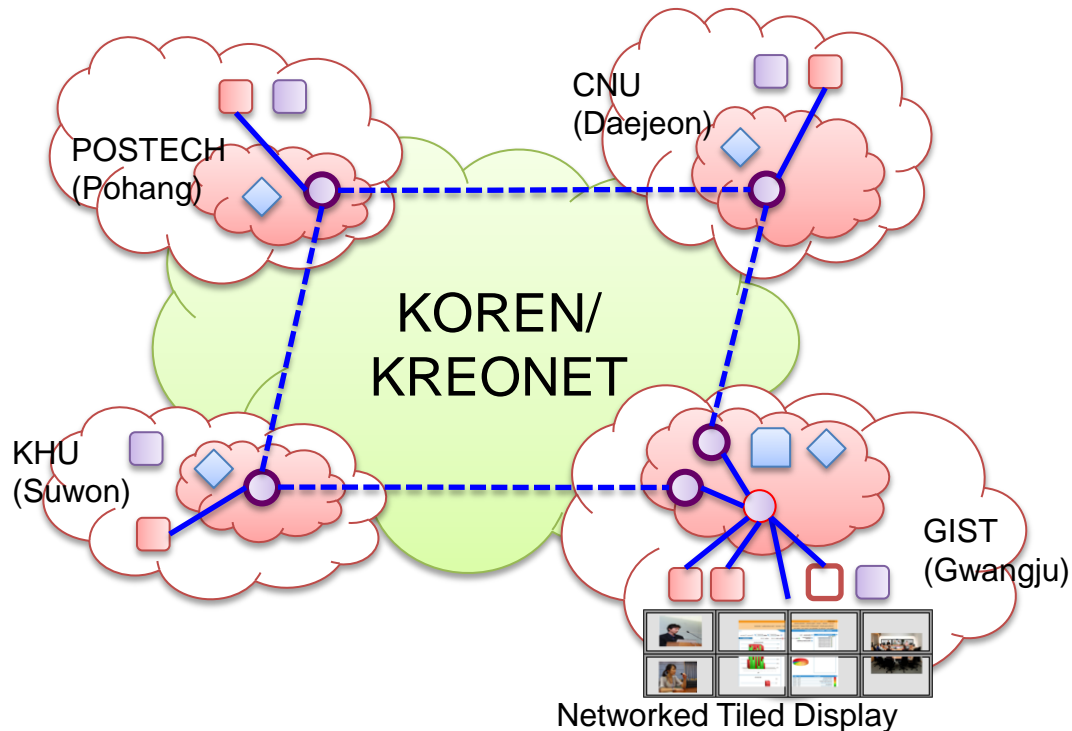


# OpenFlow - FIRST@PC (FIRST@PC NetOpen RA)

Namgon Kim and JongWon Kim  
Networked Computing Systems Lab. GIST

Aug. 10, 2011

# OpenFlow-FIRST@PC (FIRST@PC NetOpen RA)

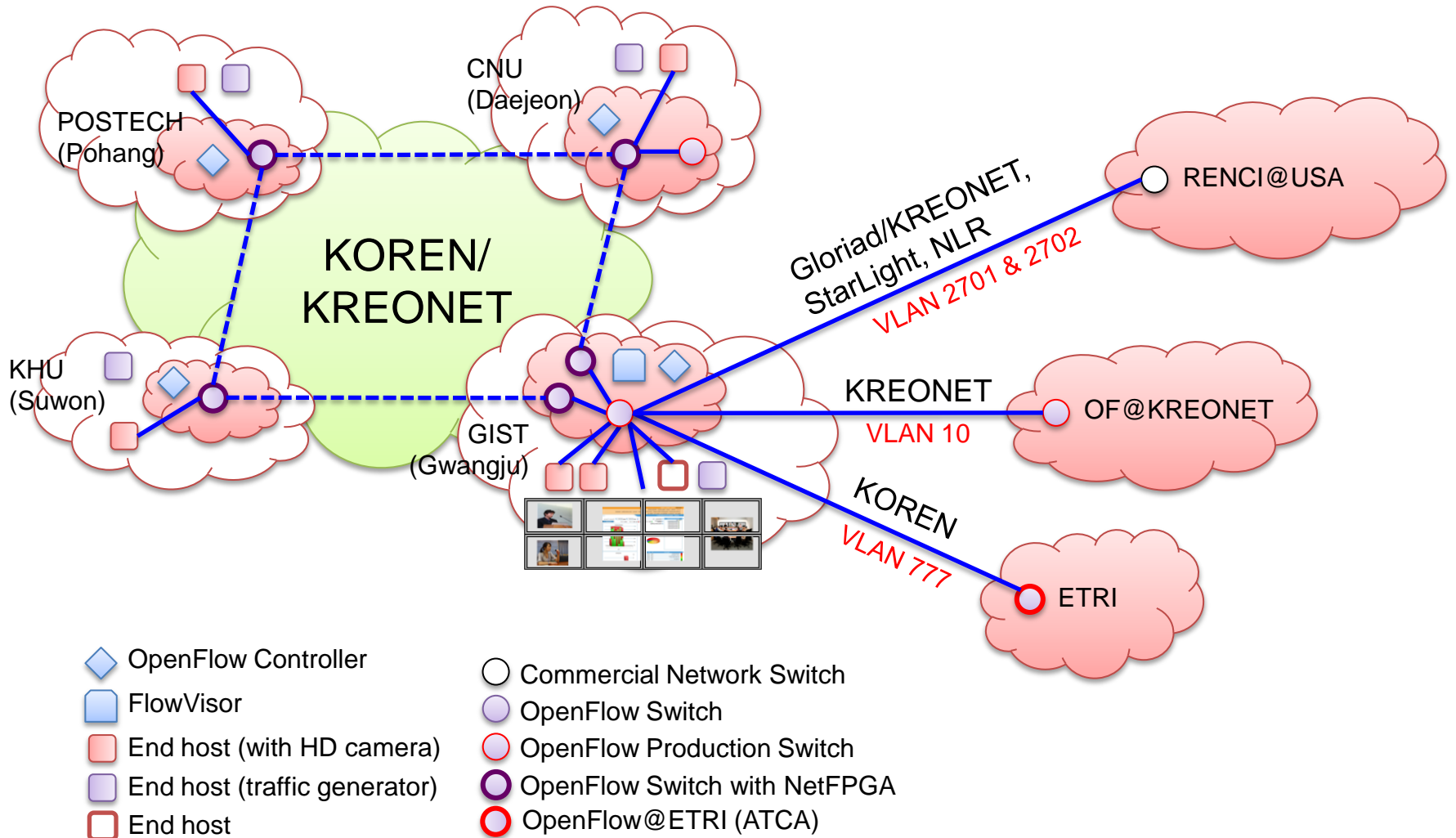


- |                              |                              |                     |
|------------------------------|------------------------------|---------------------|
