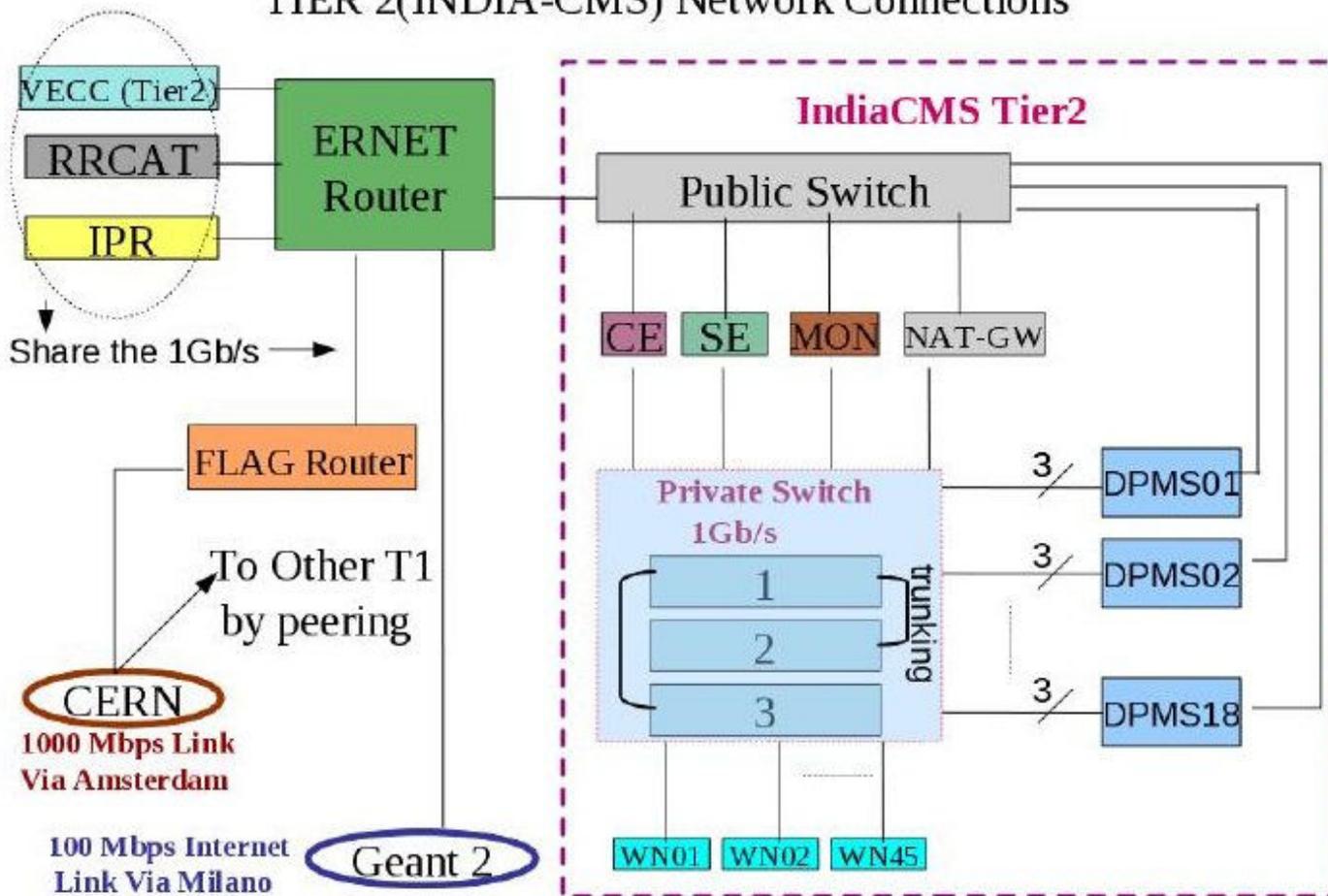
CMS PhEDEx - Transfer Rate
7 Days from 2010-01-28 to 2010-02-04

