



Connect. Communicate. Collaborate

Research Networking Between Europe and China: **ORIENT and TEIN2**

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EuChinaGrid Meeting,

Athens, 24th January 2006



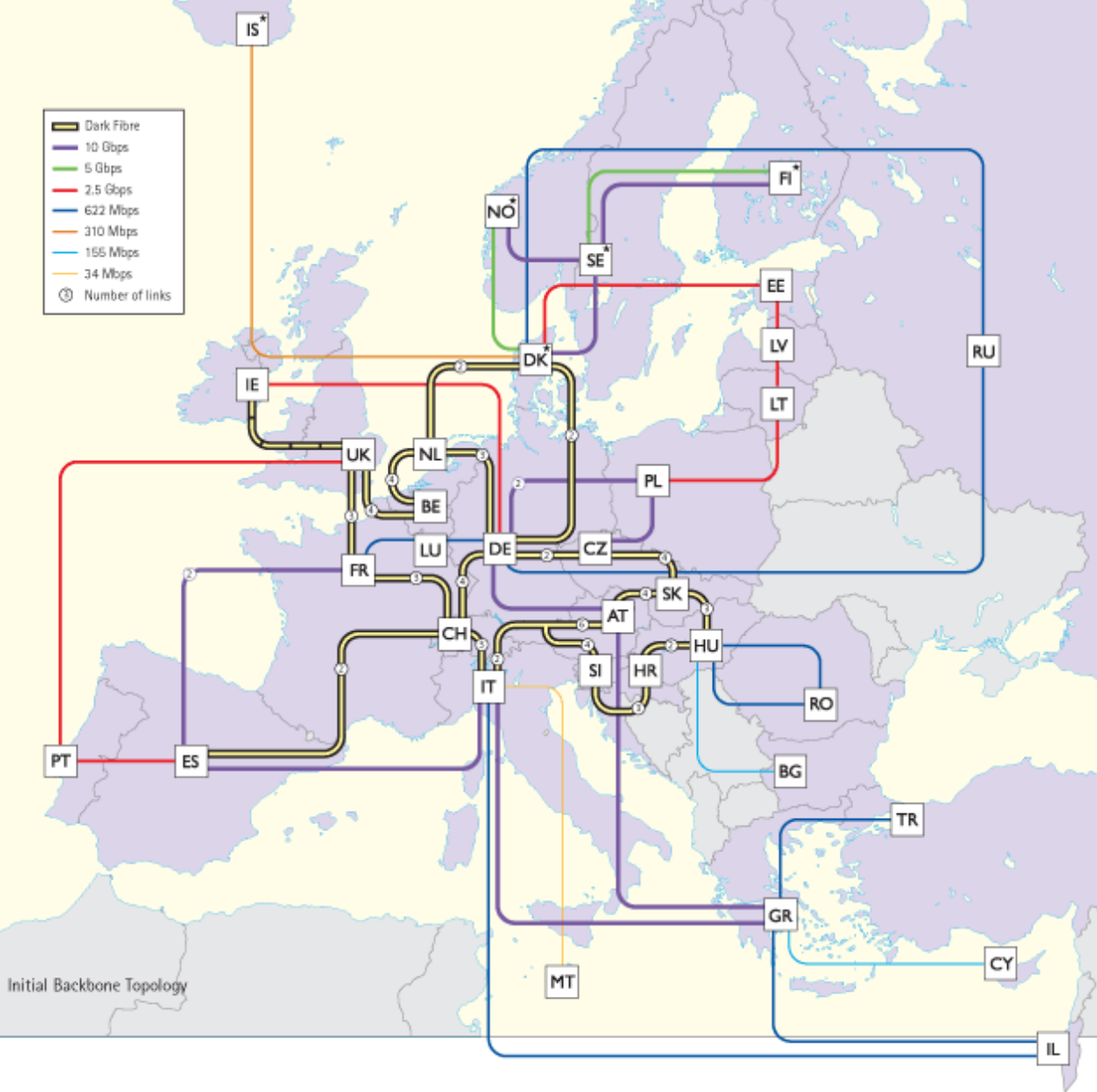
GÉANT2 is the Pan-European R&E Network:



