



HDTV - Medical Joint Session (Demo) in APAN-NZ Meeting@Queenstown

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Memories of Michael C. Wellings

- Michael C. Wellings, a pioneer in interactive and streaming media for the Internet, died Thursday, Aug. 28, 2008. He was 57.
- Mr. Wellings was director of broadcast and Internet media engineering at the University of Washington, where he worked since 1996. He also was director of engineering for the ResearchChannel consortium, which provides programming via the Internet and supports a round-the-clock broadcast channel available nationwide.
- In addition, Mr. Wellings was director of engineering for UWTV, the University of Washington's award-winning television channel, as well as KEXP-FM, a radio station licensed to the UW and operated in partnership with the Experience Music Project.



Proposed Joint Session

- In the discussion of HDTV-WG at the APAN 25th Meeting@Hawaii
 - Proposed to have joint demonstration with Medical-WG at next APAN-NZ Meeting
 - Mike, JongWon, Hasebe
- Start to make the configuration, preparation and investigation
 - Sites
 - Contents
 - Equipments
 - Network



Planning Network

- Candidate Sites

- Queenstown, Seoul, Tokyo, Seattle
- Tokyo-Seattle up to 20G
- Seattle-Queenstown up to 622M
- Tokyo-Queenstown up to 622M
- Seoul-other sites up to 622M

- KAREN

- Backbone 10G
- International connection Sydney 622M, Seattle 622M
- Venue connection 1G



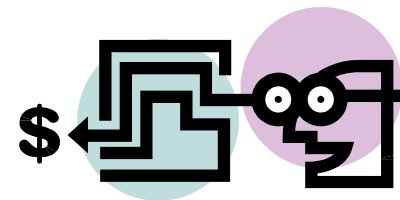
Path and RTTs

- HDTV

- Seattle to Queenstown 180ms
 - UW-REANNZ(Int)-REANNZ(Nat)
- Seattle to Tokyo 141ms
 - UW-TransPAC2-APANJP-JGN2plus
- * JPEG-2000 Encoding/Decoding delay 33~50ms

- SDTV

- Seoul to Seattle 164ms
 - KOREN-APANJP-TransPAC2-UW
- Seoul to Queenstown 248ms
 - KOREN-TEIN2SG-AARNET-REANNZ(int)-REANNZ(Nat)
- Seoul to Tokyo 24ms
 - KOREN-APANJP-JGN2plus
- * DVTS delay 80~90ms



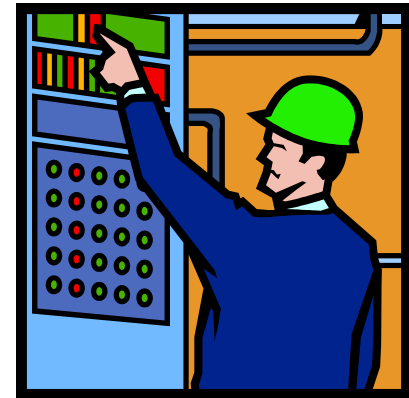
Planning Contents

- Medical
 - Blood vessel anastomosis using a tissue
 - Surgery by Dr. Newell



Planning Equipments

- Visual communication
 - HDTV (Presentation:Seattle->Venue/Tokyo)
 - JPEG-2000/IP Gateway
 - Prepared by NICT
 - SDTV (Communication:All Sites)
 - DVTS/Quatre
 - Prepared by KT Lab/Kyushu-U/NICT
- Display
 - OptiPortal Network Tiled Display
 - 5x3 tile of 24" (1920x1200) LCDs
 - Rocks-4.3/viz roll/SAGE(SVN)/CGLX
 - Prepared by AARNet/UQVisLab
 - imCast
 - Feeding HD-SDI video to SAGE-based tiled display
 - Prepared by GLORI AD-KR HDTV-WG
 - SVC
 - Feeding MPEG2 HD(HDV) to SAGE-based tiled display
 - Prepared by GIST/EVL



JPEG 2000

- State-of-the-art low bit-rate compression performance
- Progressive transmission by quality, resolution, component, or spatial locality
- Wavelet transform
 - No (low) block noise
- Lossy and lossless compression (with lossless decompression available naturally through all types of progression)
- Random (spatial) access to the bitstream
- Pan and zoom (with decompression of only a subset of the compressed data)
- Compressed domain processing (e.g., rotation and cropping)
- Region of interest coding by progression
- Limited memory implementations

