

# Toward this year's high performance demonstrations

25 August 2005  
APAN NOC session  
Taipei

Jin Tanaka  
APAN-JP/JGN2 NOCs  
KDDI

# Agenda

1. Background
2. Brief of this year's high performance demo
3. Review of the lessons and learned from last year's demo support
4. NOC function and preparation situation
5. Current global network topology
6. Proposal for success

# Background

- APAN-JP and JGN2 NOCs are supporting numerous overseas demonstrations conducted by Asian network researchers.
- With further speed-up of backbone network and increase of application bandwidth, network performance is attracting attention.
- Meeting with growth of our networks, to realize satisfactory network environment for researchers is a major challenge for NOC.
- In supporting high performance demos over high-speed international networks, possibilities of next generation application will be brought out.

# Brief of this year's high performance demo

- iGrid2005 Sep 25-29 in San Diego US
  - Several demos are expected to be held between Japan and the venue
    - Digital Cinema/UDT bulk transfer/HD conference/Data reservoir/eVLBI ...etc.
  - A good opportunity for rehearsal of SC/05
  - <http://www.igrid2005.org/>
- SC(Super computing)|05 Nov 12-18 in Seattle US
  - Numerous demos from Asia are expected. Especially Bandwidth Challenge is the highlight of all the events for us. And winning prizes as last year is aimed for.
    - UDT bulk transfer/Data reservoir/eVLBI/Space Forecast...etc.
  - <http://sc05.supercomputing.org/>

# Review the lessons and learned from last year's SC demo support (I)

- Scheduling

- It is important for NOC and participants to consult with each other for scheduling not only live performances but also preliminary tests.
- Web page supported by NOC should be effectively utilized among participants and other concerned parties.
- It is necessary to share the information on participants' requests to NOC.
- It is necessary to detect other high-performance traffics that may cause congestion.

- Reliability of network equipment

- Equipment OS should be upgraded to the reliable latest version beforehand.
- It is advisable to use equipments that have been actually used for long-distance high-performance demos.
- Equipment vendors' supporting should be strengthened.

# Review the lessons and learned from last year's SC demo support (2)

- Difficulties in measuring network performance
  - Packet loss is critical in realizing TCP high-performance under long distance network environment. In a demo of the last year, we failed to isolate the point of packet loss and could not achieve expected performance.
  - It is desirable to allow NOC to monitor as many interface counters from remote as possible.
  - Preliminary tests could not be conducted satisfactorily as machines were set up on the venue immediately before the actual live performances.
- Selecting route from Asia to venue
  - With multiple networks existing in Japan, Japan-US and US domestic, there were multiple possible routes toward the venue. There were some signal cases where set-up was delayed due to indecisiveness in selecting the route.
  - NOCs should investigate end-to-end network topology in the early stage.
  - It seems necessary to hold early consultation between NOCs and participants long before demo performance.

# Review the lessons and learned from last year's SC demo support (3)

- Handling of circuit down

- It is necessary to request circuit carriers to strengthen support and put off maintenance works before/during demonstrations and experiments.
- Preparing backup route against Japan-US circuit down is necessary.
- Uncompressed HDTV demo at JGN2 symposium in January 2005 was successfully performed on a backup route.

[http://www.calit2.net/news/2005/1\\_18-05\\_HDTVJapan.html](http://www.calit2.net/news/2005/1_18-05_HDTVJapan.html)