Connect. Communicate. Collaborate

- 7th generation of pan-European research network infrastructure
- Project partners include 30 of Europe's national research and education networks (NRENs), DANTE and TERENA
- Connects 34 countries, 3500+ research and education establishments, and over 30 million users across Europe
- 200 M EURO funding, jointly by NRENs and European Commission
- Project timescale September 2004 - August 2008





Connect. Communicate. Collaborate

GEANT2 current Topology





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GÉANT2 Objectives

- Provide a gigabit-speeds infrastructure to support European research and education
- Advanced optical networking with the first international hybrid network: IP plus switched end-to-end service provision
- Extend geographic coverage
- Provide a research infrastructure for network technology developments
- Develop a wider range of network services
 - Performance monitoring
 - Security
 - Bandwidth on demand
 - Testbed facility
 - Mobility and roaming
- Support NREN development and coordinate RTD activities
- Provide user support and consultancy





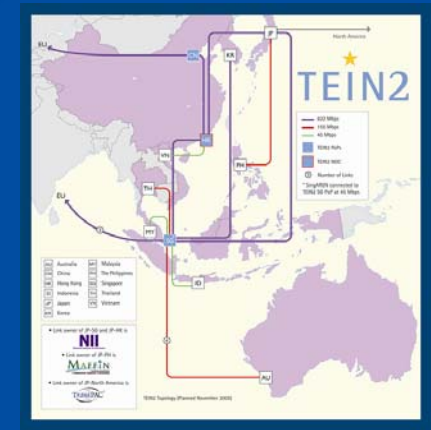
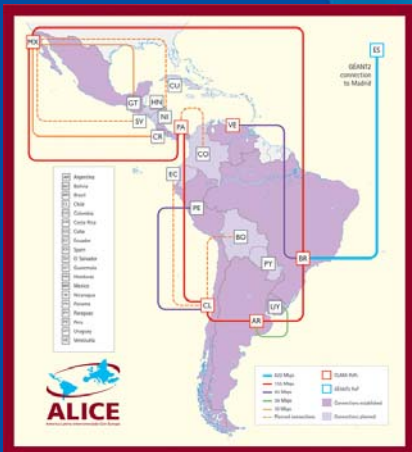
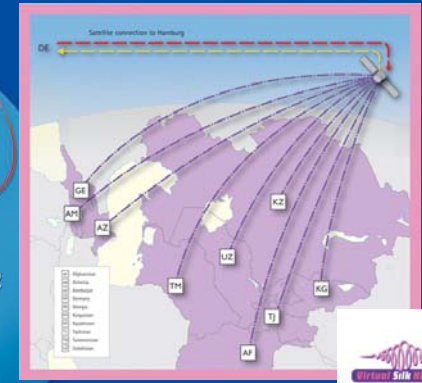
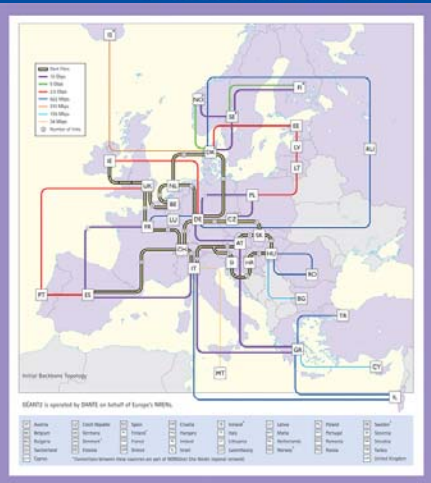
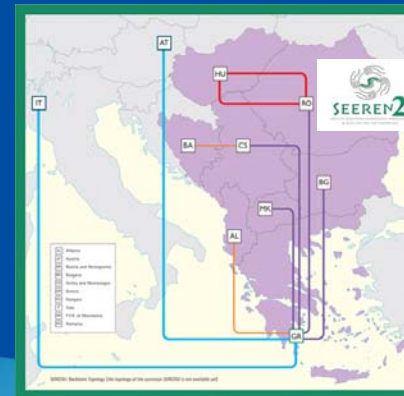
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User Support in GÉANT2

- GÉANT2 has 3 million+ users in 34 countries in Europe and beyond
- How to support them?
- Pan-European projects with ‘demanding’ requirements
 - International user groups
 - High bandwidth requirement?
 - Specialised service requirement?
- Aim to introduce new levels of accountability, transparency and service
- Custom solutions for the particular user group
- To liaise with NRENs to generate end-to-end solutions for user groups
- To manage the lifecycle of the networking aspects of each user project
- Customer focused
-hope to match this service in ORIENT and TEIN2



