APII Testbed & TEIN

ICFA Workshop
Daegu, Korea

May 24, 2005

Byung-Kyu Kim (bkkim@kisdi.re.kr)
APII Cooperation Center
Korea Information Strategy Development Institute (KISDI)

APII&TEIN Evolution
for the Mission & Common Prosperity

1995 APII Initiative @APEC TELMIN1 (Seoul)
    APII Testbed Project @APECTEL12 (CJK, jointly) *
1998 APII KR-JP launched (2 Mbps)
1999 APII KR-SG launched (8 Mbps)
2000   TEIN Initiative endorsed @ASEM3 (Seoul)
2001 APII KR-US (45Mbps)
2001   TEIN KR-FR launched (2Mbps)
2002   TEIN quoted as "the basis of a strong partnership between Asia & Europe" @ASEM4 (Copenhagen)

2003 APII KR-JP upgraded to 1.2Gbps
2003   TEIN KR-FR upgraded to 45M
2004.1   TEIN2 announced by EU, funding 10M Euro, in response to TEIN Initiative & Efforts, @HQ of EC
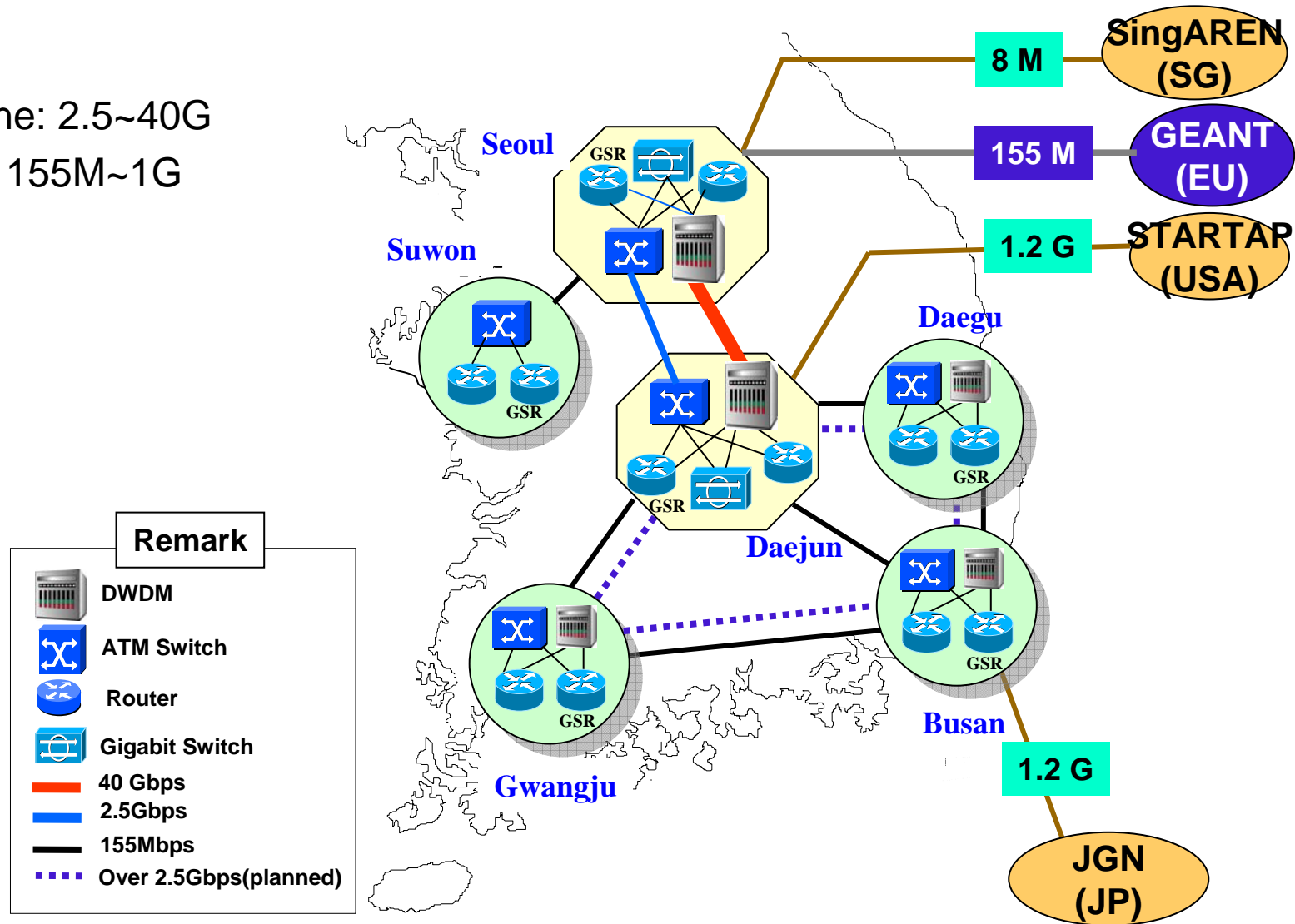**2004.5 APII KR-US upgraded to 1.2Gbps from 155M**
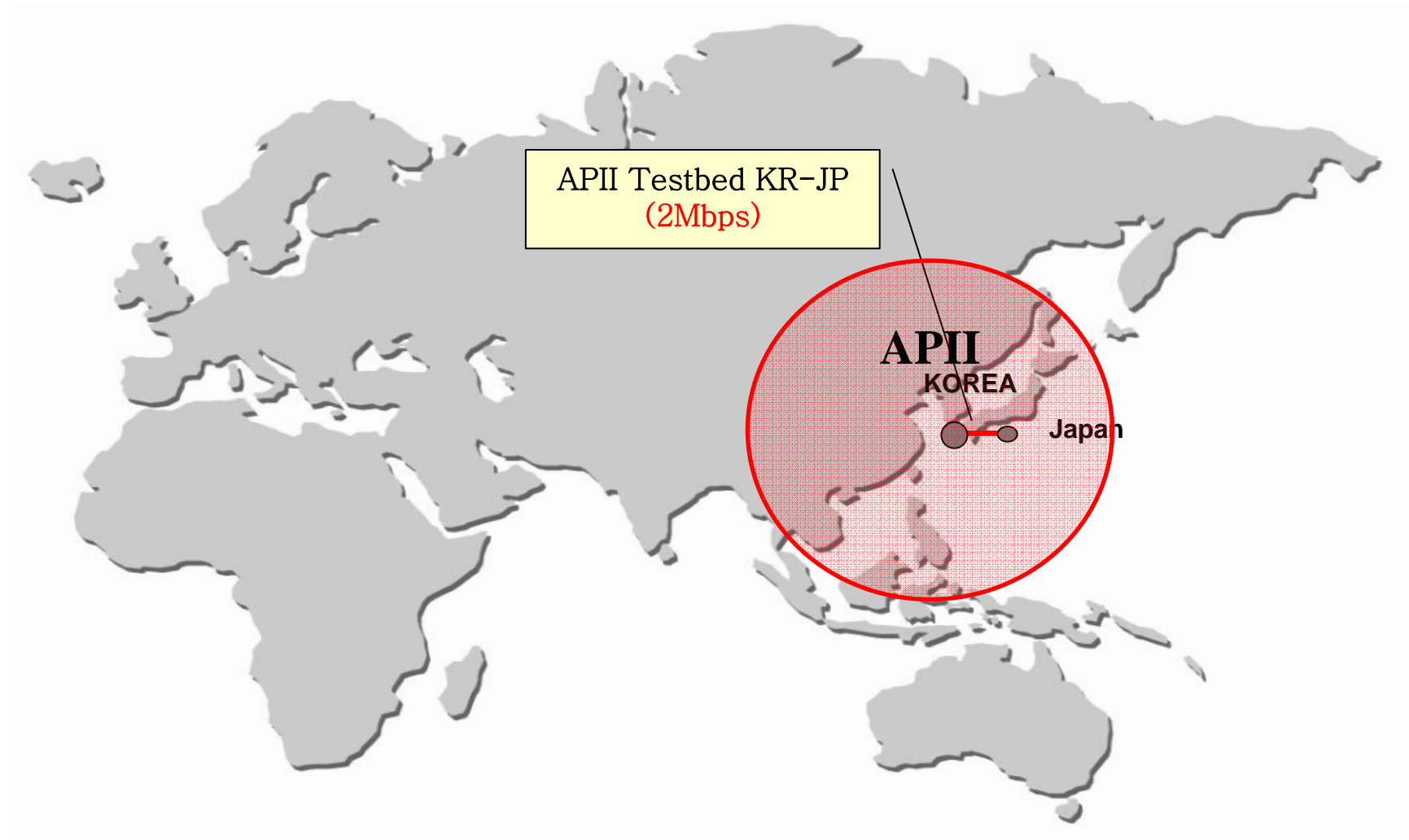**2004.8 APII KR-CN launched (2*155Mbps)**
2004.12   TEIN KR-FR upgraded to 155M

KR & Int'l Networks

APEC APII

TEiN

- Backbone: 2.5~40G
- Access: 155M~1G

Seoul

Suwon

Daegu

Daejun

Gwangju

Busan

8 M — SingAREN (SG)

155 M — GEANT (EU)

1.2 G — STARTAP (USA)

1.2 G — JGN (JP)

GSR

Remark

	DWDM
	ATM Switch
	Router
	Gigabit Switch
▬▬	40 Gbps
▬▬	2.5Gbps
▬▬	155Mbps
▪▪▪▪	Over 2.5Gbps(planned)