<http://www.wide.ad.jp/news/press/20050127-JGN-e.html>

# NOC function and preparation situation

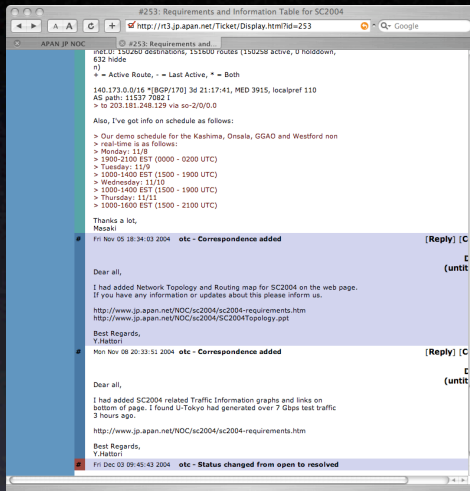
## - System -

- APAN/JGN2 NOC members should be able to give support to participants both at Japan and at the venue in US. Such function should be prepared.
- Using instant messages, IP phones etc. will allow real-time response.
- Collaboration and information-sharing with StarLIGHT, SCinet etc. should begin in the early stage.
- Equipment vendors' support should be strengthened for important demos.
  - Cisco, Juniper, Force10, Foundry, AlaxalA(Hitachi),
- Special web page will be prepared for this year again for information-sharing with participants and other NOCs.
  - for iGrid2005 <http://www.jp.apan.net/noc/iGrid2005/>
  - for SC|05 <http://www.jp.apan.net/noc/sc2005/>
- Ticket system (Request tracker) will be used again for information-sharing.



# NOC function and preparation situation

## -Ticket System(Request Tracker)-



Information Sharing among Participants

Request

Support

### Participants

- tatebe (Osamu Tatebe:AIST), shimizu (Toshiyuki Shimizu:AIST), aida (Kento Aida:TITECH), kudoh (AIST), f-okazaki (OKAZAKI fumihiro)
- hiraki (Kei Hiraki:TokyoUNIV.), mary (TokyoUNIV.), makoto (TokyoUNIV.), yama (Seiichi YAMAMOTO:TokyoUNIV.)
- kitaq-e2ecc (JGN2 Kitakyushu RC)
- oka (Koji OKAMURA:KyushuUNIV.), kasahara (Yoshiaki Kasahara:KyushuUNIV.), tabaru (KyushuUNIV.)
- sobue.shinichi (JAXA), fujita (Naoyuki FUJITA:JAXA), ookawa (JAXA), yaz (Katsumi Yazawa:Fujitsu), t.kai (Fujitsu), mshino (Fujitsu), kaz (Fujitsu), tsukahara.tomoh (Fujitsu), k-yamauchi (Fujitsu)
- kobayashi (Masahiro Kobayashi:Tsukuba-WAN), kazmiya (Kazutaka Miyasaka:MAFFIN), shogo (Shogo Fujii:OsakaUNIV.)

Trouble-shooting, Provisioning

Request

### Oversea NOC members

- jhlee (Lee, Jaehwa:APAN-KR), kihwan (Kihwan Kwon), chrobb (Chris Robb:GlobalNOC), jhicks (John M Hicks:GlobalNOC)

### JP NOC members

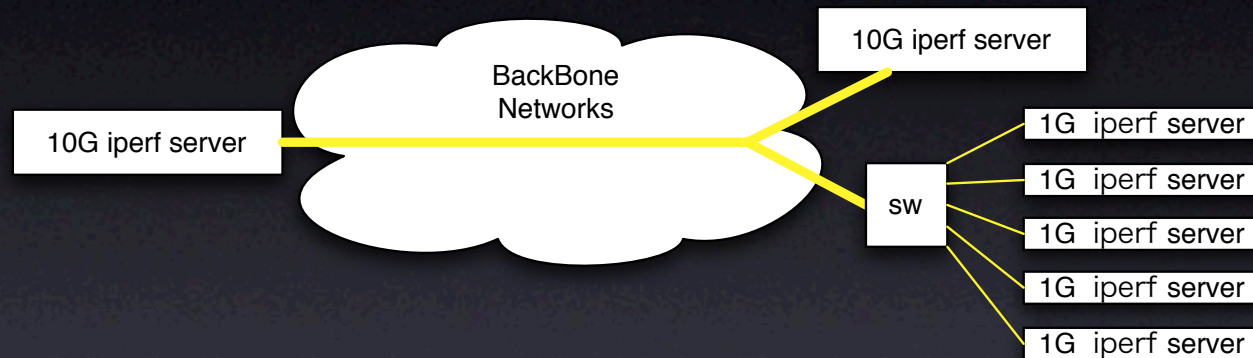
- ikob (Katsushi Kobayashi), zhang (NICT), kato (Akira Kato:WIDE), kitaji (Yoshinori Kitatsuji), konish (APAN), kita (KITAMURA, Yasuichi), masaki (Masaki Hirabaru), akiyama (OsakaUNIV.), eguchi (EGUCHI Hisashi:MAFFIN), goto (APAN), s.sekiguchi (AIST), suguru (WIDE), machi (NICT), jin (Jin Tanaka:APAN/JGN2), hattori (Yoshitaka Hattori:APAN/JGN2), ki (share account:KDDIlabs), kuramochi (APAN/JGN2), watanabe (APAN/JGN2), nakai (APAN/JGN2), otc (KDDI Operators)

Collaboration

# NOC function and preparation situation

## - New tools in Tokyo XP -

- 10G measurement machine has been installed at Tokyo XP this year. If the opponent side has a similar machine, performance test at nearly 7G(one stream) will be always available.