The Global Reach of European Research Networking



- 10 Gbps
- 2.5 Gbps
- 622 Mbps
- 155 Mbps
- 34-45 Mbps
- Planned Connections
- Satellite Connection

Design and production coordinated by DANTE on behalf of GEANT2
www.dante.net www.geant2.net



TEIN2 Project History

- Oct 2000 Trans-Eurasia Information Network endorsed by ASEM 3, Seoul
- Nov 2001 Seoul – Paris link starts (“TEIN1”)
- Mar 2003 EC studies for TEIN 2nd phase start (“TEIN2”)
- Jan 2004 TEIN2 Information Day held, Brussels
- May 2004 EC/DANTE TEIN2 contract starts
- Oct 2004 TEIN2 planning studies completed
- Dec 2004 TEIN2 network procurement begins



TEIN2 Partners

- Beneficiaries: China (CERNET), Indonesia (ITB), Malaysia (MDC), Philippines (ASTI), Thailand (ThaiREN), Vietnam (MOST)
- Non Beneficiaries: Japan (APAN-JP, MAFFIN, NICT, NII), Korea (KISDI), Singapore (SingAREN)
- Third Parties: AARNet, Academia Sinica
- European: France (RENATER), Netherlands (SURFnet), UK (UKERNA)
- Contracting Partner: DANTE





Contractual Details

- European Commission funding up to 10 M Euro/80% funding for beneficiaries, others participate at own cost
- EC has contracted DANTE to manage TEIN2 up to Dec 2007
- TEIN2 Technical Committee provides forum for project partners, met 8 times since May 2004