Legend:
- T1_US_FNAL_Buffer
- T1_UK_RAL_Buffer
- T1_FR_CCIN2P3_Buffer
- T1_TW_ASGC_Buffer
- T1_ES_PIC_Buffer
- T1_DE_KIT_Buffer
- T1_IT_CNAF_Buffer
- T1_CH_CERN_Buffer
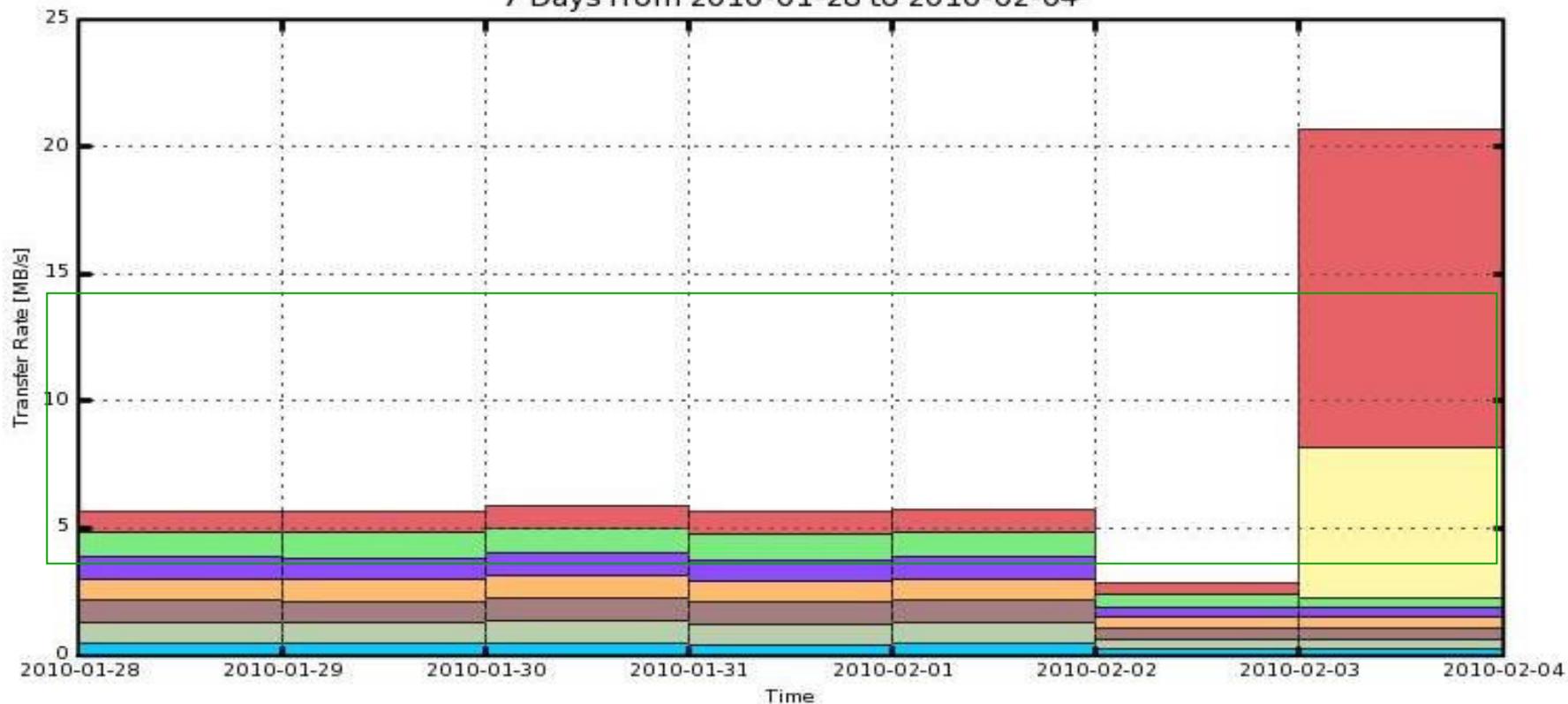
Maximum: 20.66 MB/s, Minimum: 2.83 MB/s, Average: 7.44 MB/s, Current: 20.66 MB/s

