

# グローバルリサーチネットワーク 「新しい使命」

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Jun Murai  
WIDE Project  
KEIO University



WIDE

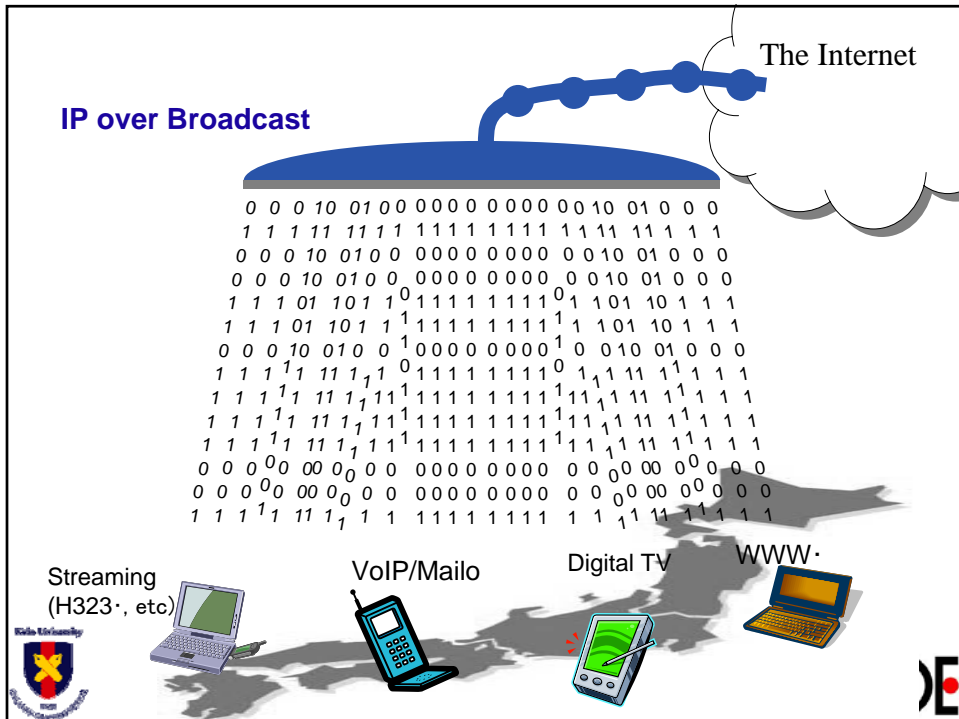
## てんこ盛り、研究ネットワークの使命

1. 先端ネットワーク技術の開発
2. 先端ネットワーク運用技術の確立
3. 商用ネットワークとの連携
4. 情報通信技術人材の育成
5. 国際情報社会推進への貢献
6. すべての科学技術関連領域の発展基盤

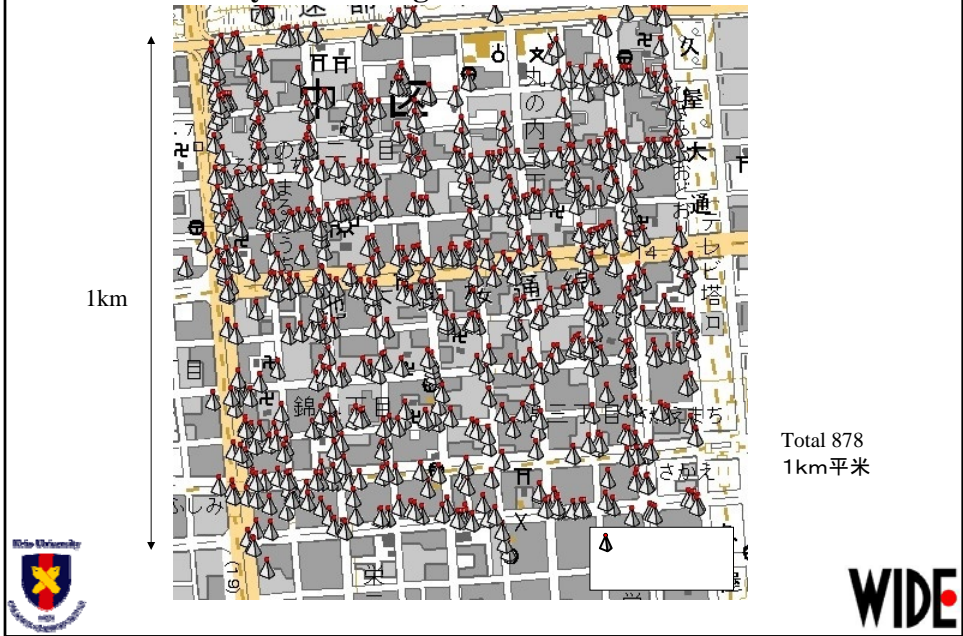


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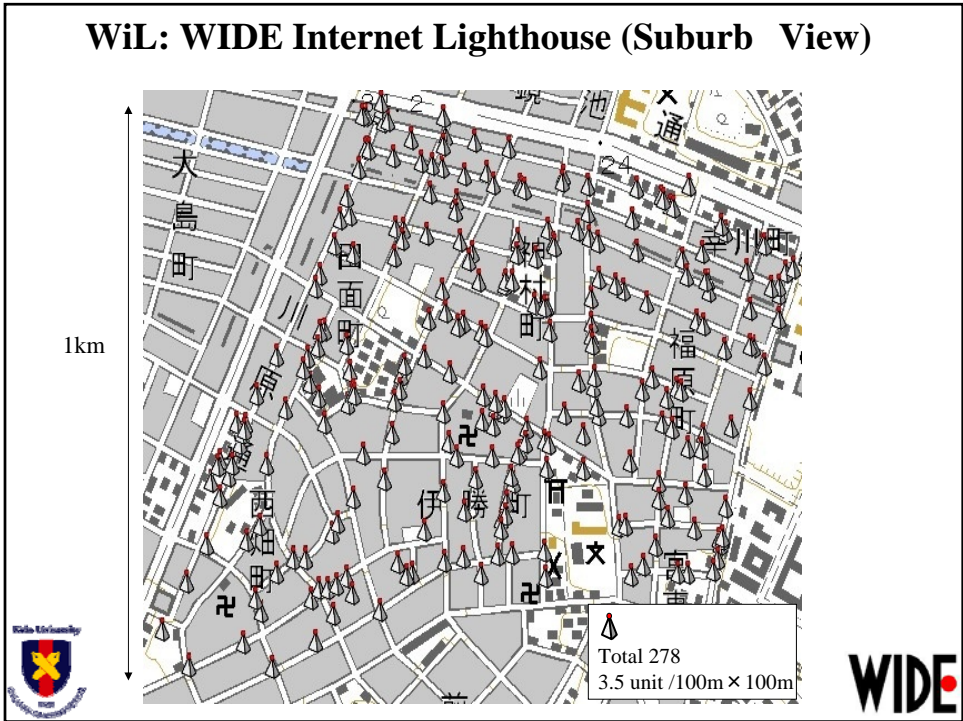
# ケーブルだけじゃない