APII KR-JP Launched (1998)
started small Mega Capacity, seeding …

APII Testbed KR-JP
(2Mbps)

APII
KOREA

Japan

R&A: RSVP Back-bone, Multicast, Caching, Real-time VLBI, Measurement of Performance, Tele-medicine, Tele-cinference, ATM Performance, GEO-Giga Net **…**
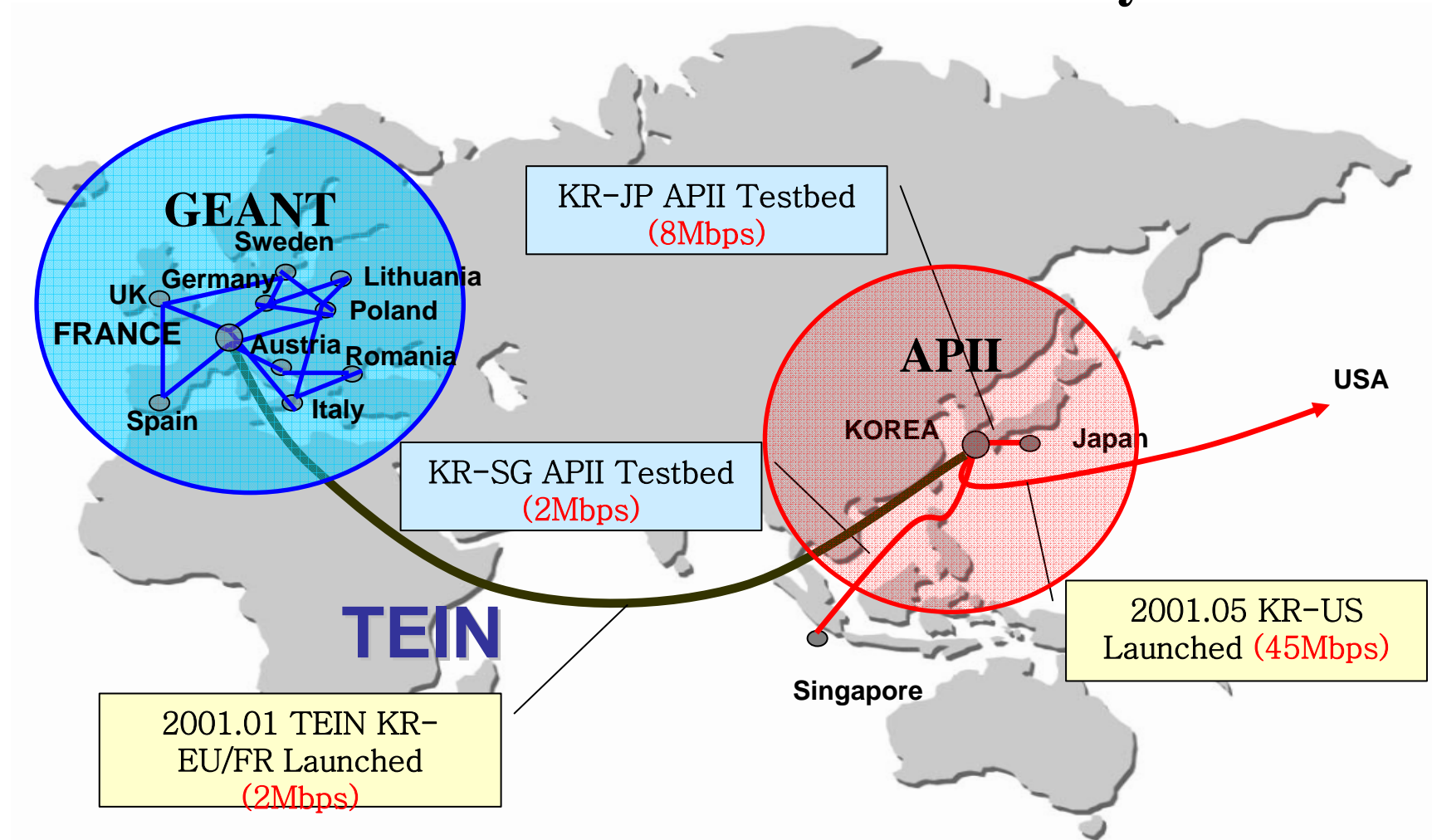
APII KR-JP, APII KR-SG (1999-2000) extended to SEA