| End host (with HD camera)    | OpenFlow Switch              | OpenFlow Controller |
| End host (traffic generator) | OpenFlow Production Switch   | FlowVisor           |
| End host                     | OpenFlow Switch with NetFPGA |                     |

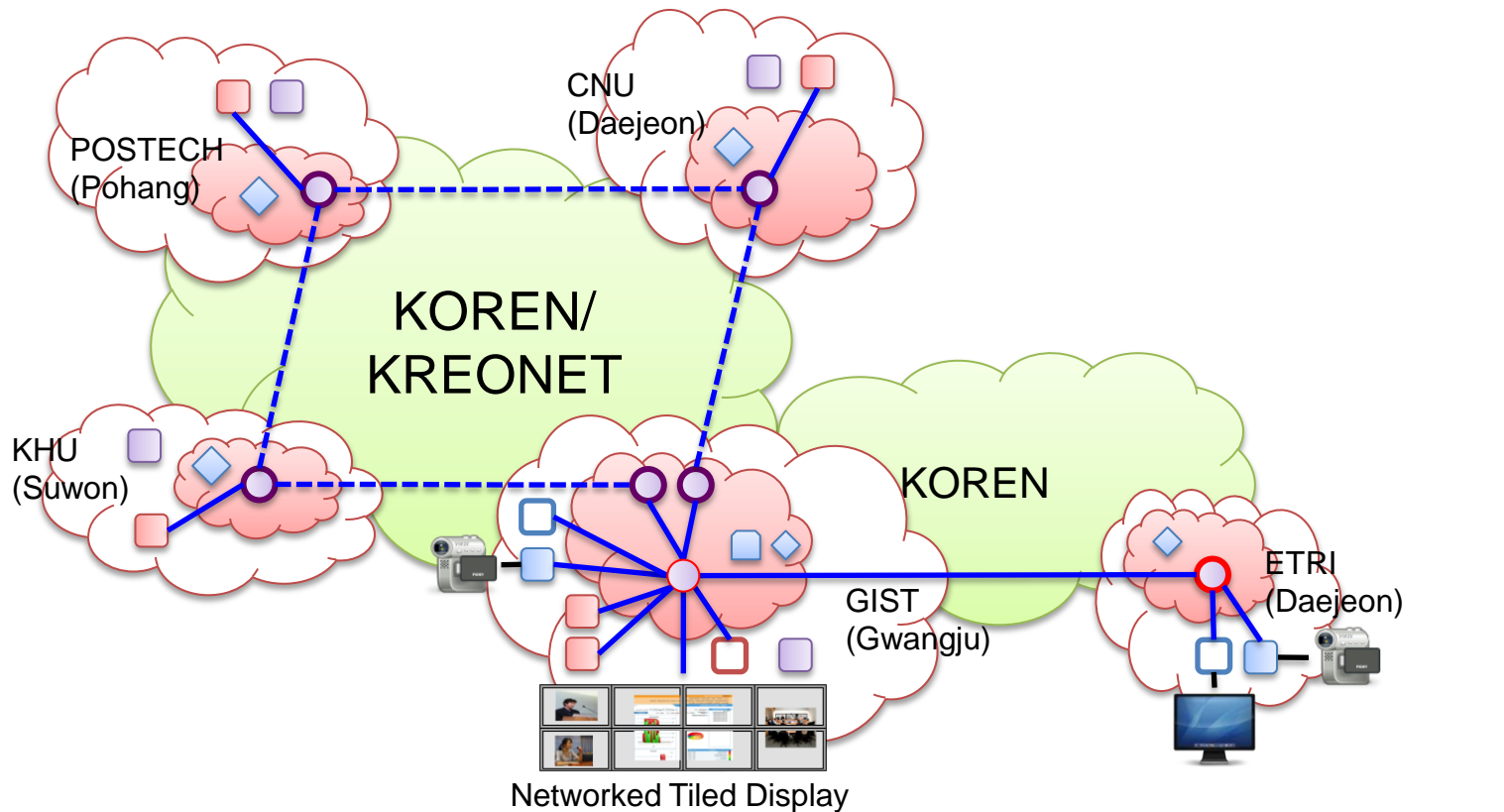
<http://trac.nm.gist.ac.kr/first/wiki/FIRSTPCTestbed>