**WiL: WIDE Internet Lighthouse (City View)**  
**(WiL=Locky + PlaceEngine)**



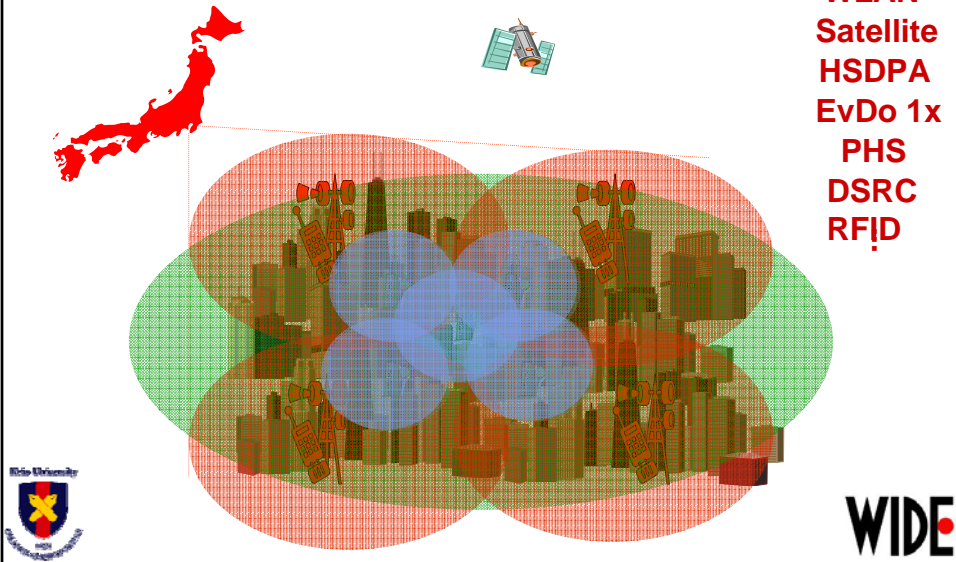
**WiL: WIDE Internet Lighthouse (Suburb View)**