99.07 KR-JP
upgraded to 8Mbps

APII

KOREA

Japan

99.10 KR-SG
Launched (2Mbps)

Singapore
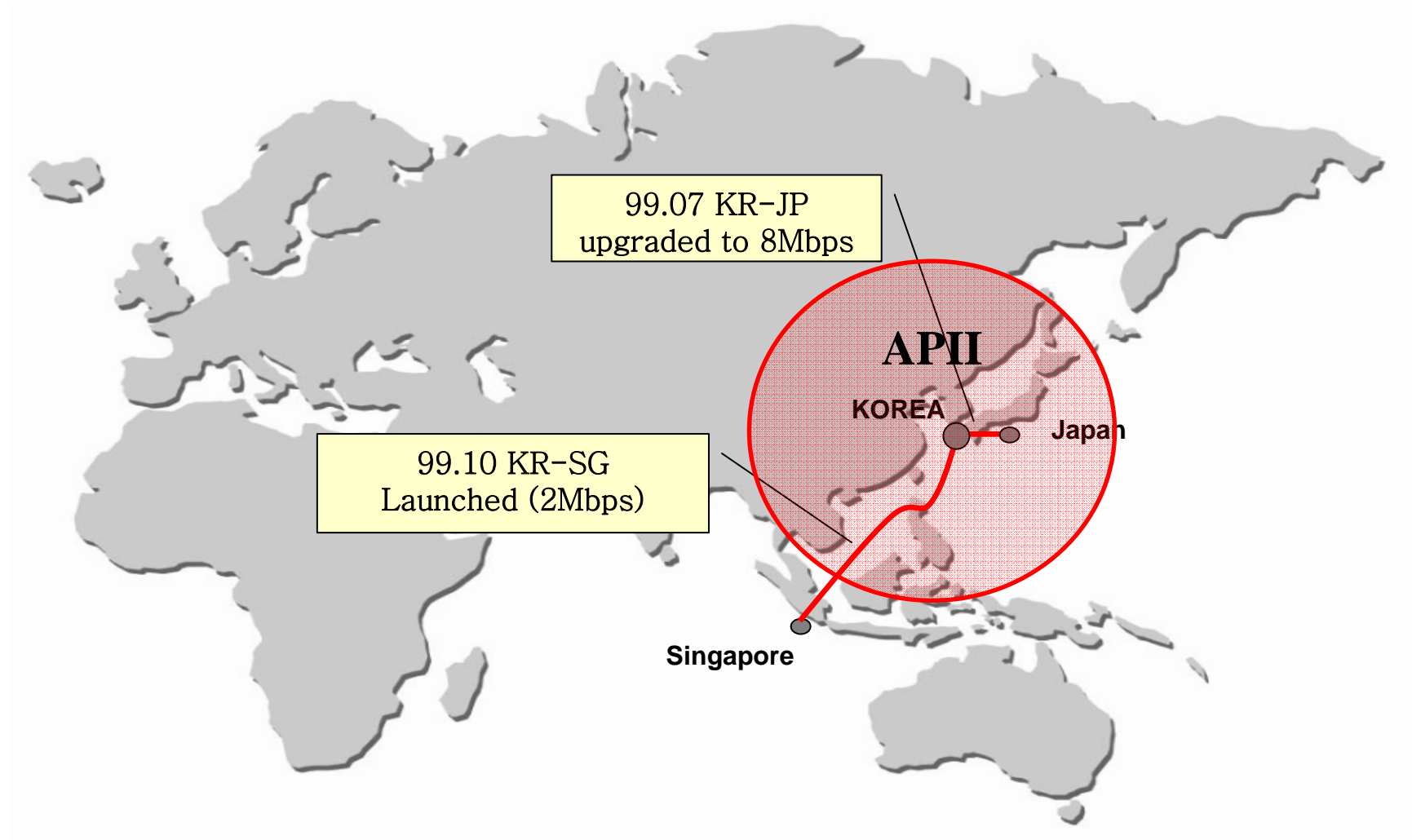
• IPv6, Virtual Univ., digital video transmission, Bio, Multicast, High