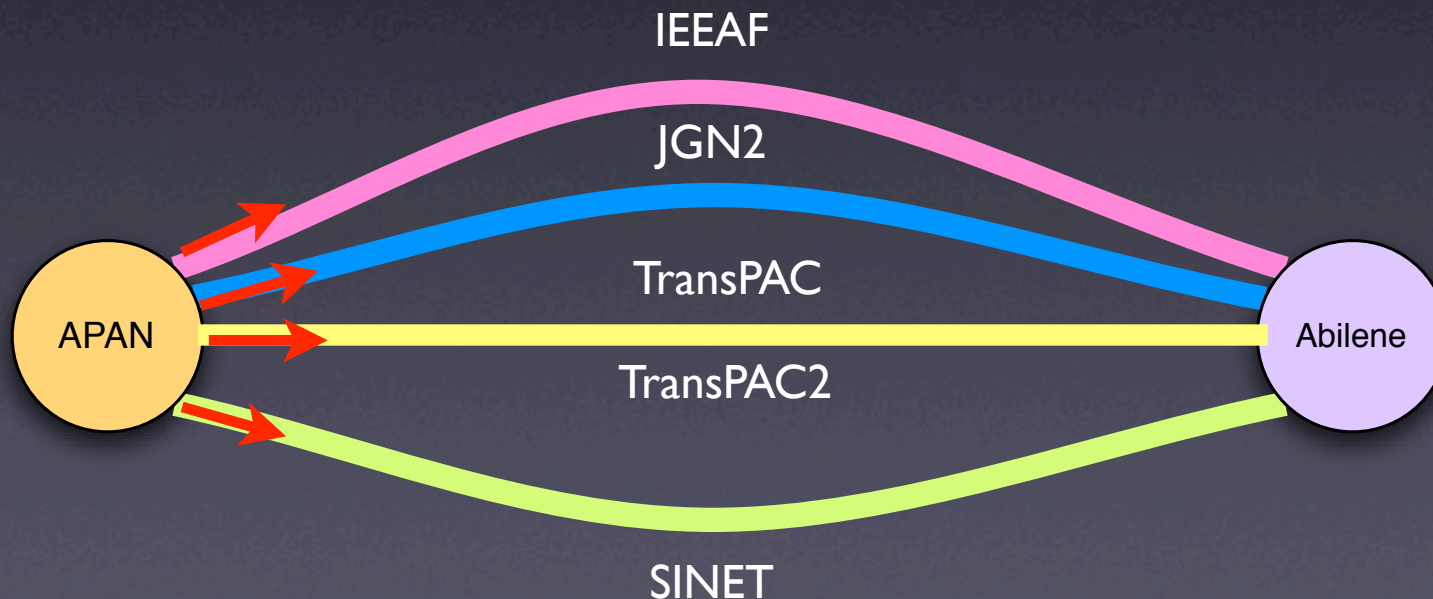


- As APAN router proxy has been completed, it will be possible to verify operation of machines within Tokyo XP without contacting operators.  
<http://tools.jp.apan.net/rp/>
- SNAPP, a high-speed traffic-graph collection/depiction tool, will allow us to know real-time traffics of participants. <http://nms2.jp.apan.net/cgi-bin/snapp/index.cgi>
- Advanced scheduler for managing network resources will bring fair network utilization and strict scheduling control for participants and NOC. => Presented by Ikeda-san@APAN Tokyo XP