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EU-IndiaGrid2 (RI-246698) Framework Programme 7 (2007-2013) Research infrastructures projects

- The objective of the National Knowledge Network is to bring together all the stakeholders in Science, Technology, High... ... ... Com... ...ally up to the... ...h extre...

- NKM... ...tion and s... ...d of three...

- The j... initia... ...ledge Com... ...f IT.
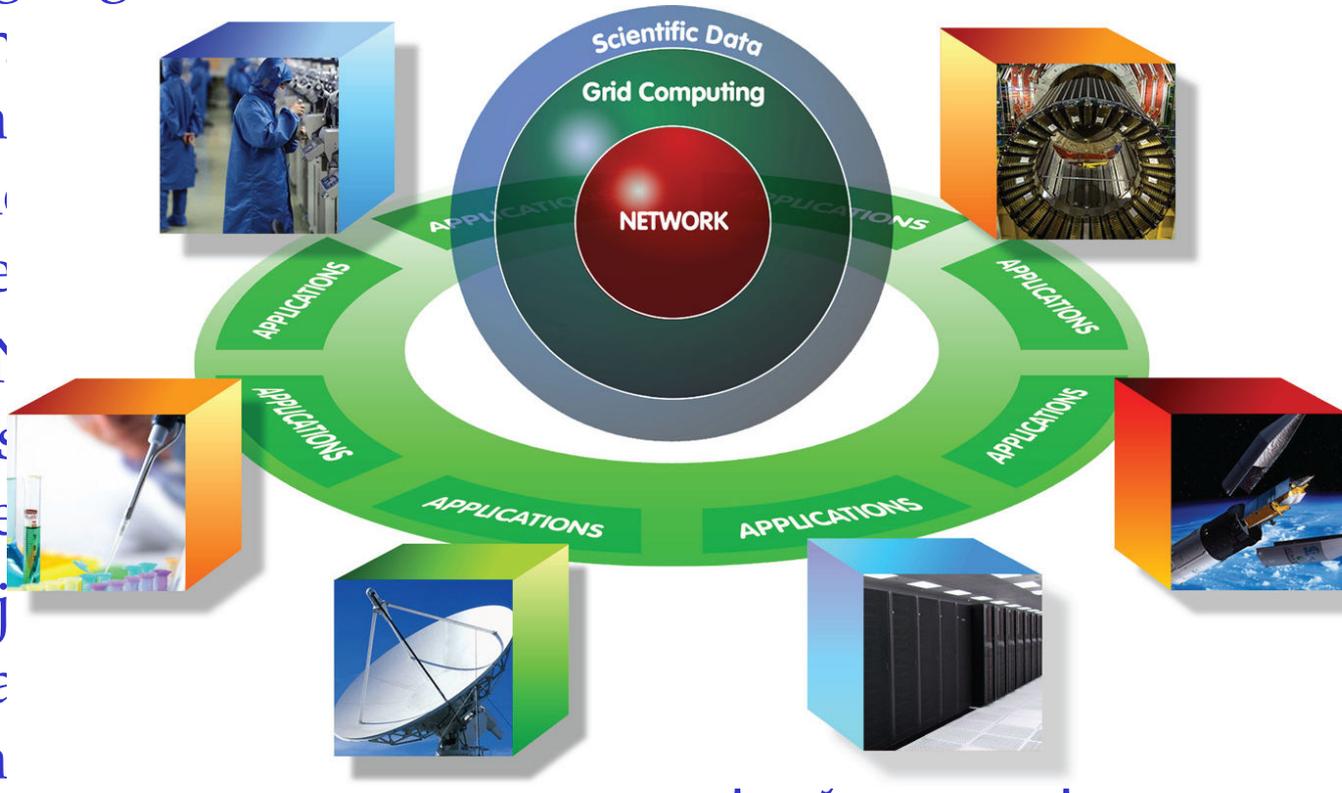
Design of the NKN is complete. (including final phase)
The Backbone of the initial Phase is ready and operational - 50 Institutes connected