quality video conference, tele-medicine, Broadband CDMA, RSVP, ATM, Maritime application …
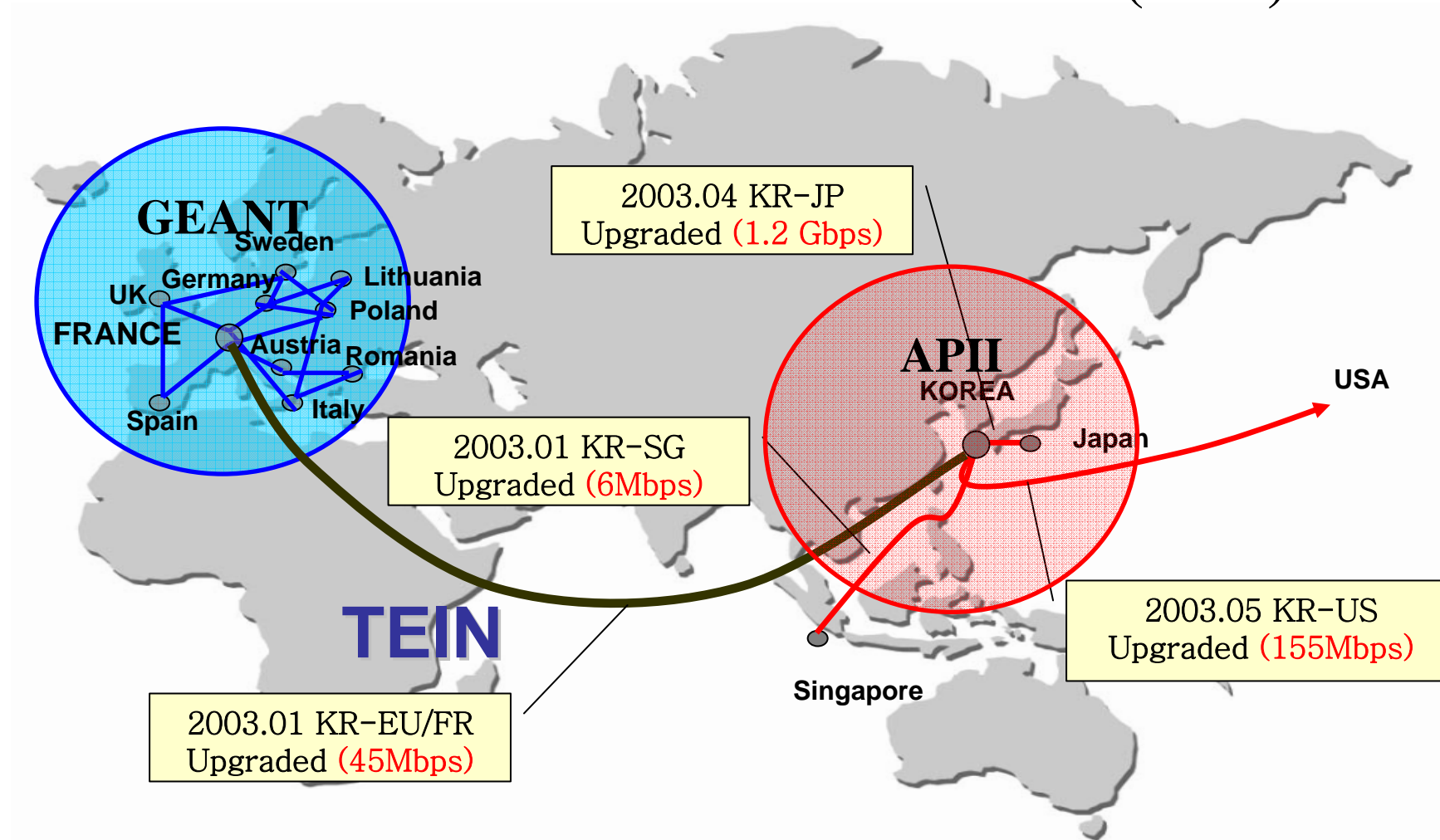
APII KR-US, TEIN KR-EU (2001-2002) inter-continental connectivity