JPEG 2000 STD

- Part1 Core coding system Basic coding/decoding system
- Part2 Extensions Extension of Part1
- Part3 Motion JPEG 2000 Motion Jpeg2000
- Part4 Conformance testing Code stream testing on image transmission
- Part5 Reference software Reference software for testing Jpeg2000
JasPer software (C) <http://www.imagepower.com/>
JJ2000 software (Java) <http://jj2000.epfl.ch/>
- Part6 Compound image file format Mixture image (Picture&Text)
- Part7 N/A
- Part8 JPSEC Secured Jpeg2000
- Part9 JPIP Handling on network
- Part10 JP3D 3 Dimensions image

Connecting Sites



NICT SPARC
Tokyo, JP



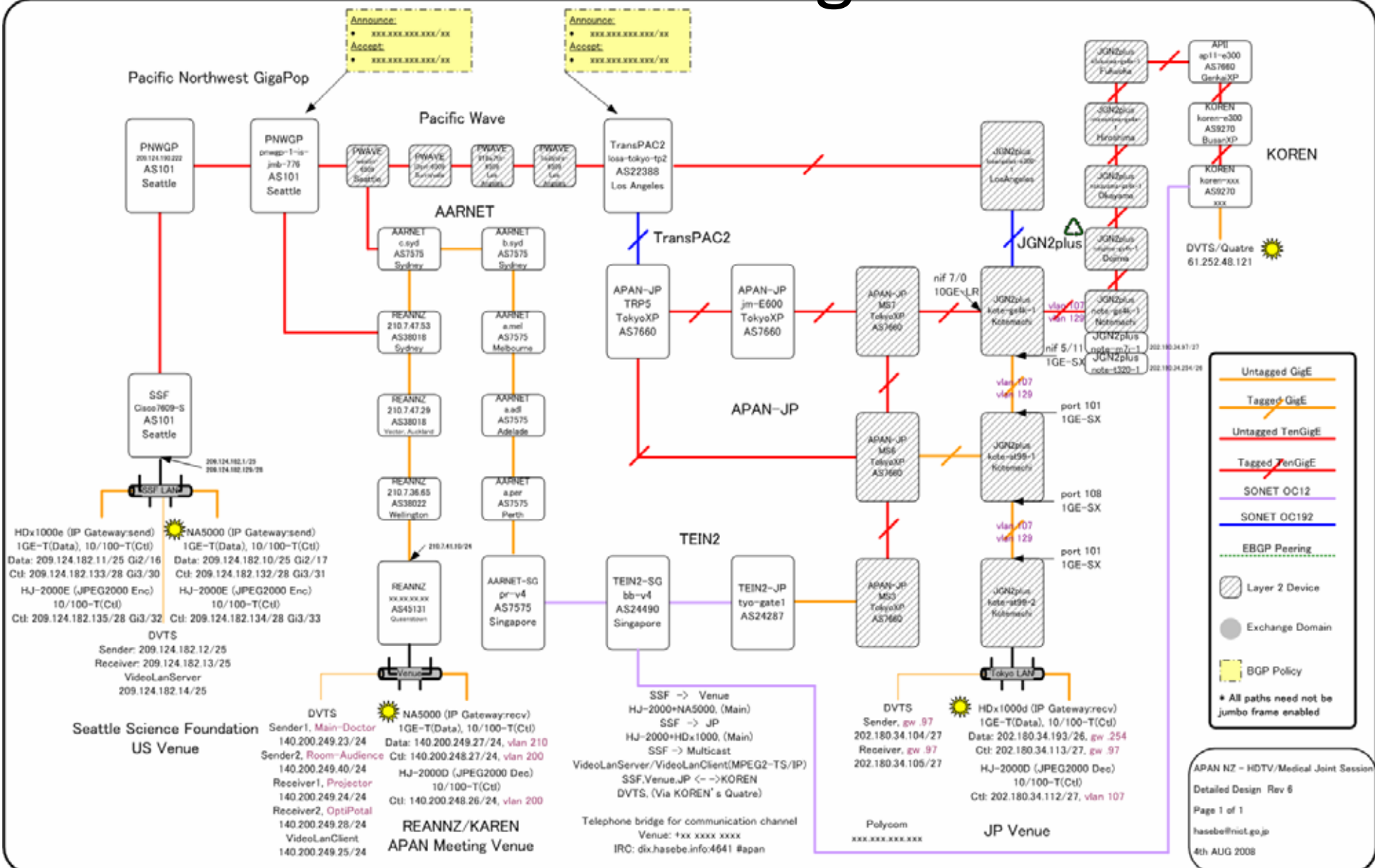
Seattle Science Foundation
Seattle, US



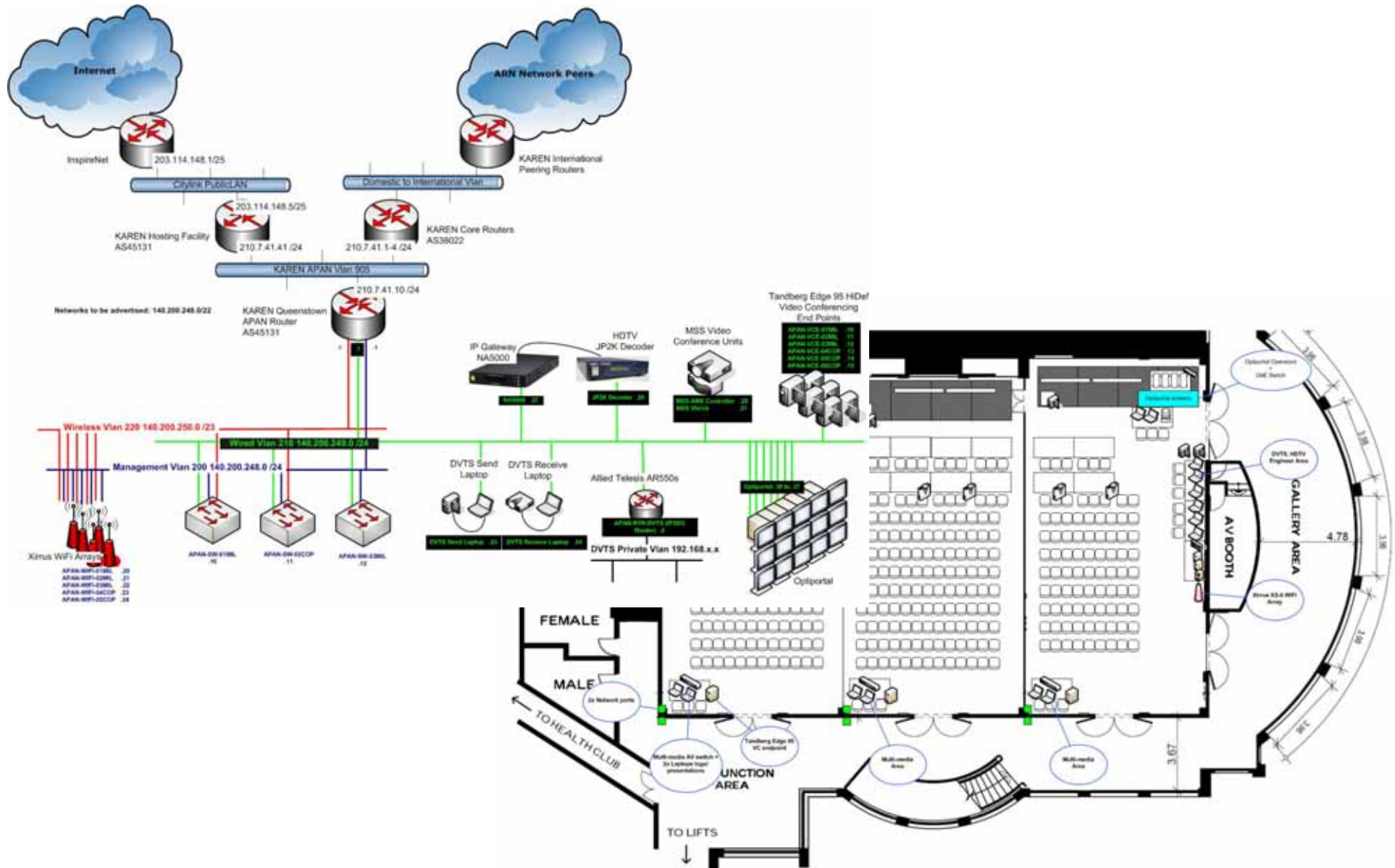
APAN-NZ Venue
Queenstown, NZ



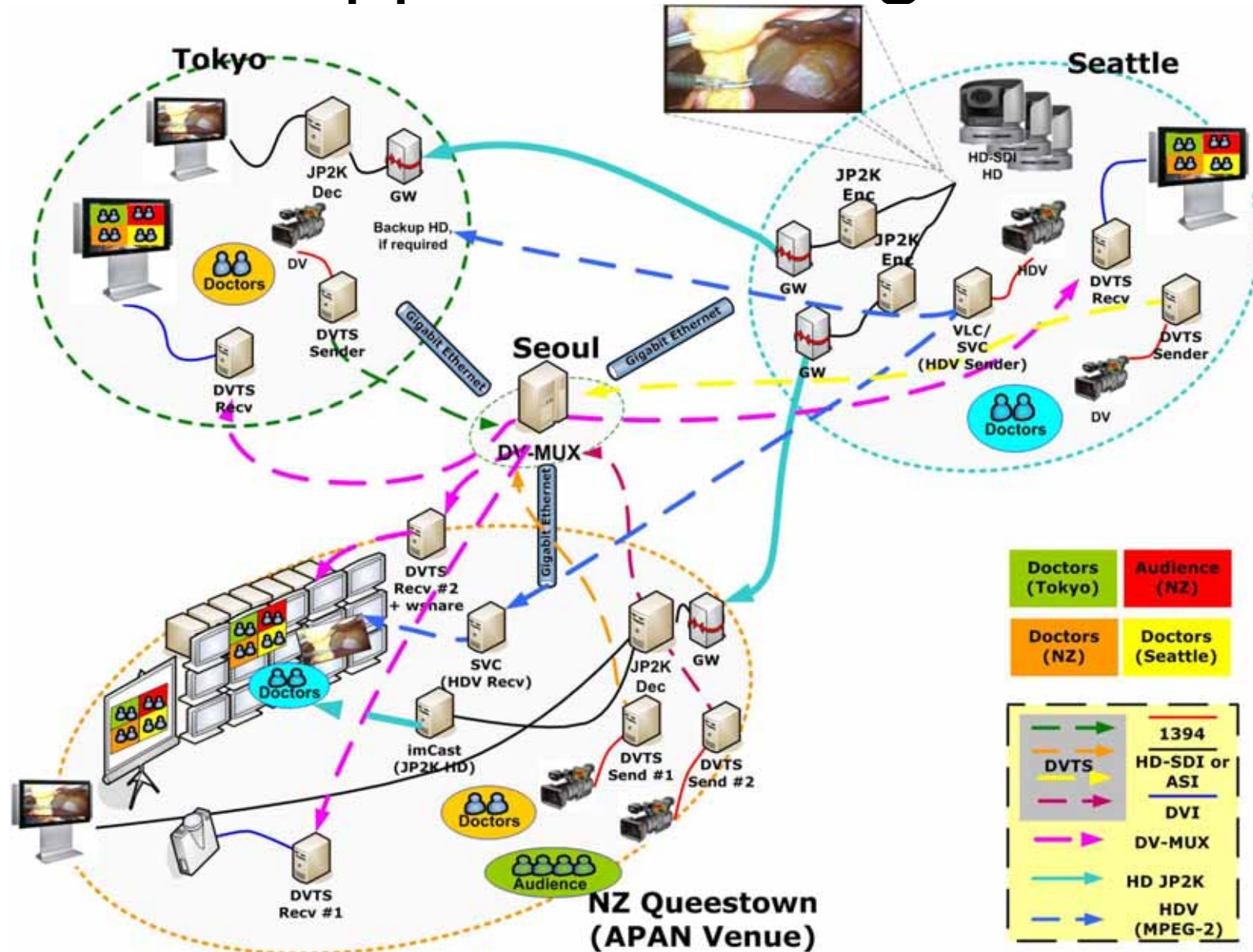
Network Diagram



Local Connection



Application Image