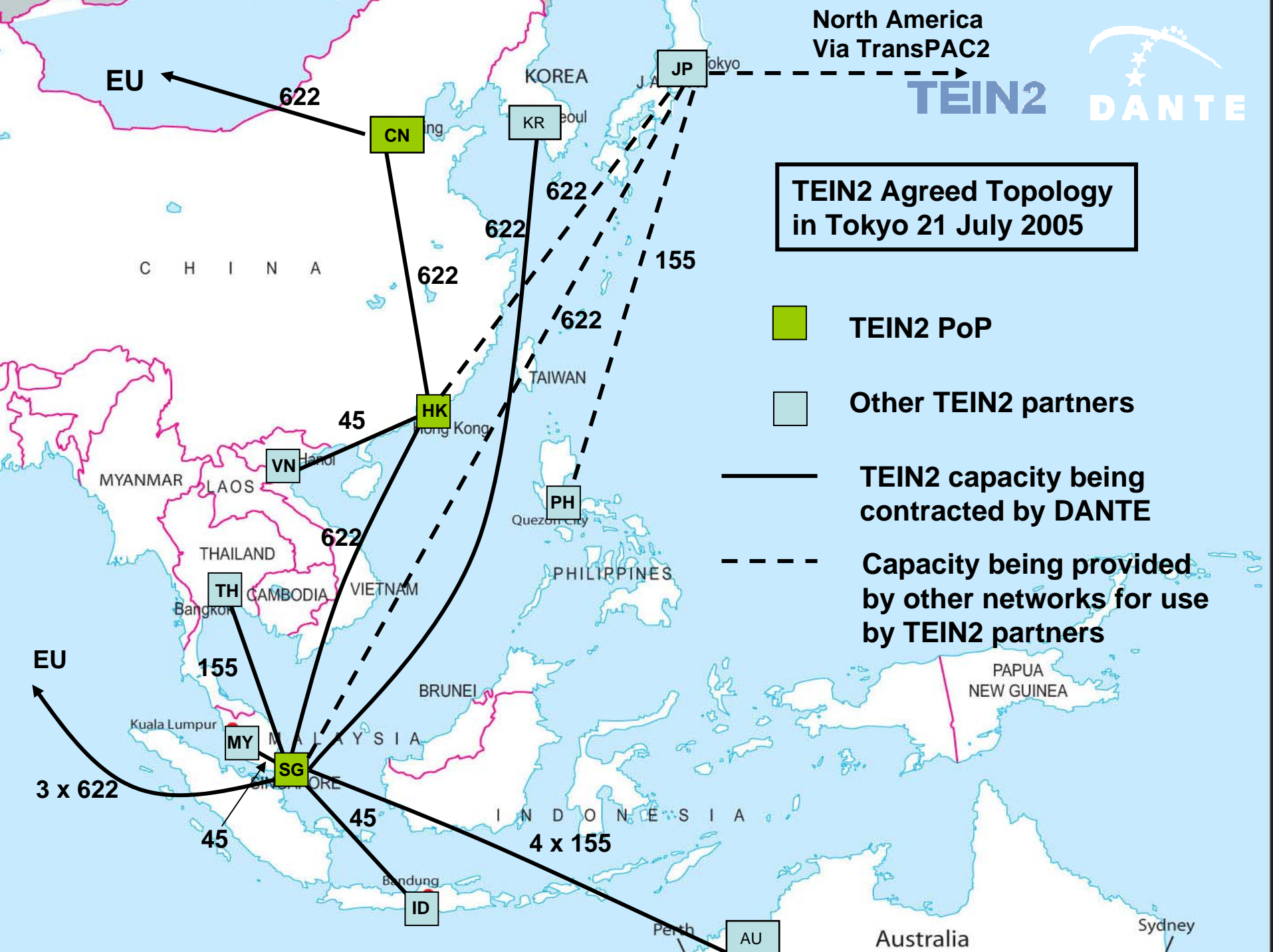
North America
Via TransPAC2

TEIN2

DANTE

**TEIN2 Agreed Topology
in Tokyo 21 July 2005**

-  **TEIN2 PoP**
-  **Other TEIN2 partners**
-  **TEIN2 capacity being contracted by DANTE**
-  **Capacity being provided by other networks for use by TEIN2 partners**





TEIN2 PoPs Status

- Singapore
 - Kim Chuan data centre
 - Operational
- Hong Kong
 - Mega I-Advantage data centre
 - PoP under construction
- Beijing
 - At CERNET premises
 - PoP under construction