KR-JP APII Testbed
(8Mbps)

GEANT

Sweden
Germany   Lithuania
UK   Poland
FRANCE   Austria
                        Romania
Spain   Italy

APII

USA

KOREA   Japan

KR-SG APII Testbed
(2Mbps)

2001.05 KR-US
Launched (45Mbps)

TEIN

Singapore

2001.01 TEIN KR-
EU/FR Launched
(2Mbps)

• IPv6, HEP, distance learning, HEP, Multicast, VoIP, Disaster Prevention, Traffic Engineering, tele-medicine, Articficial Heart, Weather Forecas, Bio ...

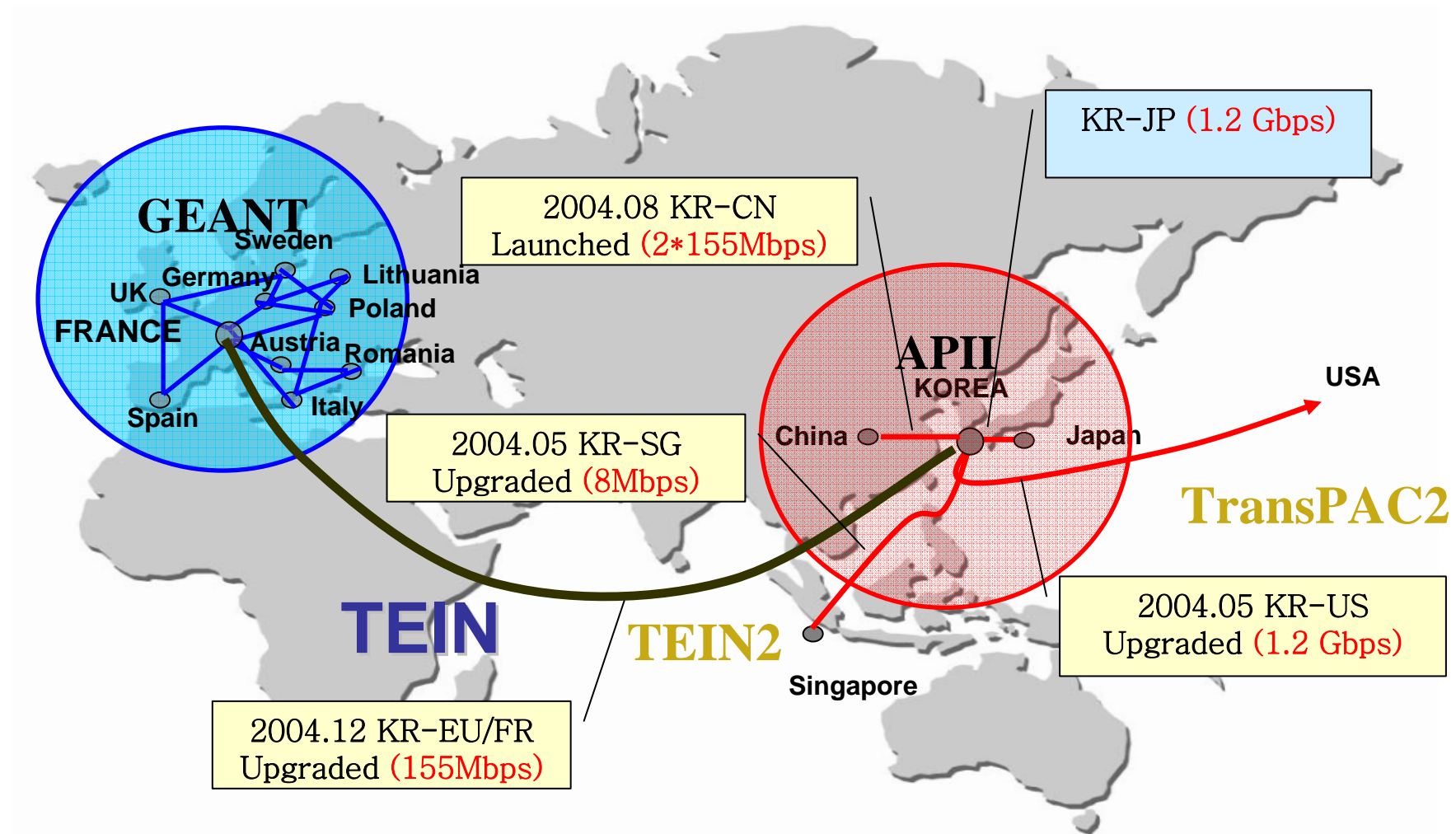# APII/TEIN Expanded, Upgraded & Linked with Global Initiatives (2003)

GEANT

Sweden
Germany   Lithuania
UK   Poland
FRANCE   Austria   Romania
Spain   Italy

2003.04 KR-JP
Upgraded (1.2 Gbps)

2003.01 KR-SG
Upgraded (6Mbps)

APII
KOREA

USA

Japan

TEIN

2003.05 KR-US
Upgraded (155Mbps)

Singapore

2003.01 KR-EU/FR
Upgraded (45Mbps)

• R&A: Nano, IPv6, tele-medicine, earth-environment, Traffic Engineering, Disaster Prevention, Bio-data ...

APII/TEIN Expanded, Upgraded & Linked with Global Initiatives (2004)

GEANT

Sweden
Germany   Lithuania
UK   Poland
FRANCE   Austria   Romania
Spain   Italy

KR-JP (1.2 Gbps)

2004.08 KR-CN
Launched (2*155Mbps)

APII
KOREA

USA

China   Japan

2004.05 KR-SG
Upgraded (8Mbps)

TransPAC2

2004.05 KR-US
Upgraded (1.2 Gbps)

TEIN

TEIN2

Singapore

2004.12 KR-EU/FR
Upgraded (155Mbps)

- **R&A: Nano, IPv6, tele-medicine, earth-environment, Traffic Engineering, Disaster Prevention, Bio-data …**

- **Compose Working Groups for the areas of: Advanced Network, Access Grid, IPv6, Traffic Measurement, Physics, Medical Science, Earth System …**

Mission of APIICC: as given since 1995

Purpose +	Mission +
Promote the construction of Asia Pacific Information Infrastructure (Mission 2) to realize continuous development and **co-prosperity** in APEC (Mission 1)	**(1)** **Promote Cooperation @ APECTEL & APEC +**
Improve the interconnectivity and the inter-operability of pilot networks and testbeds in the region (Mission 2)	**(2)** **Establish & Expand Intra-Regional Connectivity: APII Testbed Links**
Improve the interconnectivity and the inter-operability of pilot networks and testbeds in the other region (Mission 2+)	**(2+)** **Initiate & Strengthen Inter-Regional Connectivity: TEIN & TEIN2 Links (EC) IRNC (NSF, US)**
Promote and support joint research and application on the APII Links (Mission3) *And also on the connected links of other region (Mission 3+)*	**(3)** **Promote & Facilitate Joint R&D: Intra-regional R&A on the Links Inter-regional R&A on the Links**