Equipments@SSF

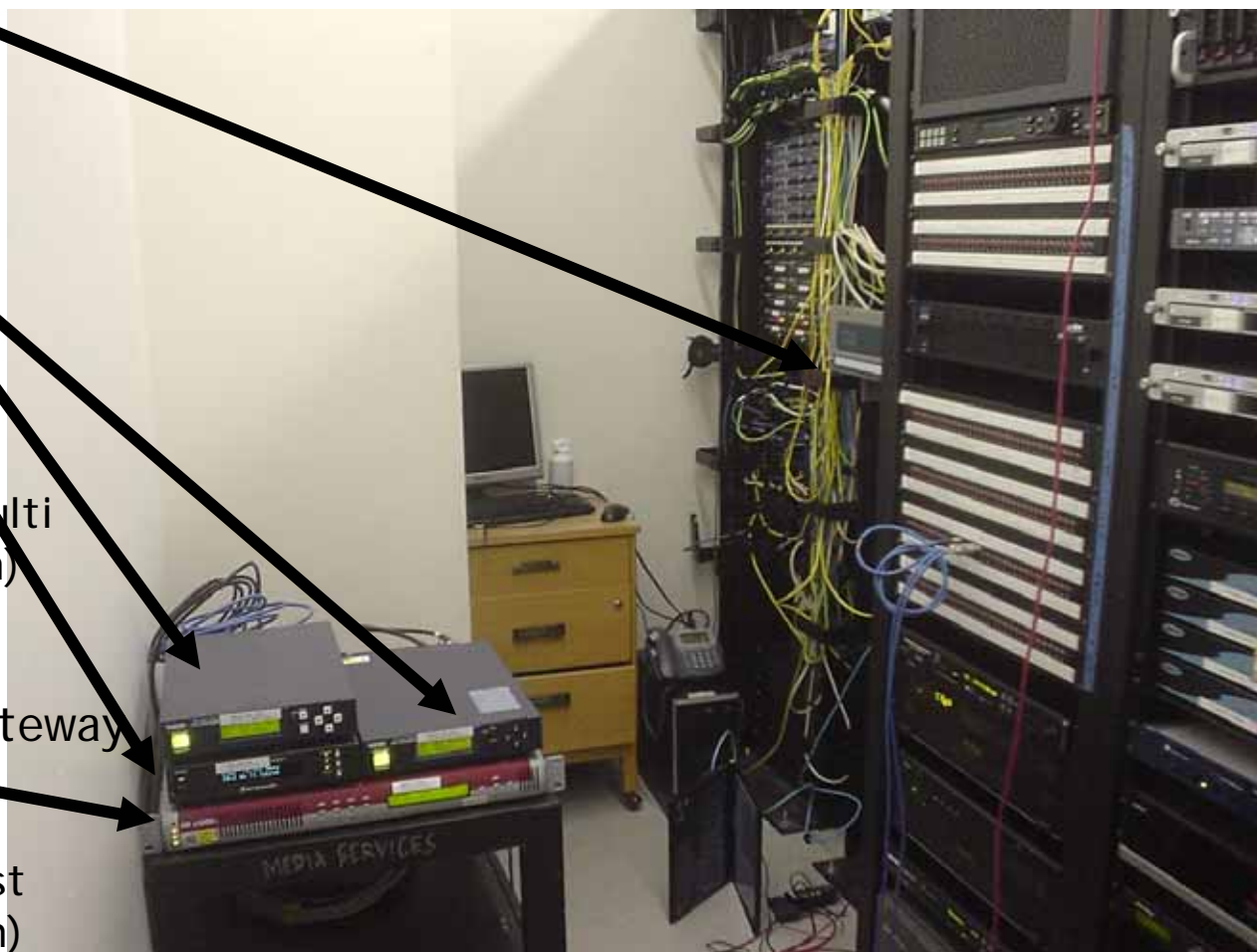
Switch to PNWGP
Cisco 7609
10G connection to PNWGP

JPEG-2000 Encoder
YEM HJ-2000E
HD-SDI ASI
Bit rate:20~213Mbps

IP Gateway
NEL NA5000
ASI IPv4/IPv6/Unicast/Multi
FEC(Forward Error Correction)
Crypting function
Frame check function