# NOC function and preparation situation

## - Circuits and Network resource (I)-

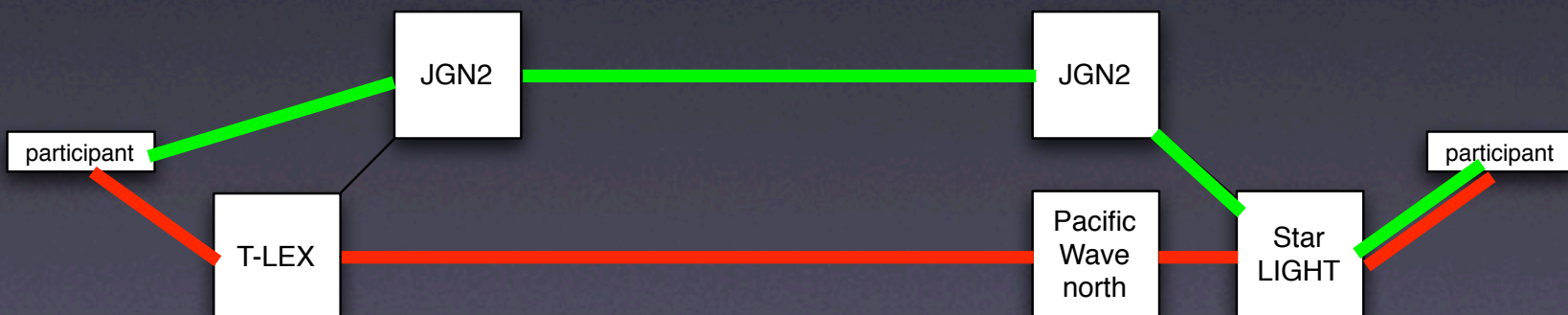
- Four JP-US 10G circuits
  - As TransPAC2 has been upgraded from 2.4G to 10G, APAN-JP can use four 10G circuits between Japan-US: TransPAC2, JGN2, IEEAF, SINET. If operation on L3 network of TransPAC2/Abilene/SINET is realized, it will satisfy users' demand for routing.



# NOC function and preparation situation

## - Circuits and Network resource (2) -

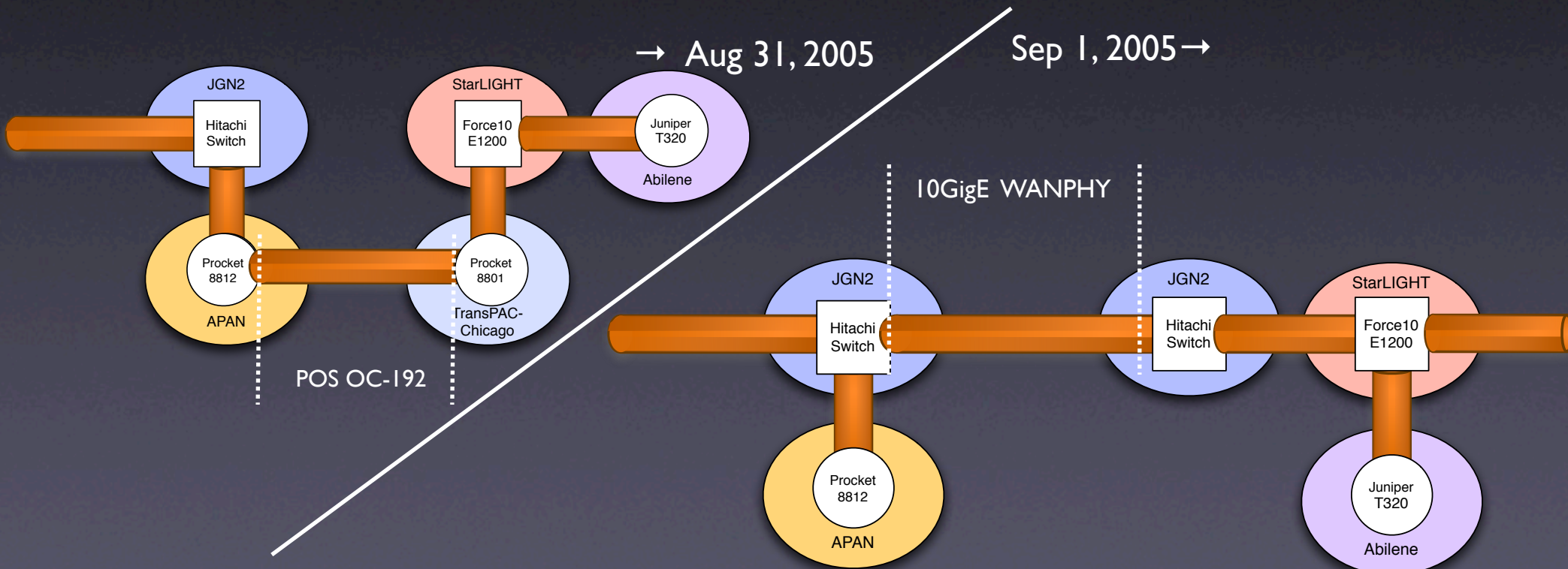
- L2 network provisioning
  - If there is no router on the L2 path established on JGN2 and/or IEEAF circuit, no automatic rerouting will be possible. So, if a backup path is counted in the early stage of networking, it will help us trouble-shoot circuit issues.
  - Provisioning for the above would be laborious compared with the case of L3, but it will be achievable if there is strong collaboration among International lambda networks.