Action Items of APIICC: expanded to better meet AP demand

Mission	Action Item
Promote Cooperation for common prosperity **@ APECTEL & APEC +**	- **Support for Chairing Group & POCs of TEL** - **Maintain APEC TEL, APIICC Website** - **IT Cooperation with ASEAN+3, ASEM-Asia Community**
Establish & Expand **Intra-Regional Connectivity:** **APII Testbed Links**	- **KR-JP (NICT, JP)** - **KR-CN (CERNET, CN)** - **KR-SG (SingAREN, SG) *** - **KR-US (PNWGP, StarLight, CA*Net4)**
Initiate & Strengthen **Inter-Regional Connectivity:** **TEIN & TEIN2 Links (EC)** **IRNC (NSF, US)**	- **TEIN KR-FR + GEANT(EU)** - **TEIN2 ASEM Asia + GEANT/GEANT2(EU) *** - **IRNC (APAN + NSF, Indiana U, Internet2, US) ***
Promote & Facilitate Joint R&D: **Intra-regional R&A on the Links** **Inter-regional R&A on the Links**	- **Joint Projects Utilizing APII/TEIN, APAN** - **Working Groups (IPv6, Disaster, Medical…)** - **APII KR-JP Workshops, CJK Collaboration** - **Asian DHX Forum**

Joint R&A Projects and Working Groups
on APII & TEIN (FY2005)

Joint R&A Projects

- Study on the construction of weather and climate change data exchange
  system between Korea and Europe
- One-way End-to-End Packet Delay Measurement for IPv6 Application
  in TEIN
- Study on Simulation of Nano-Scale Transister Using the TEIN Network
- Intercontinental research of advanced network & culture technology
  on TEIN/APII

Working Groups

- Physics WG (HEP, Fusion, ..)
- Advanced Network WG (IPv6, Security, International collaboration..)
- Medical Science WG (telemedicine…)
- Video Conferencing WG (Access Grid, HDTV..)
- E-learning (Medical) WG

Asian DHX Forum 2004

During ITU Telecom Asia 2004
(Sep 7, 2005) in Busan
http://anf.ne.kr/events/anw2004/DHX.htm

Next Asian DHX
Forum will be held in
Seoul on Sep 6, 2005
during APECTEL WG
meeting in Seoul.

Digital Heritage Exchange: HDTV over IP

- **What**
  - HDTV demonstration between KR,ES,US
- **When**
  - Early September during ITU Telecom ASIA 2004 (@Busan BEXCO, KR)
- **Partners**
  - ANF, GIST, KISDI, KISTI (KR), Washington Univ., ResearchChannel(US), UPC(ES)
- **Links**
  - KR-US: BEXCO-ResearchChannel
  - KR-ES: BEXCO-UPC