Government of India has recently given approval for final phase

Legend:
- PoP Level 1
- PoP Level 2 (State Capital)
- PoP Level 2
- Dark Fiber
- Network Operations Centre (NOC)
- Disaster Recovery NOC (DRNOC)

e-Infrastructures
across Europe and India
The Indian National Grid:
the Need and the Purpose by Dr. R. Chidambaran
Principal Scientific Adviser to the Government of India

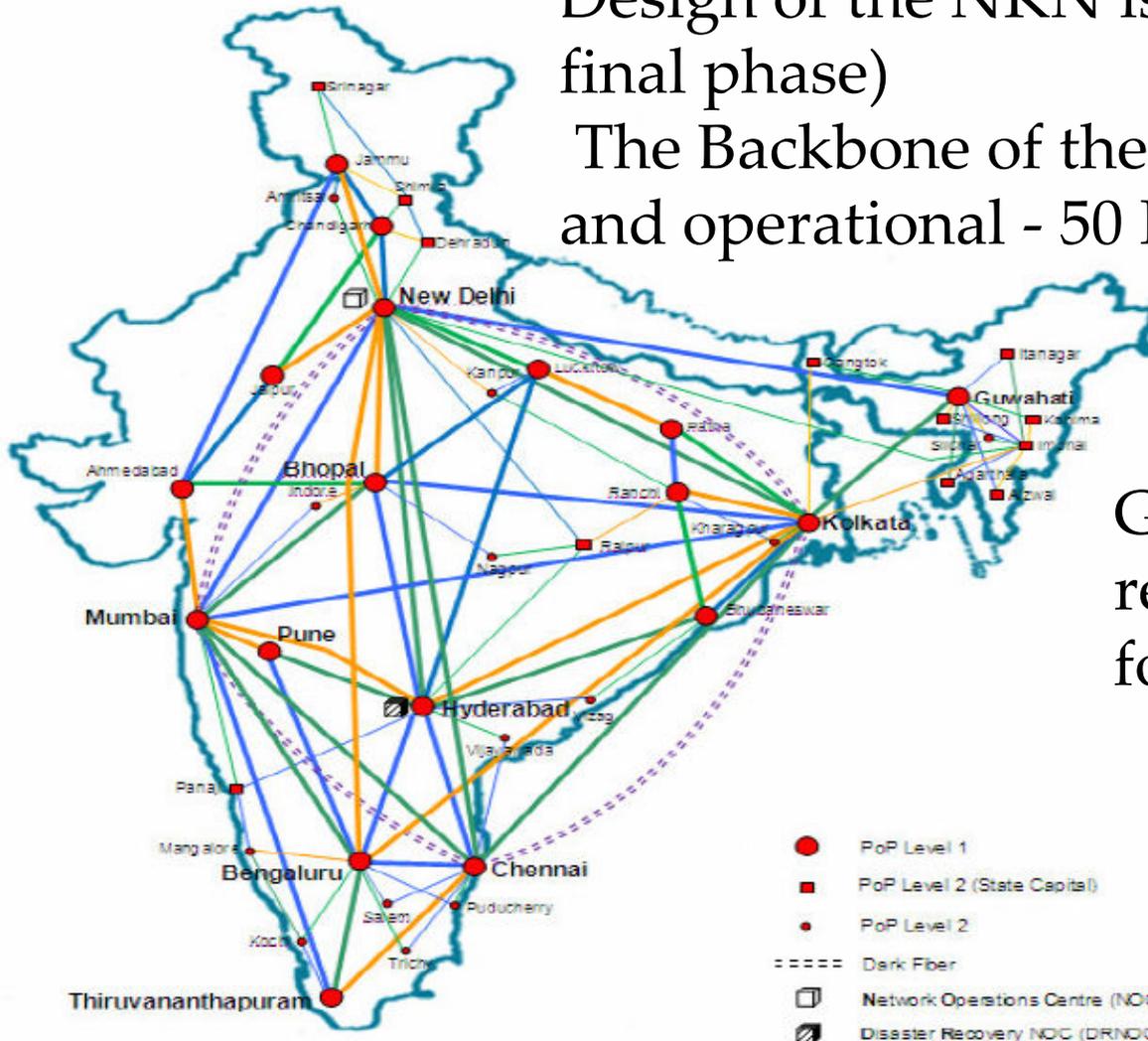- *The **EU-IndiaGrid** project is playing a key role in fostering the cooperation between the GARUDA and regional WLCG Projects and EGEE, the major European Grid Initiative, and has achieved significant progress so far*