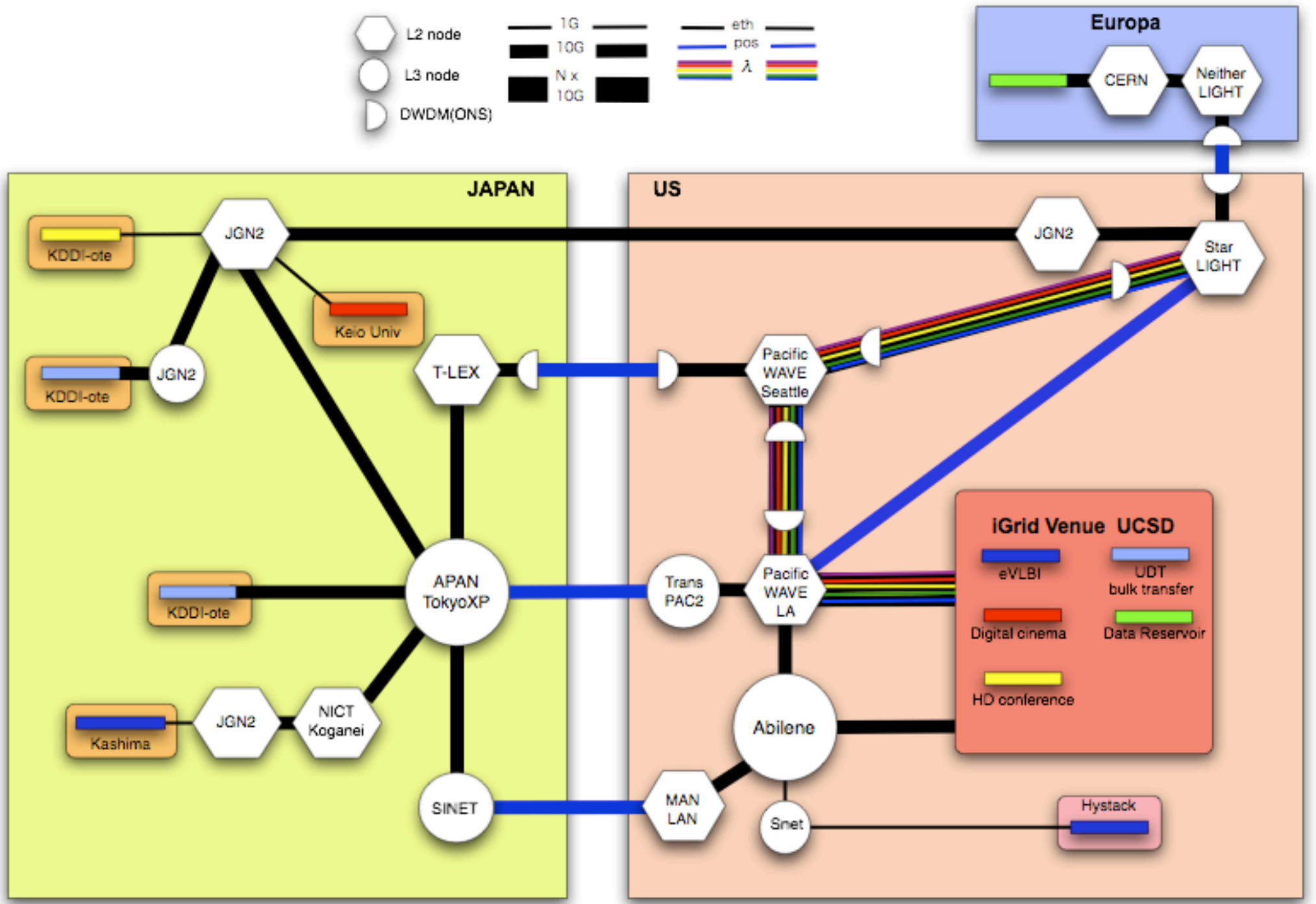
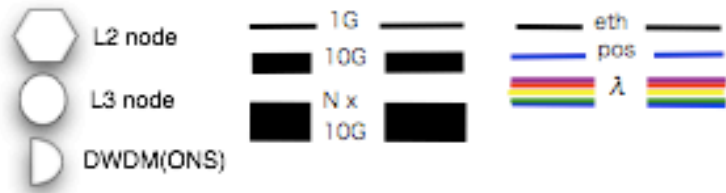
# NOC function and preparation situation