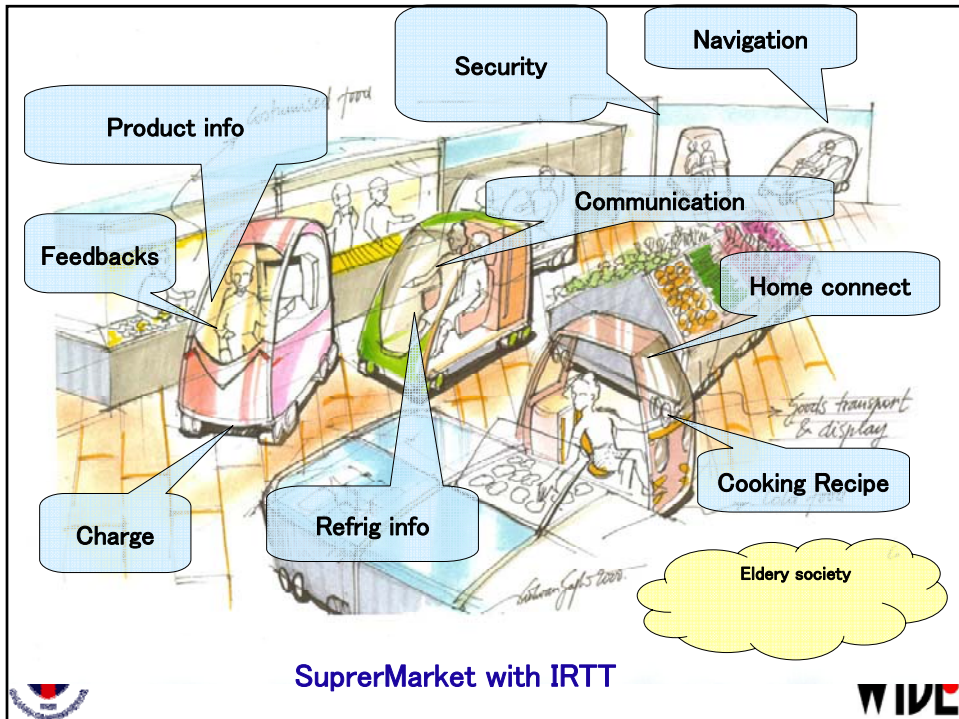


# Digital Information in the Air

WiMAX  
WLAN  
Satellite  
HSDPA  
EvDo 1x  
PHS  
DSRC  
RFID



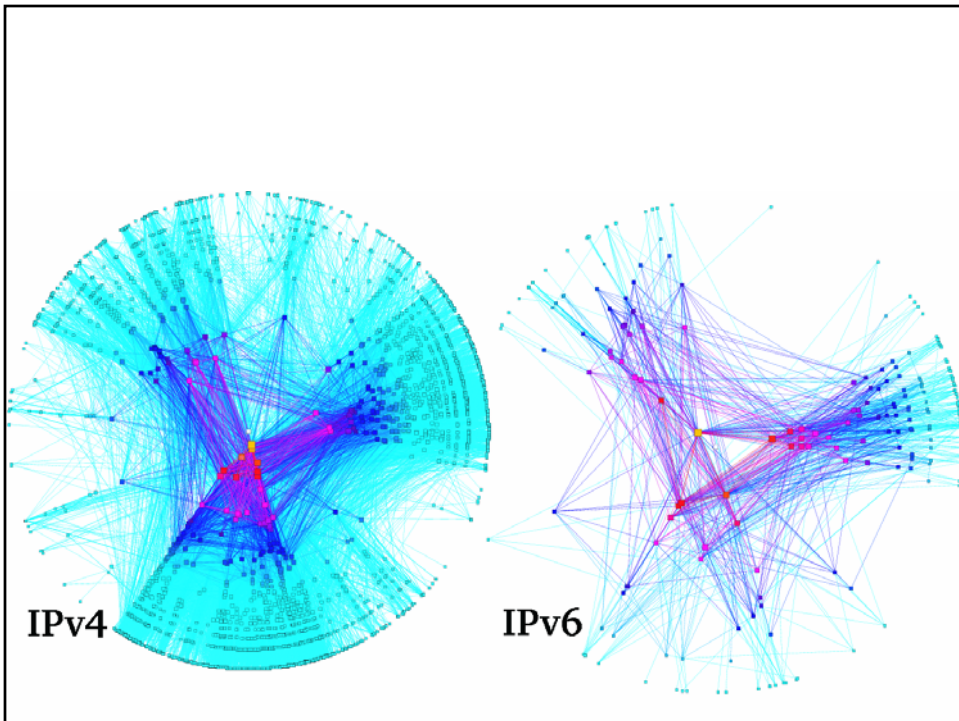
**WIDE**



**SuperMarket with IRTT**

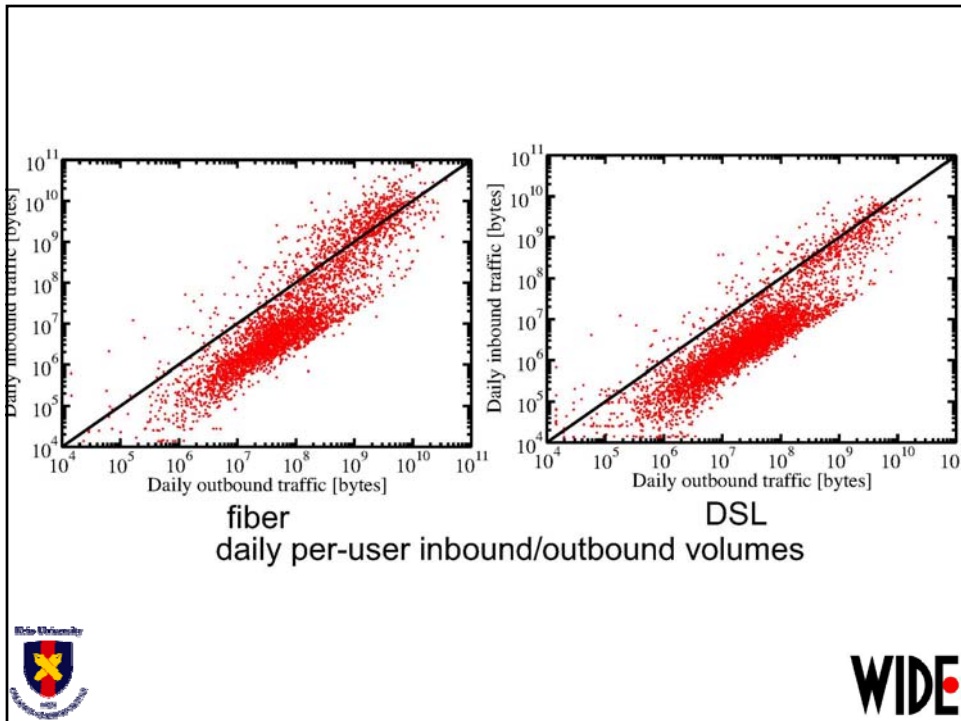
**WIDE**



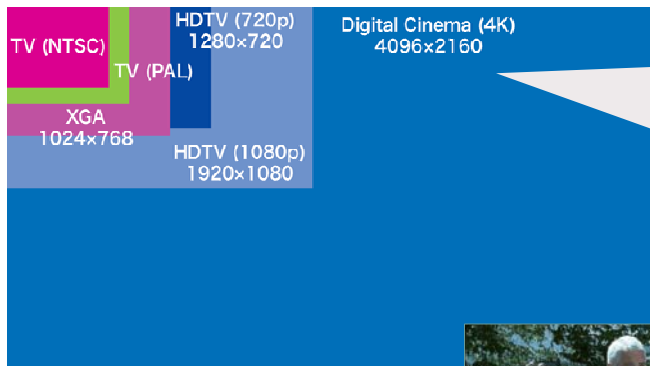


**Broader**

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## 4K Digital Cinema - Format

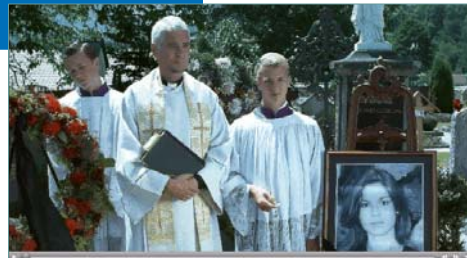


✓ Comparison of screen resolutions for TV, computer display (XGA), HDTV and digital cinema

✓ The higher the resolution, the clearer and more realistic the picture

✓ The 4K Digital Cinema format has been developed by members of DCCJ (Digital Cinema Consortium Japan) with contributions from DMC researchers

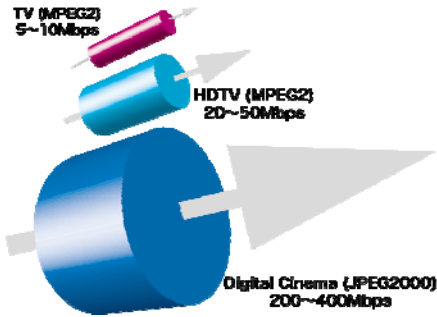
✓ The format has been approved as an international standard by DCI (Digital Cinema Initiative)



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# 4K Digital Cinema - Transmission



✓ DMC, in cooperation with NTT, UCSD and UIC, achieved the world's first successful transmission of a real-time 4K digital cinema stream across the Pacific Ocean in September 2005

✓ This proved that global giga-bit networks can be formed to transmit ultra-high resolution moving images for academic, educational, medical and cultural applications



# Sound Education for Children

Cultivating aesthetic sensibility in elementary school pupils through sound



<http://sound.yochisha.keio.ac.jp/dmc/>



# Broader and Faster

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WIDE



WIDE

## Remote Live Music Session at 2005 World Exposition, Aichi, Japan

“Delayed Live Music Session between Aichi and Amsterdam”

Dual Direction Collaboration with Ultra Long Distance Internet HDTV

Aichi



Amsterdam



Closing forum “EXPO 2005 International Forums”



## Real-time, Peer-to-Peer, Multicast Communication Across the World



Yonsei University (Seoul) Tsinghua University (Beijing)  
University of Cambridge (Cambridge) Keio University (Tokyo)  
San Francisco Global Studio (SF)



## DMC Institute International Symposium: Convergence: Towards A New Paradigm for Creative Society



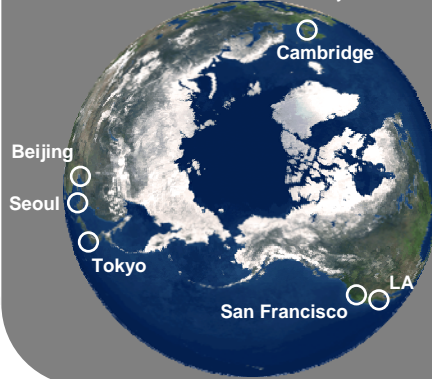
✓ All operational Global Studio locations participated in our 5th international symposium



The symposium concluded with all participants signing the DMC Manifesto towards the Creative Society (online)

### Intensive Discussion using the Global Studios

- Talking Circle 1: Content design
- Talking Circle 2: Media convergence in creative society
- Talking Circle 3: Distributed and autonomous creative society



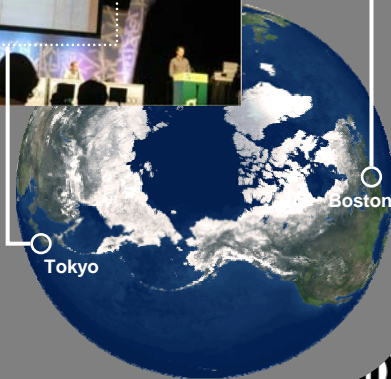
## Teleconferencing across Pacific and American Continent: at SIGGRAPH2006