APII Workshop 2004

- **Time & Place : 2004.10.28-29 @ NICT**
  - Co-hosted by NICT & KISDI
- **Participants & program:**
  - MIC-JP & MIC-KR; NICT & KISDI
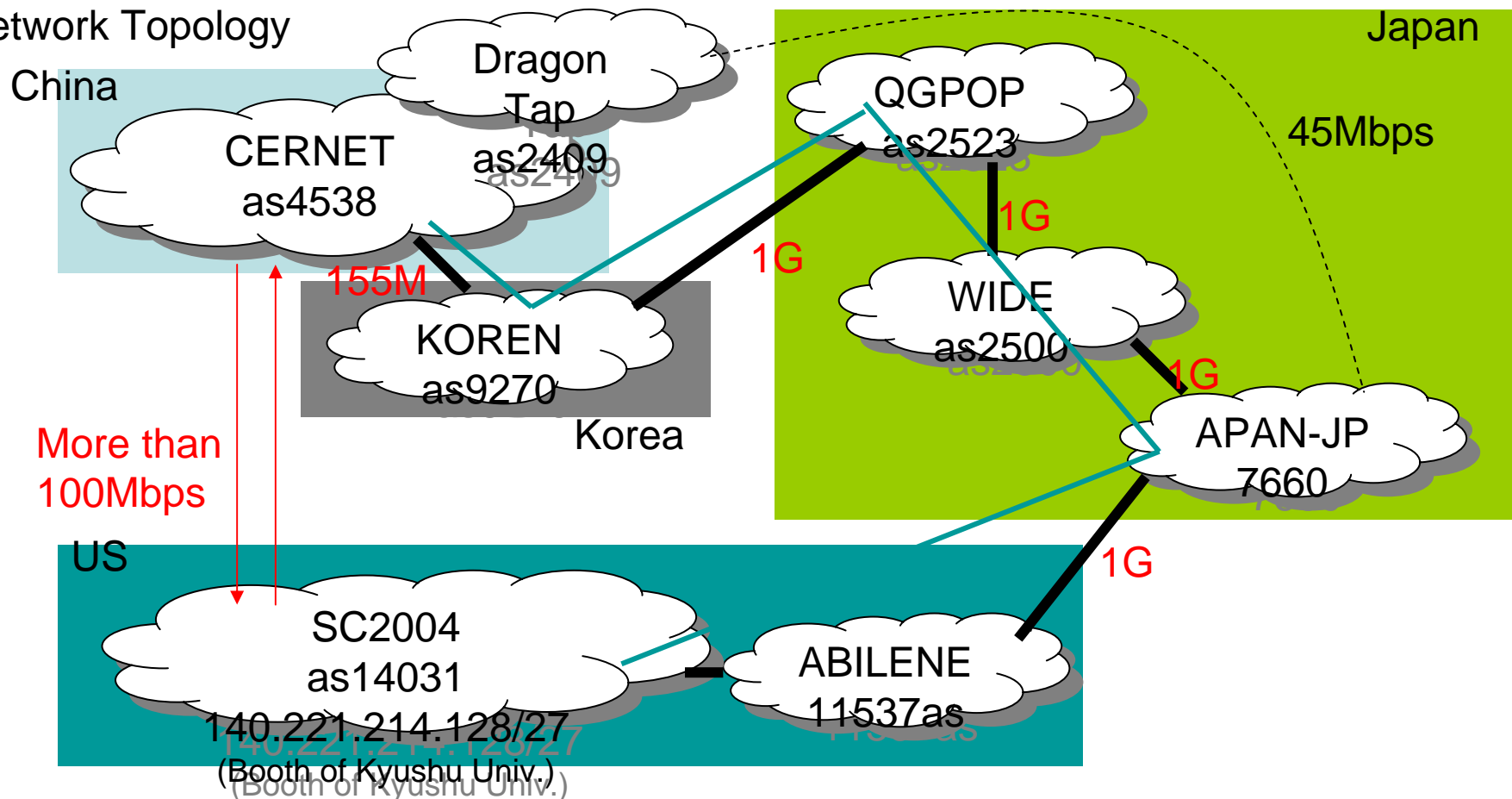 - Widening participants: CJK & SEA countries

SC2004 Challenge Award

- **Where: Nov 2004 @ SC 2004 conference (Pittsburgh, US)**
- **Title: CJK Bandwidth Challenge Award**
- **Awardees: CERNET(CN), Kyushu Univ(JP), KISDI(KR)**
- **Reason: showing bandwidth to CJK**

Network Topology

China

Japan

Dragon Tap as2409

CERNET as4538

QGPOP as2523

45Mbps

1G

1G

WIDE as2500

155M

1G

KOREN as9270

Korea

APAN-JP 7660

More than 100Mbps

US

1G

SC2004 as14031 140.221.214.128/27 (Booth of Kyushu Univ.)

ABILENE 11537as

TEIN2 Meeting @ CN, TH, SG, KR (Sep 04–May 05)
Participation: Asian ASEM members + EU + …

Event & Task 2005

- **Promotion & expansion of Joint R&A**
  - Policy notice on utilization of backbone links of prime stakeholders

- **APII Workshop 2005**
  - Organization com. & program com. b/w NICT & KISDI
  - 5-6 Sept 2005, Seoul

- **Asian DHX Forum 2005**
  - Organization com. & program com.
  - 6 Sept 2005, Seoul

New Phase of APII/TEIN in cooperation with Global Links

Previous Focus

Establishment & expansion of intra-regional connectivity

Future Direction

Both, intra-regional & inter-regional

Develop & Promote joint R&A efforts, utilizing APII Links & global Links connected to APII

Collaboration for Common Prosperity

Strengthen and Cooperate Linked Initiatives: APII, TEIN/TEIN2 & IRNC

New Phase of APII/TEIN in cooperation with Global Links

North Asia : C-J-K Connectivity

APII KR-JP: 1.2 Gbps (-> 10 Gbps)

APII KR-CN: 155 Mbps (-> 622Mbps ~ 2.5Gbps -> 10 Gbps)

N. Asia-S.E. Asia Connectivity

TEIN2 Intra-Asia Connectivity:45Mbps~622Mbps(or 2.5Gbps)

Participants: (CN, MY, ID, TH, VN, PH), (KR, JP, SG),...APAN

N. Asia - EU, N. America Connectivity

APII KR-US: 1.2 Gbps

TEIN2 (Asia-Europe): 622 Mbps or 2.5 Gbps

Thanks !!

For more information - www.apiicc.org