- *This **"bridging" role between European and Indian grid infrastructure** has now the opportunity to improve, thanks to the recently approved plan for a multi-gigabit, low latency, e-Infrastructure: National Knowledge Network (NKN). The NKN project will represent a major step forward setting up the layer for an ICT-based infrastructure interconnecting the major laboratories and research centers across India.*

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EU-IndiaGrid2
Sustainable e-infrastructures
across Europe and India

Basis:
capitalise on EU-IndiaGrid Project achievements & huge infrastructural developments in India;
leverage the expertise obtained by partners during EU-IndiaGrid

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EU-IndiaGrid2 Consortium

EUROPE

INFN - The Italian National Institute of Nuclear Physics (project coordinator)

TRUST-IT

Italian Academic and Research Network (GARR)

Cambridge University

CEA - Commissariat à l'Énergie Atomique - France

INTERNATIONAL

Abdus Salam International Centre for Theoretical Physics

INDIA

Bhabha Atomic Research Centre, Mumbai

Centre for Development of Advanced Computing (C-DAC)

Indian Education and Research Network (ERNET)

Indian Institute of Science

Indian Institute of Technology

University of Pune

SAHA Institute of Nuclear Physics

TATA Institute for Fundamental Research, and National Centre for Biological Sciences

Variable Energy Cyclotron Centre (VECC)

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EU-IndiaGrid2 main objectives

- **Consolidate & Enhance** cooperation between European and Indian e-Infrastructures for the benefit of EU-Indian collaboration in e-Science

- **Support** specific user communities in the exploitation of grid infrastructure in areas strategic for EU-Indian collaboration

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EU-IndiaGrid2 main objectives

- **Ensure** a sustainable approach to e-Infrastructures across Europe and India through dissemination actions, meetings & workshops

- **Foster** and **Enhance** cooperation with other European Initiatives in the Asian region and worldwide

EU-IndiaGrid2 Launch Event
Indian Institute of Technology Delhi
Monday January 11th 8 p.m.

Opening by

Dr Chidambaram - Principal Scientific Adviser to Indian Government

*Philippe Taxis du Poet – Representing the EU Delegation*

a tangible impact on the region

TEIN3

- **The latest phase of the Trans-Eurasia Information Network initiative , extending capacity to South Asia**

- **Improves intra-regional connectivity across Asia at upgraded link capacities**

- **Provides the fastest direct research links between Asia and Europe**

- **Supports and promotes world class EU-Asian collaborative network applications**

- **Drives innovative applications with high societal benefit**

- **Fosters digital inclusion in the region and is a catalyst for establishing and developing of national research and education networking in the region's developing countries**