✓ Using Global Studio technology, DMC has successfully connected Tokyo and Boston via a high-speed network to enable teleconferencing at SIGGRAPH2006, the most renowned international conference in the world in the field of digital content technology, for the first time in its history



As a result in 2006, teleconferencing via this technology will be incorporated into the official program from next year



## Next-generation Application of High-speed Networks and Multi-Screens



✓ Players in different locations must cooperate by using the 9 floor panels in their room to maneuver a satellite without being hit by meteors

DMC, in cooperation with USC, has developed "Andrew Revolski," an interactive game in which players in remote sites need to cooperate to achieve a common goal

✓ This game makes use of global giga-bit networking and multi-screens

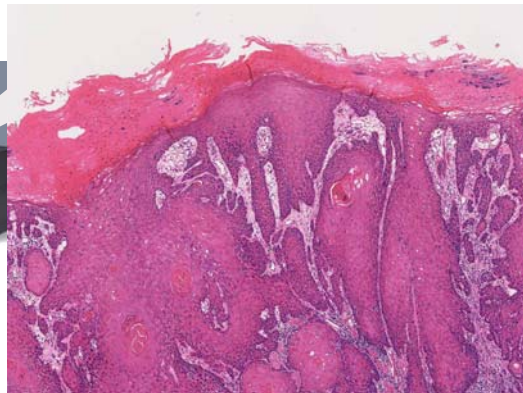


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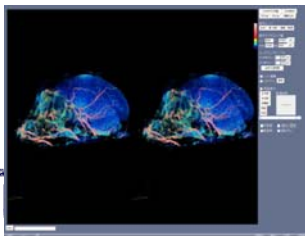
## IT Revolution in Medical Education

✓ Zooming in on organic samples without a microscope

NanoZoomer Digital Pathology  
By Hamamatsu Photonics



✓ Development of an anatomical 3D atlas of the marmoset

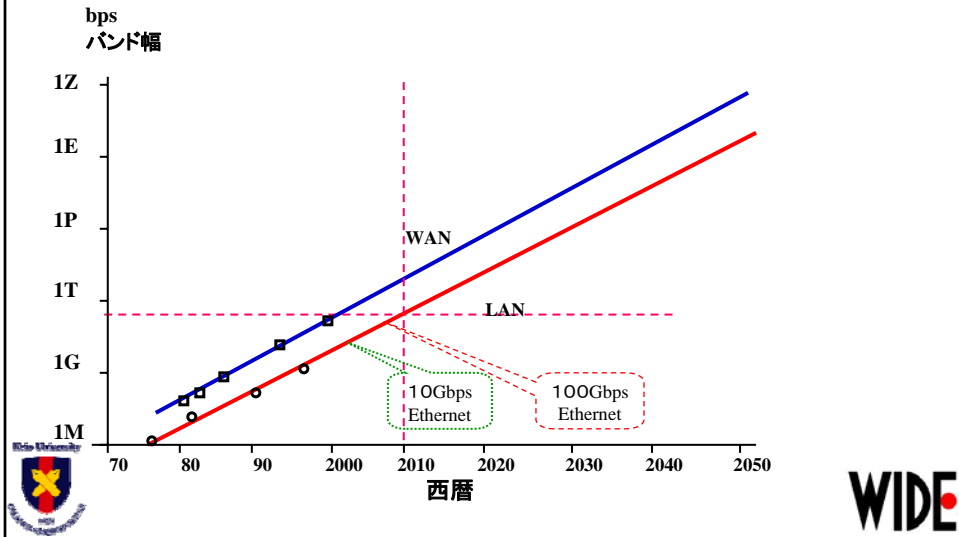


✓ Digital interactive pathological/anatomical samples are used in medical education at schools, but are also accessible from anywhere via the Internet to promote distance learning

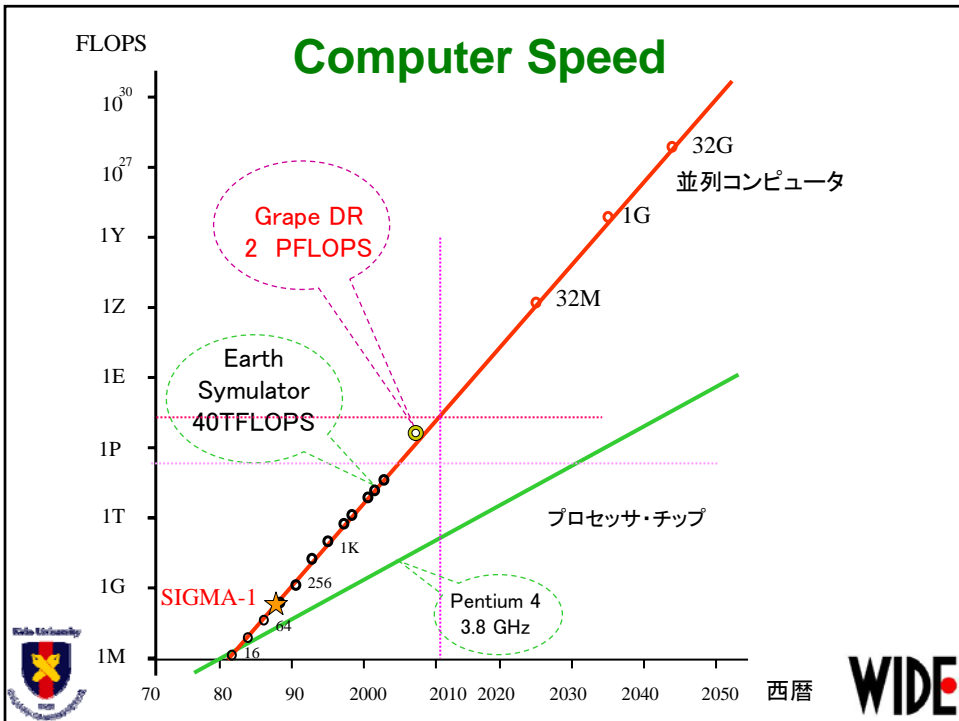
✓ This opens up possibilities for the global sharing of medical knowledge, but a solution for intellectual property and privacy issues still needs to be found