## - Circuits and Network resource (3) -

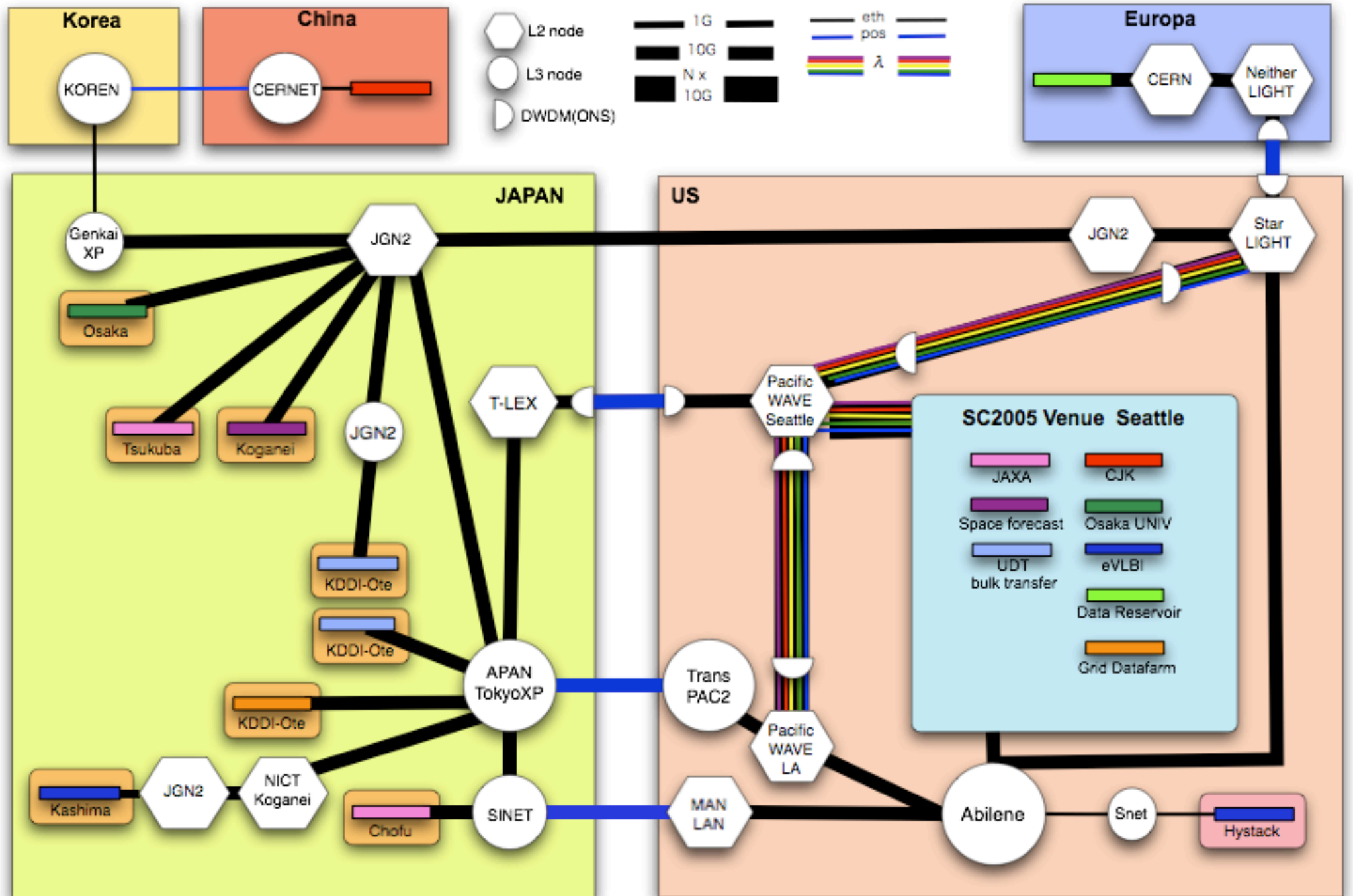
- L2 network establishment over JGN2 Chicago Link
  - L2 network is going to be established over JGN2 Japan-US Link as from September 1 this year. For this, network architecture may be altered significantly. Especially, the connection between tpr4(procket)-JGN2 SW will be changed as below and this impact on the demos is remaining unclear.