- **Towards TEIN4 under full Asian ownership**

DANTE

Opportunities for Global Cooperation in Asia Pacific

TEIN3 Backbone Topology January 2010
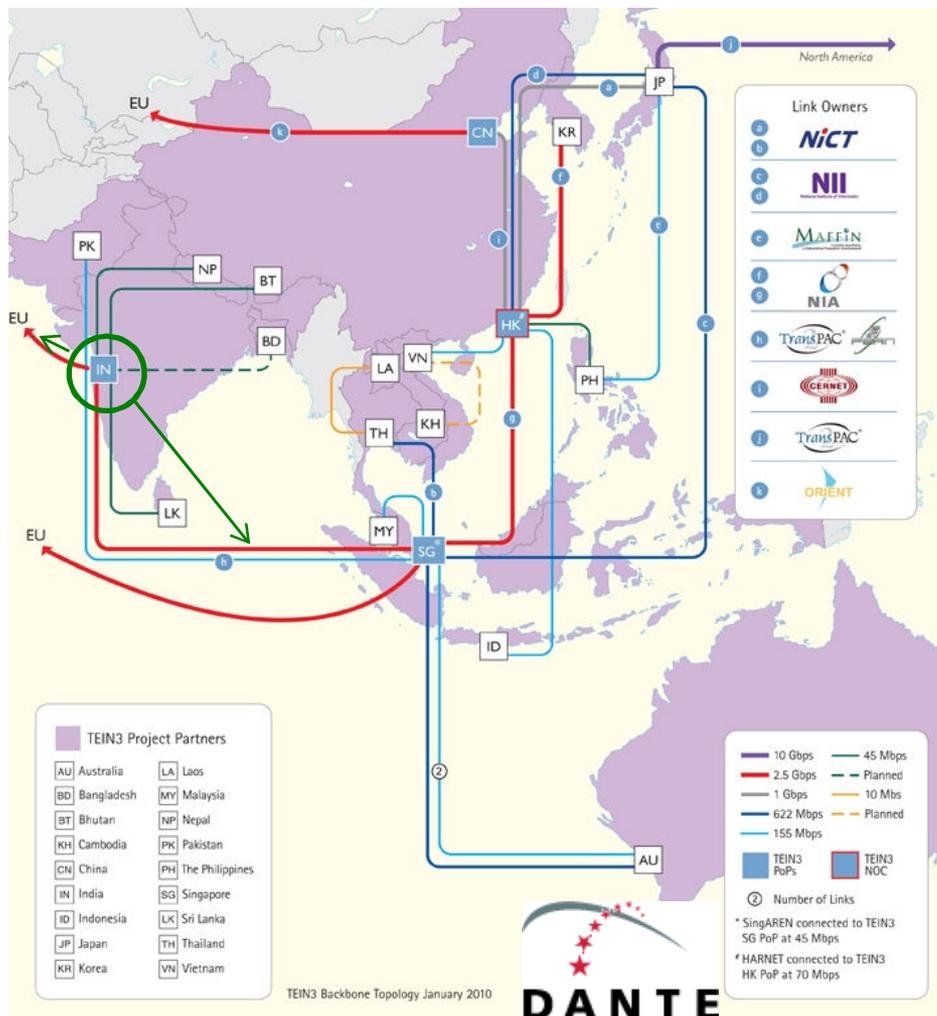
New TEIN3 PoP established in Mumbai

2.5Gbps link between Mumbai and GÉANT PoP in Madrid operational

Additional 2.5Gbps link between Mumbai and TEIN3 PoP in Singa-pore currently being tested

Cathrin Stover – DANTE –
EU-IndiaGrid2 Kickoff

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EU-IndiaGrid2
Sustainable e-infrastructures across Europe and India

EU-IndiaGrid2 will exploit the EU-IndiaGrid project achievements and the strong cooperation links established with the foremost European and Indian e-Infrastructure initiatives paving the way for successful sustainable cooperation across European and Indian e-Infrastructures.