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# Network Speed



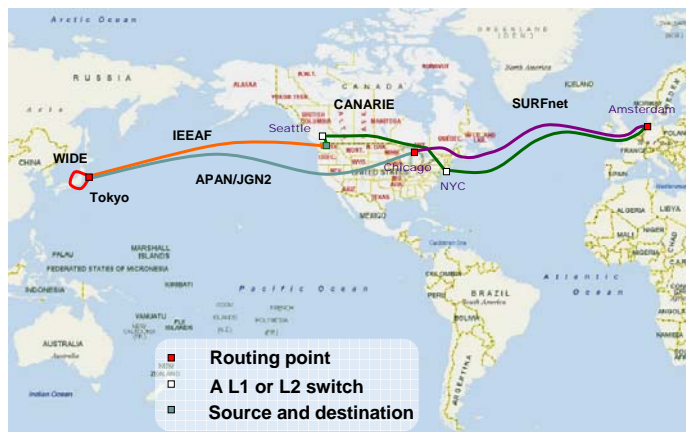
# Computer Speed

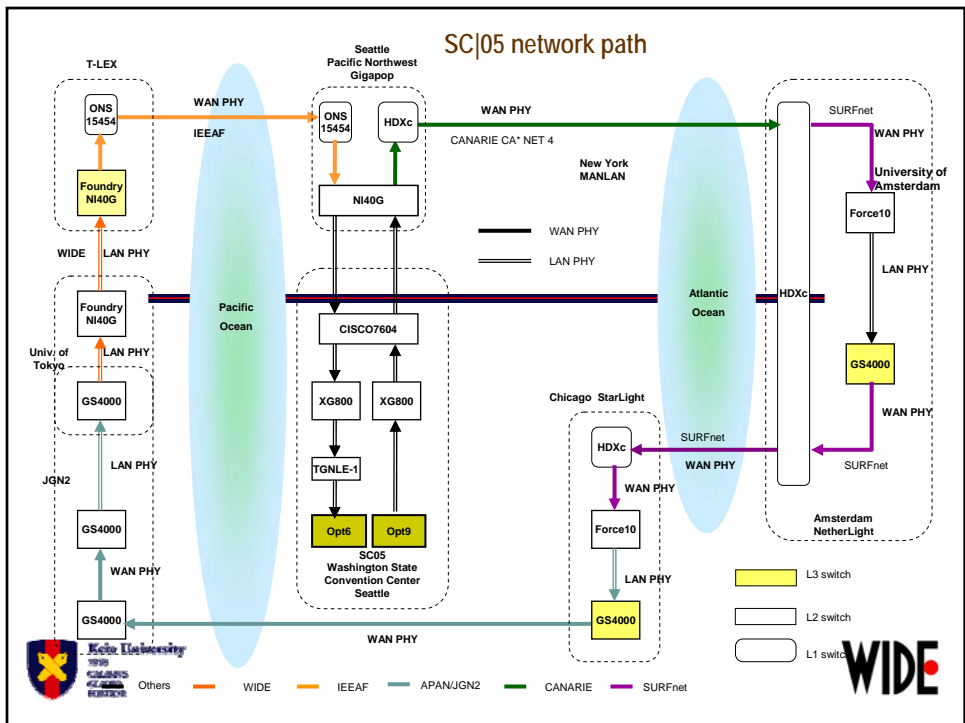


## LSR Trophies presented Apr 2006



### SC|05 network path map



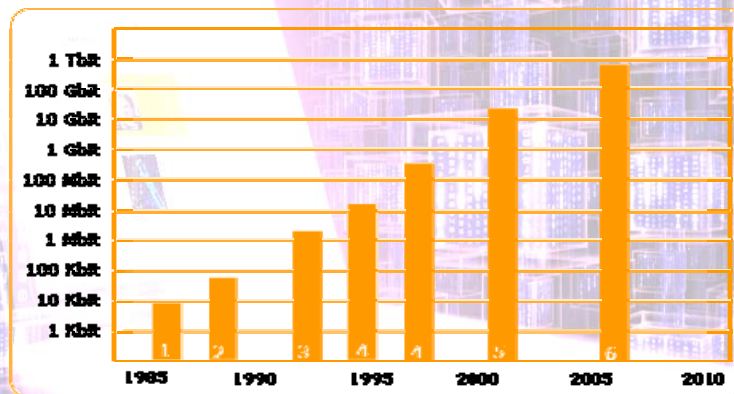




# Light Path



## Surfnetの推移とトラフィック量



## 先端科学技術研究からの要求



CERN Atlas Pit construction



## Coverage

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# SOI (School On Internet) Asia -based on satellite Internet technology

## 24 Partner Universities in 12 Countries

### Thailand

Chulalongkorn University, Asian Institute of Technology, Chulachomkiao Royal Military Academy, Prince of Songkla University

### Laos

National University of Laos

### Myanmar

University of Computer Studies

### Indonesia

Brawijaya University, Sam Ratulangi University, Hasanuddin University Kampus Tamalanrea, Institut Teknologi Bandung, Universitas Syiah Kuala

### Malaysia

Universiti Sains Malaysia, Asian Institute of Medicine, Science & Technology

### Vietnam

Institute of Information Technology

### Philippines

Advanced Science and Technology Institute, University San Carlos

### Nepal

Tribhuvan University

### Cambodia

Institute of Technology of Cambodia

### Bangladesh

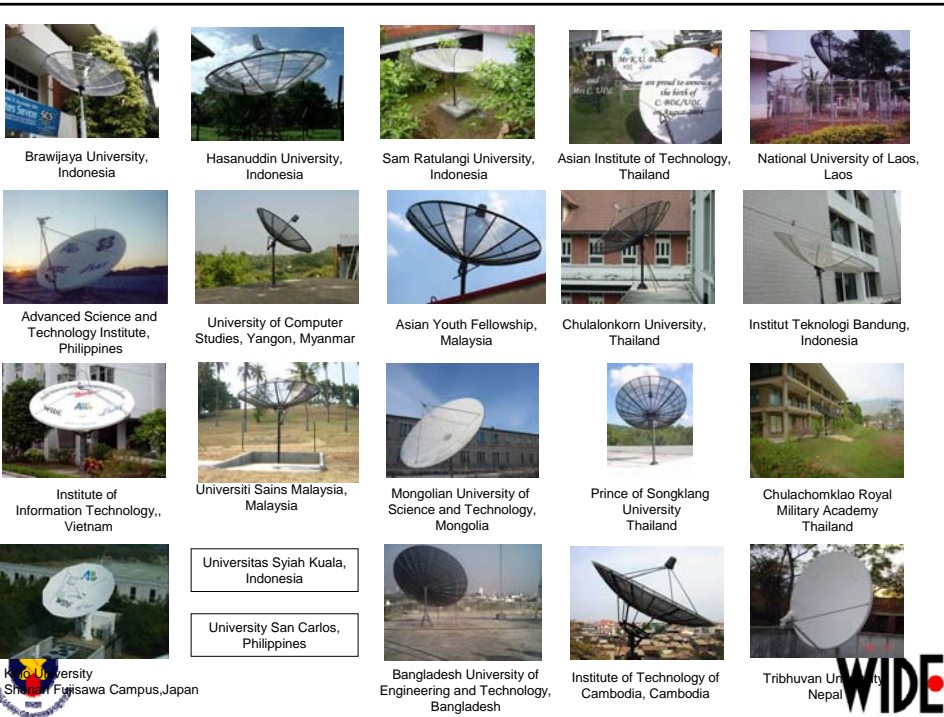
Bangladesh University of Engineering and Technology