MPEG2-HD Encoder/IP Gateway
Frontiers HDx1000e
HD-SDI ASI

ASI IPv4/Unicast/Multicast
FEC(Forward Error Correction)
Frame check function



Equipments@NICT SPARC

JPEG-2000 Decoder
YEM HJ-2000D
ASI HD-SDI
Bit rate:20~213Mbps

Multi Format Conv
Roland Edirol VC300-HD
HD-SDI , HDV,DV,COMP,SDI ,DVI

MPEG2-HD Decoder/IP Gateway
Frontiers HDx1000e
ASI HD-SDI
IPv4/Unicast/Multicast ASI
FEC(Forward Error Correction)
Frame check function



Equipments@Venue

JPEG-2000 Decoder
YEM HJ-2000D
ASI HD-SDI
Bit rate:20~213Mbps

IP Gateway
NEL NA5000
ASI IPv4/IPv6/Unicast/Multi
FEC(Forward Error Correction)
Crypting function
Frame check function



Other scene

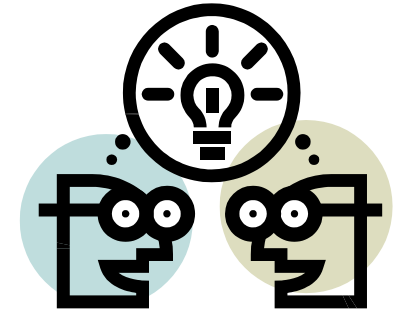


OptiPortal
5*3 24" Monitors
5 PCs
Rocks/viz roll/
SAGE/CGLX

Seattle Science Foundation



Pros and Cons



- Image quality

- Compressed HDTV is getting good image and low bandwidth
- But encoder/decoder is expensive

- Preparation/operation at SSF


- There were no DVTS/VLS PCs and DVCams
- Only visual engineer is in SSF



- Gap of the delay (audio)

- HDTV(v): Seattle Queenstown 220ms
- SDTV(a/v): Seattle Seoul Queenstown 500ms

- Flying Japanese



Totally **64** hours spent on the plane
Carried, installed, set up, checked and withdrew
equipments in 6 carton boxes /w ATA Carnet
+ baggage lost, cancel flight



Project Participants (JP)

- JGN2plus

- K. Hasebe [hasebe@nict.go.jp]:HD/SD/NW@All locations
- K. Nakamura [kazuhiko@nict.go.jp] :HD/SD/NW@Tokyo
- T. Nakao [t.nakao@ntt.com]:HD@SSF/NZ
- K. Morikubo [morikubo@jgn2.jp]:@Tokyo

- APAN-JP

- Y. Tahara [ash@wide.ad.jp]:NW@Tokyo
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- Y. Kitamura [kita@jp.apan.net]:

- QGPoP

- Prof. K. Okamura [oka@ec.kyushu-u.ac.jp]:SD/NW@All Locations
- Prof. M. Omori [ohmori@chikushi-u.ac.jp]:SD/NW@All Locations

Project Participants (KR,US)

- **GI ST Networked Media Lab.**
 - Prof. JongWon Kim [jongwon@nm.gist.ac.kr]:Chair
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- **KOREN-NOC**
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- **Seattle Science Foundation**
 - Shawn Sullivan [ShawnS@sabey.com]:HD/SD@SSF
- **Research Channel/Pacific Northwest GP**
 - Jim DeRoest [deroest@u.washington.edu]:HD/NW@SSF
 - Mike Wellings [wellings@washington.edu]:

Project Participants (Down Under)

- **AARNet**
 - Christoph Willing [c.willing@uq.edu.au]:OptiPortal@NZ
 - Greg Wickham [Greg.Wickham@aarnet.net.au]:Opti Portal@NZ
- **REANNZ**
 - Julie Watson [julie.watson@reannz.co.nz]:LA@NZ
 - Andrew McKegg [McKeggA@reannz.co.nz]:LA/NW@NZ
 - Callum Lewis:AV/NW@NZ

Project Participants (Medical)

- NZ
 - Kyushu University Hospital
 - Dr. Shuji Shimizu [shimizu@surg1.med.kyushu-u.ac.jp]
- Tokyo
 - Juntendo U. Hospital
 - Dr. Arai
 - Asahikawa Red Cross Hospital
 - Dr. Tokugawa
- Seattle
 - Swedish Hospital
 - Dr Newell [David.Newell@swedish.org]:Surgery
 - Seattle Science Foundation
 - Joanie Block [JoanieB@seattlesciencefoundation.org]