Generous router equipment donation from





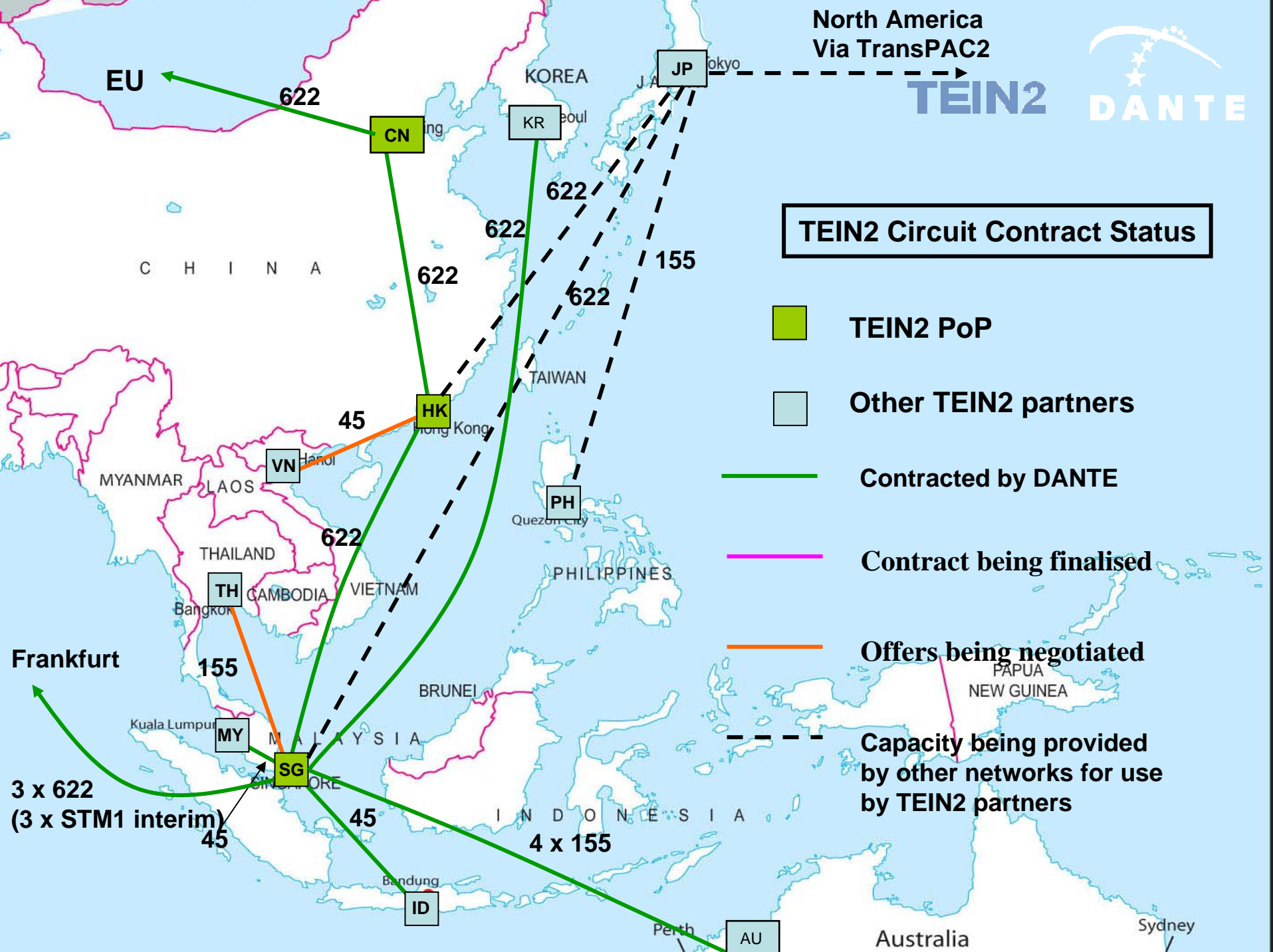
North America
Via TransPAC2

TEIN2

TEIN2 Circuit Contract Status

- TEIN2 PoP
- Other TEIN2 partners

- Contracted by DANTE
- Contract being finalised
- Offers being negotiated
- Capacity being provided by other networks for use by TEIN2 partners





North America
Via TransPAC2

TEIN2

EU (Copenhagen)

Late Feb

JP Tokyo

Circuit Service Dates



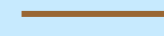
TEIN2 PoP



Other TEIN2 partners



Operational



Ready for testing



Being provisioned



Capacity being provided by other networks for use by TEIN2 partners

C H I N A

Late Jan

CN Beijing

KR Seoul

HK Hong Kong

Late Jan

VN Hanoi

Late Jan

TH Bangkok

PH Quezon City

PHILIPPINES

EU (Frankfurt)

Mid Feb

MY Kuala Lumpur

SG Singapore

Mid Mar

ID Bandung

Late Jan

BRUNEL

INDONESIA

PAPUA NEW GUINEA

Perth

AU

Australia

Sydney



TEIN2 NOC

- TEIN2 NOC service formally tendered under European procurement rules
- Contract awarded to Tsinghua University (CERNET NOC provider)
- TEIN2 NOC being constructed in Hong Kong
- Co-operative working with APAN-NOC and other partner NOCs being established
- Will also operate ORIENT NOC



ORIENT

ORIENTAL RESEARCH INFRASTRUCTURE TO EUROPEAN NETWORKS

- A project linking academic networks in China (CERNET and CSTNET) and Europe (GÉANT2 Partners)
- Funded by the Chinese Government (MoST), the European Commission and the European NRENs
- Partners:
DANTE (Co-ordinator), CERNET (China), GARR (Italy), DFN (Germany), RENATER (France), UKERNA (UK), CESNET (Czech Rep), GRNET (Greece)



ORIENT: relationship with TEIN2

- **Projects are distinct:**
 - TEIN2 provides an Asian network with links to Europe
 - ORIENT provides a dedicated link to China
- **BUT projects have synergies:**
 - ORIENT will provide additional bandwidth between Beijing and Europe, available to TEIN2 partners
 - This will either increase capacity of 622Mbps TEIN2 link (probably to 2.5 Gbps) or offer a physically separate link, which can provide TEIN2 with a redundant route to Europe
 - In either case European-Chinese projects will be provided with robust network capacity for collaboration



Conclusions

- The first substantial intra-Asian network is entering service: TEIN2
- Provides first direct regional Asia-Europe R&E links
- Will be complimented by a dedicated project to increase available bandwidth to China: ORIENT
- Offers great opportunities for collaborative research projects within Asia and Asia/Europe

- 1st phase of trans-Siberian China-