### Mongolia

Mongolian University of Science and Technology

### Japan

Tohoku University, Tokyo University of Marine Science and Technology, Japan Advanced Institute of Science and Technology, Keio University



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## Understanding and Solving Real-world Problems at SOI Asia -Tsunami Disaster Recovery Project

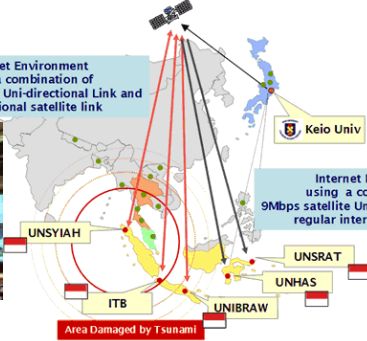
Keio University and SOI Asia assisted Universitas Syiah Kuala, the largest national university in Indonesia, by providing distance learning during its recovery from the tsunami.



Photos by Chermg Talay Subdistrict Administration Office



Internet Environment using a combination of 9Mbps satellite Uni-directional Link and bi-directional satellite link



Tsunami Symposium on SOI Asia network



## Annual SOI Asia Operators Workshop (in 2005 at Brawijaya University, Indonesia)



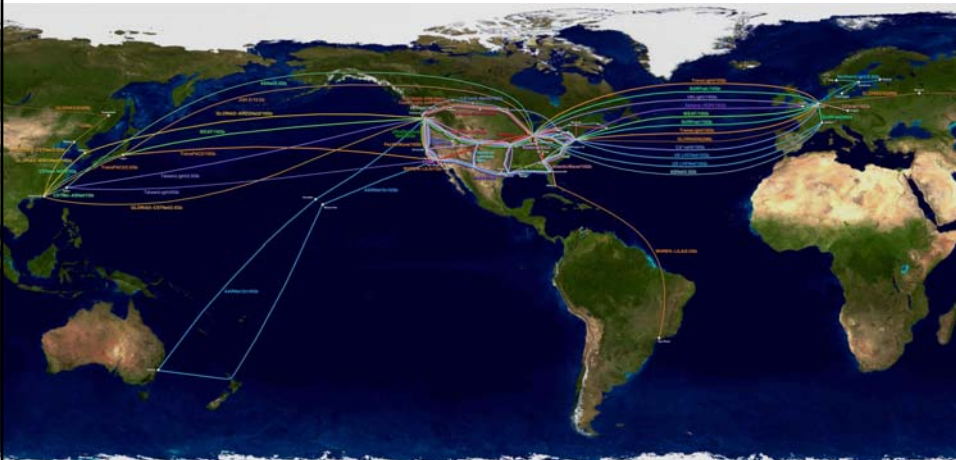
# Broader and Faster

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## Global Lambda Integrated Facility World Map – August 2005

International Research & Education Network bandwidth, to be made available for scheduled application and middleware research experiments by August 2005.



Visualization courtesy of Bob Patterson, NCSA/University of Illinois at Urbana-Champaign.  
Data compilation by Maxine Brown, University of Illinois at Chicago. Earth texture from NASA.



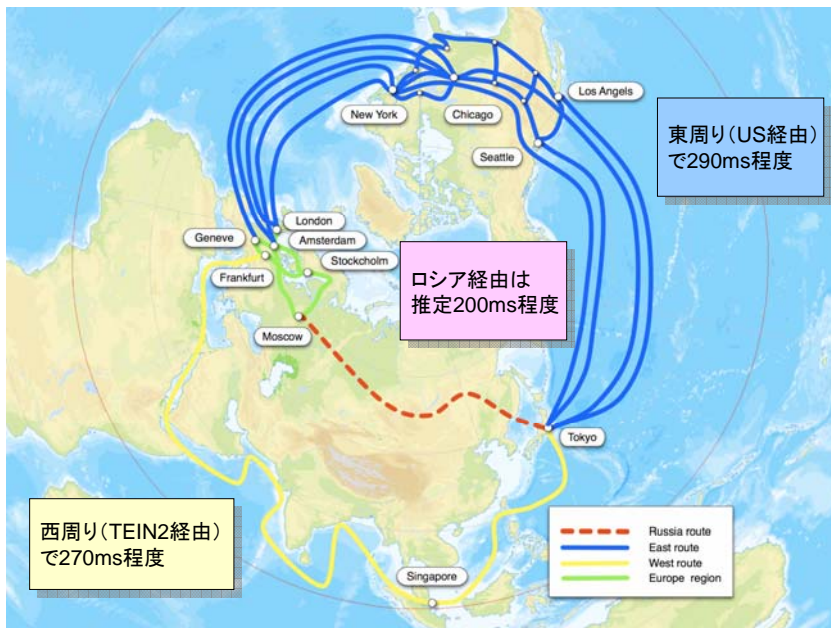


# GLIF Points

- [AMPATH](#) - Miami
- [CANARIE-StarLight](#) - Chicago
- [CANARIE-PNWGP](#) - Seattle
- CENIC - Los Angeles
- [CERN](#) - Geneva
- CzechLight - Prague
- HKOEP - Hong Kong
- [KRLight](#) - Seoul
- [MAN LAN](#) - New York
- [NetherLight](#) - Amsterdam
- [NorthernLight](#) - Stockholm
- [Pacific Northwest GigaPoP](#) - Seattle
- [StarLight](#) - Chicago
- [T-LEX](#) - Tokyo
- [UKLight](#) - London