# Network topology for iGrid2005



# Network topology for SC2005



# Proposal for success

## - System -

- Definite and precise requests should be informed to NOC by participants.
  - Participants are requested to contact NOC in this opportunity. APAN/JGN2 NOC will lay out all the requests with Global NOC.
  - NOC will consult each participant based on the above information to provide the best solution.
- On-site support by APAN-JP/JGN2 NOC members
  - Limits did exist in remote operation last year. This year, some members from APAN-JP/JGN2 NOC will be staffed on the venue to support participants with SCinet NOC.
- End-to-End preliminary tests much like live performances
  - End-to-End preliminary tests are requested to be held as early as possible. Digital Cinema Team, who is going to participate in iGrid2005 in September, already completed preliminary tests in July, with the following issues cleared up:
    - ▶ It turned out that there was no problem in the performance between Tokyo and StarLIGHT machines.
    - ▶ But  $\pm 30 \mu$  or less jitter was occurred in arriving UDP packets.
    - ▶ New information was confirmed :All L2 network will be used in the live performance.



# Proposal for success

## - Network Engineering (I) -

- Successful L2 networking over JGN2 Tokyo-Chicago Link
  - On September 1, Dr. Akira Kato (WIDE) and I are trying to set up Hitachi/AlaxalA GS4000 at Chicago to establish connection between Japan-US with 10GigE WANPHY.
  - Setting of Inter-domain L2 path/lambda path is 'still' time-consuming compared with the case of L3 networking. So let us start working at once!
  - Experiences from actual operation of 10GigE WANPHY interfaces should be built up. => More intensified cooperation with circuit carriers will be needed as end users cannot see SONET errors at all.

# Proposal for success

## - Network Engineering (2) -

- Challenge to network performance on IPV6
  - Unfortunately, the experience of IPv6 performance test exceeds IG is poor, it is necessary to do the Preliminary test enough.
  - Osaka University challenged the HDTV transfer with IPv6 in SC2003 BWC, But the demonstration was not able to achieve well due to the HDTV codec trouble.
  - As Iperf machines at APAN TokyoXP and Abilene are supporting IPv6 protocol, It is expected these are useful for the checking IPv6 performance.

# Proposal for success

## - Network Engineering (3) -

- Zero packet loss in the first place !
  - In case of any performance problem, closely check interface counters with the naked eye or check them remotely.
  - Check any congestion points or interface-rate difference points as they can be the cause of buffer overflow on interface.
  - Switches have less interface buffer than routers. So be careful about them.
- Utilization of new advanced tools
  - There are several 10G iperf machines in Japan and US {APAN(ikedasan), NICT-Koganei(Hirabaru-san), JGN2-KitakyusyuRC(Kumazoe-san), StarLIGHT(UIC)}.
  - Use them in combination for trouble-shooting!
  - We are going to try to establish Hitachi/AlaxalA version of Router Proxy.
  - The new scheduling system is expected to be helpful in resource management. Operators and participants, please use it!

**Thank you !**

**If you have any requirements, please  
contact APAN/JGN2 NOC  
and Global NOC  
as soon as possible !**