## 学術NWにおける日欧伝送遅延

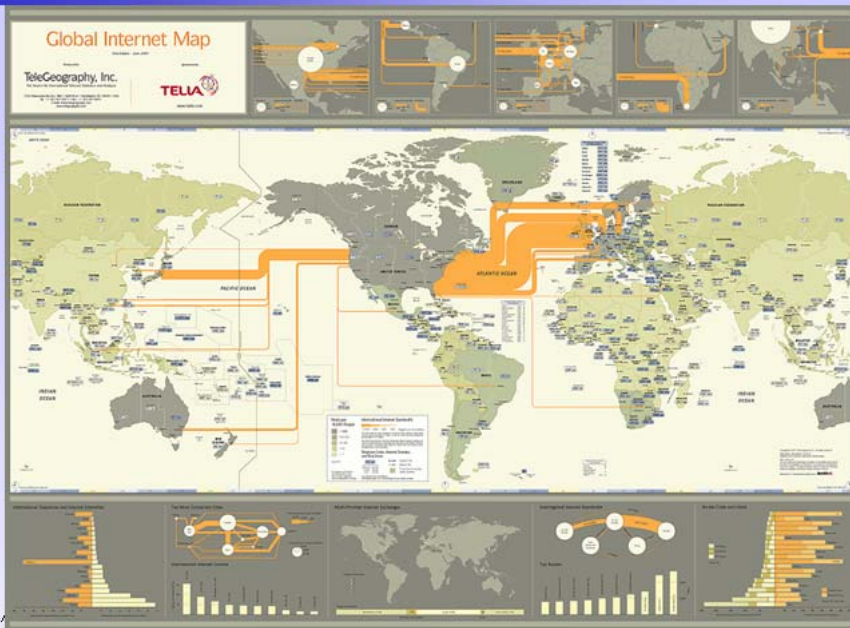


# 日本は「さいはて」

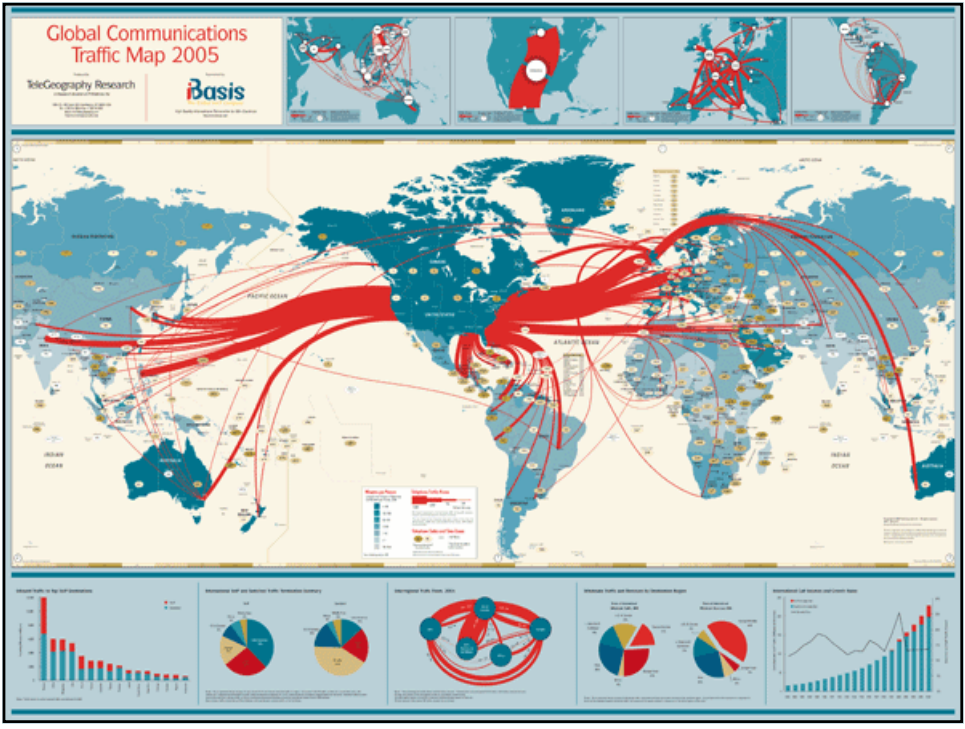
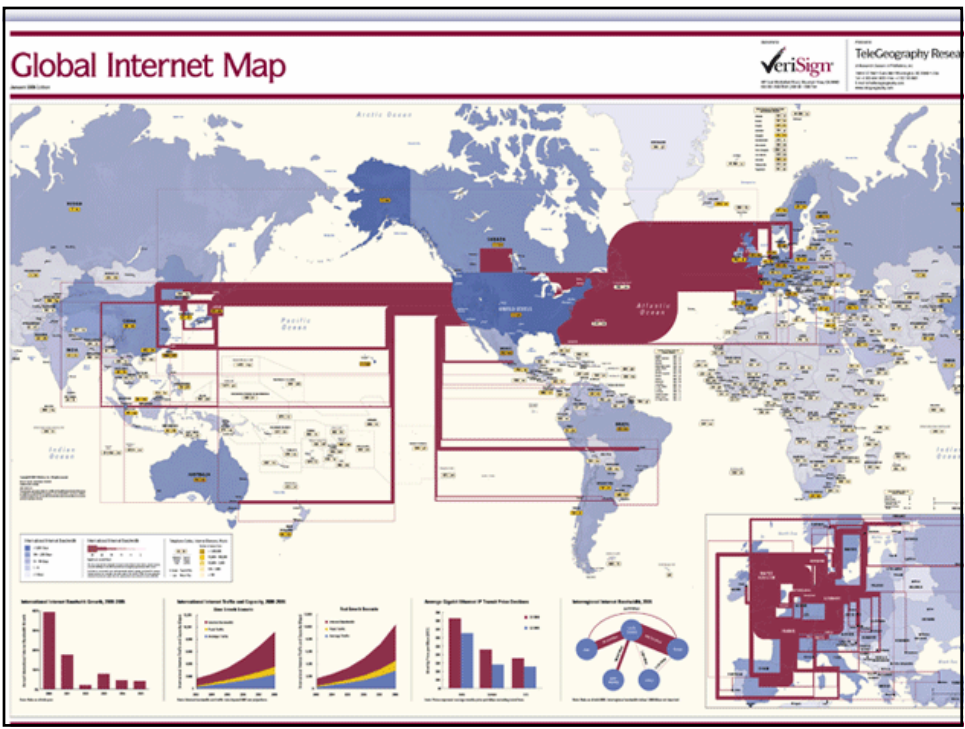
Far WEST



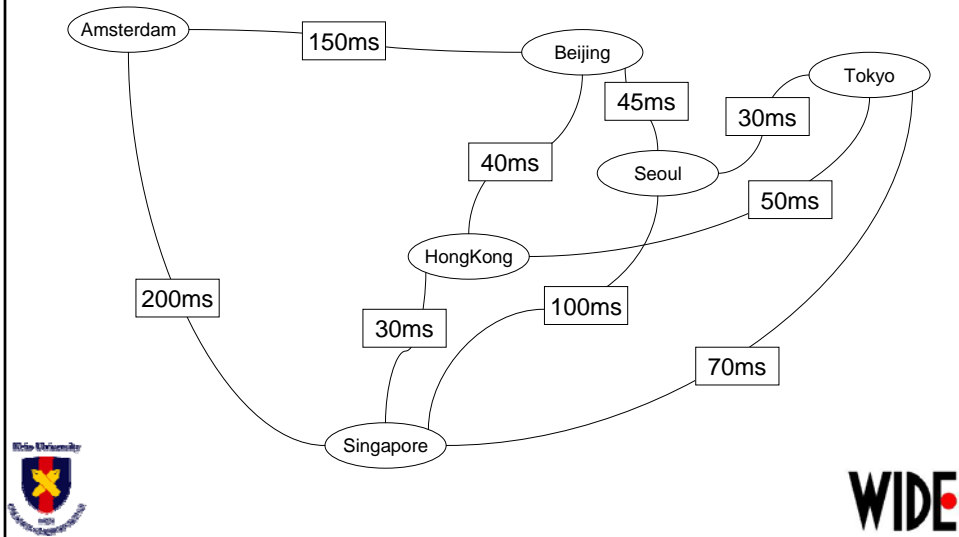
## 2001 Internet Traffic



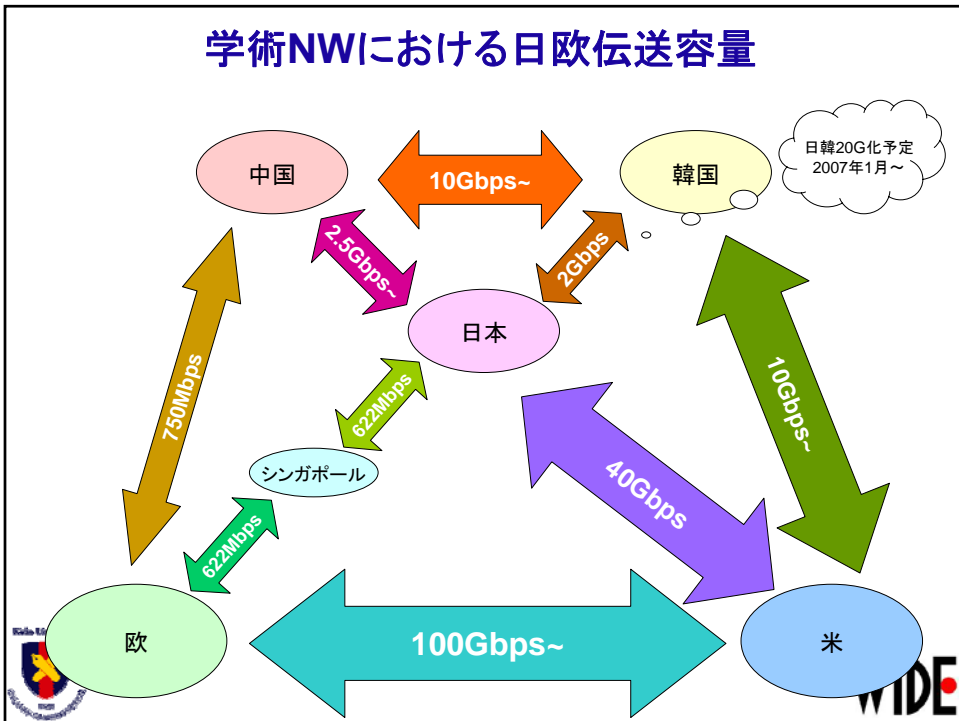




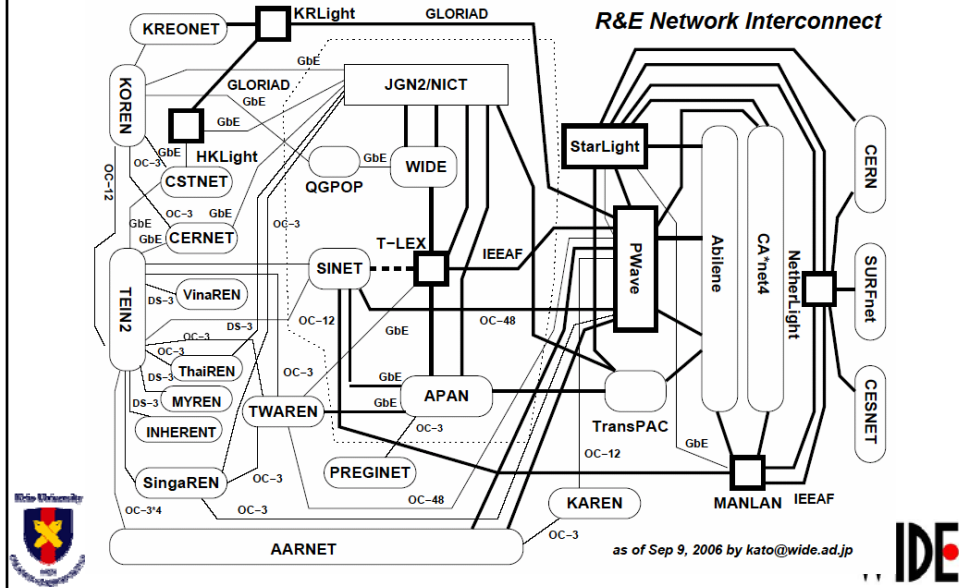
## 欧州～アジア都市間伝送遅延



## 学術NWにおける日欧伝送容量

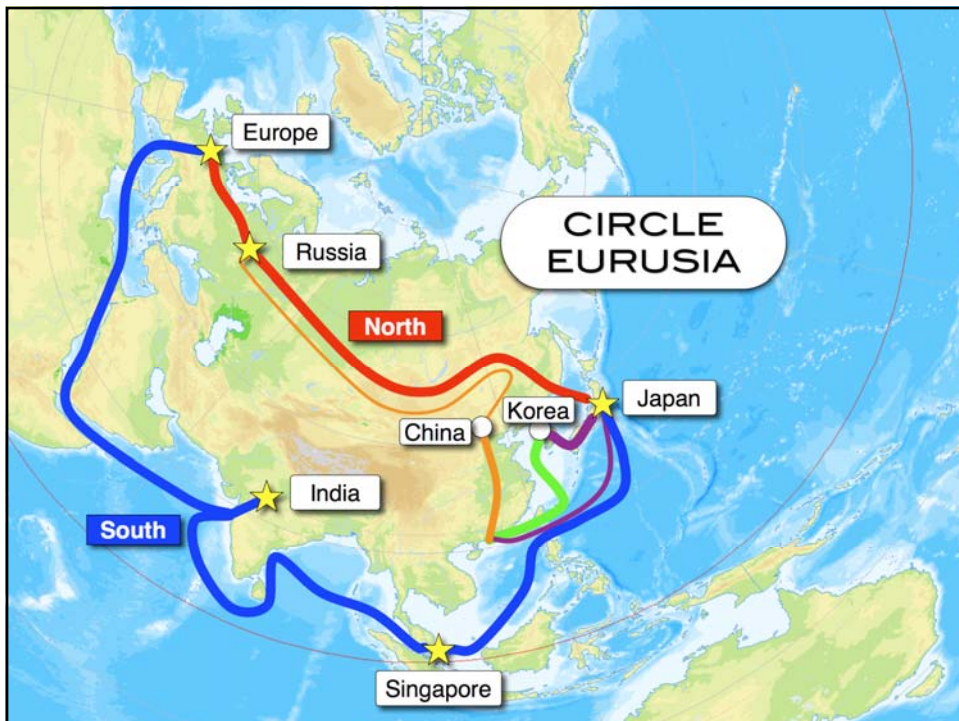


# All Japan (very rare diagram!)



# Circle eurasia.net





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未来グローバルICT社会

**JGN**の役割!



**WIDE**