# OF-FIRST@PC

## External Connections

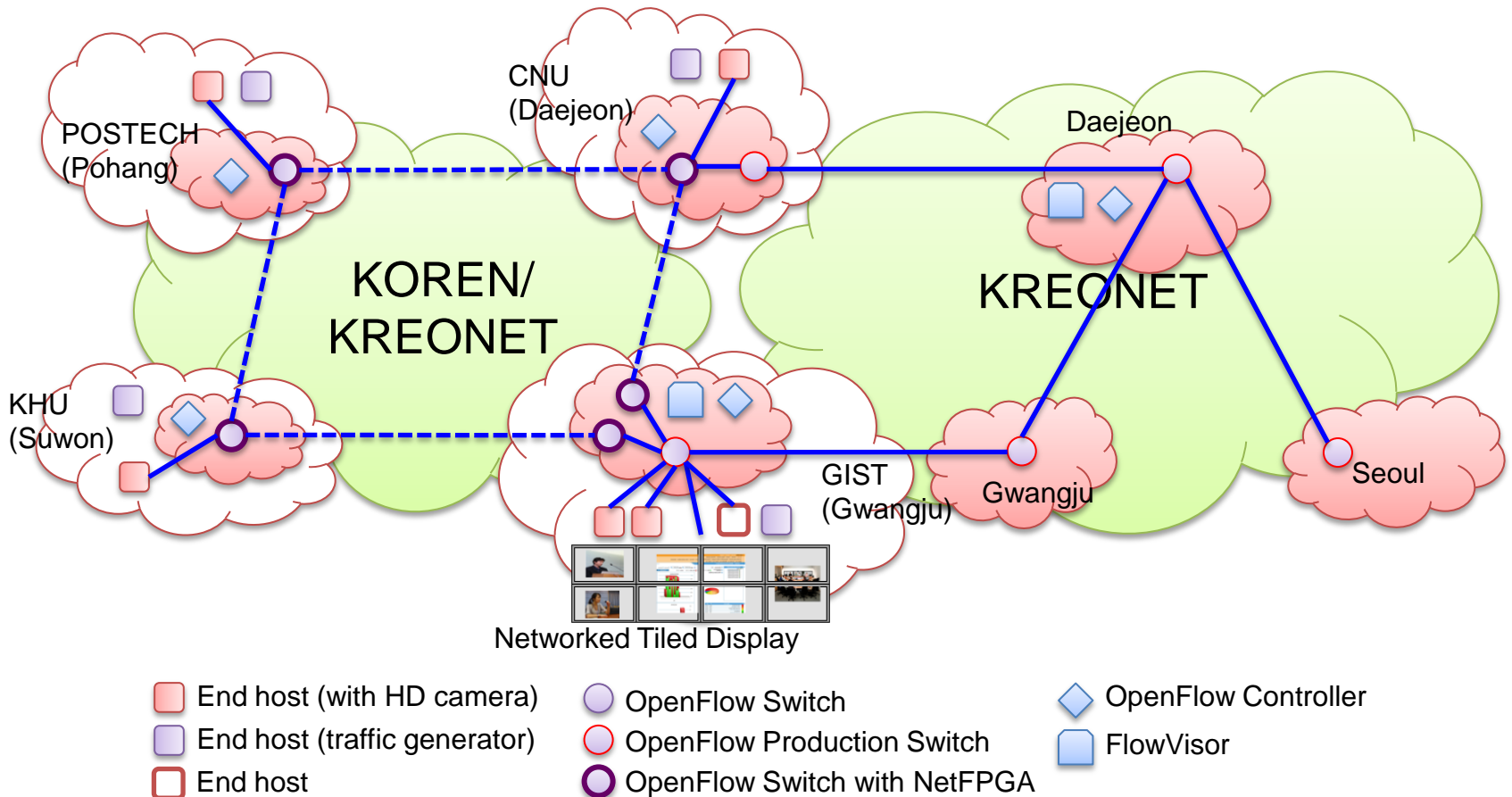


# OF-FIRST@PC & ETRI

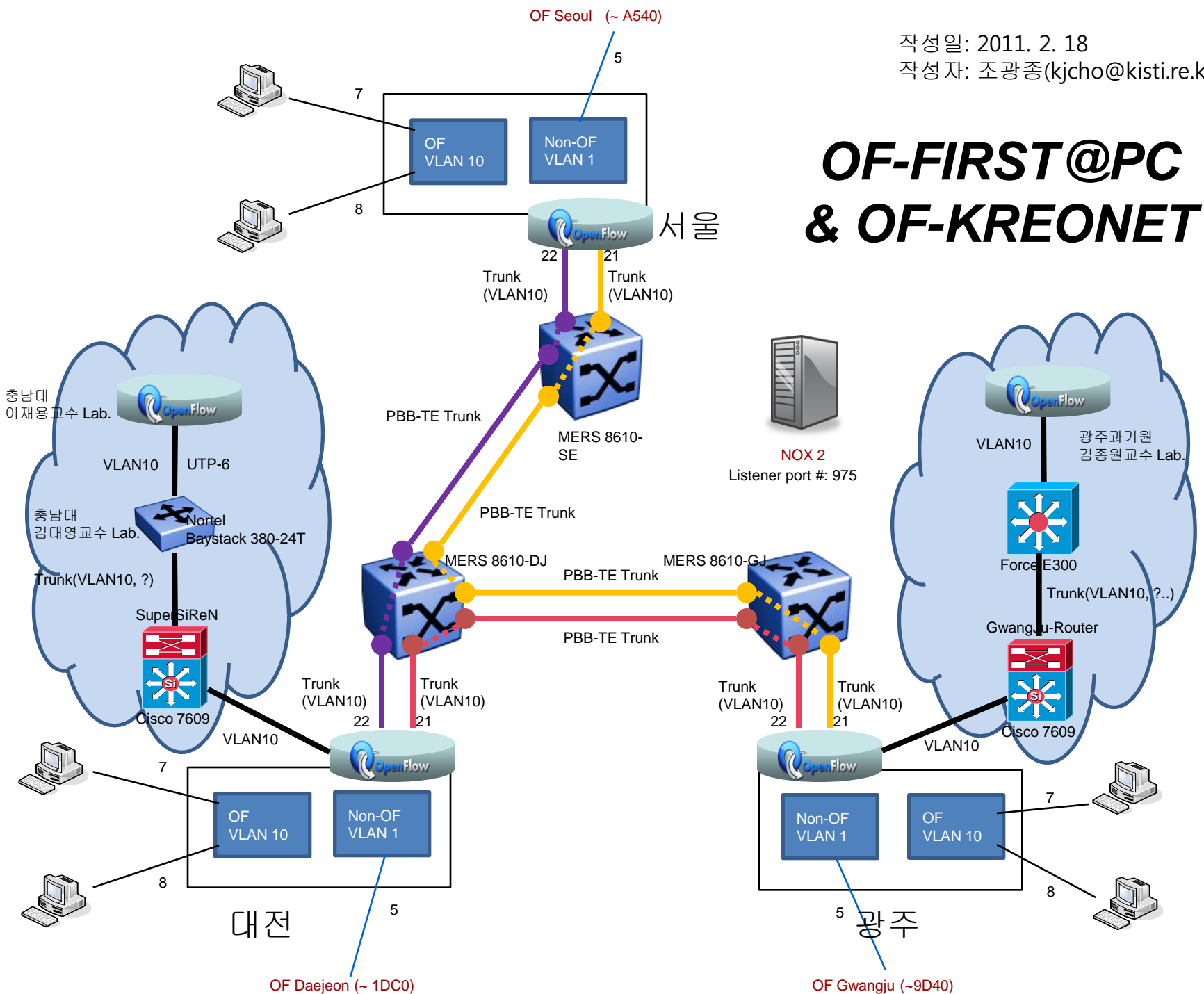


- |  |  |   |
|--|--|---|
|  DXT compressed HDV Sender      |  OpenFlow Switch              |  OpenFlow Controller |
|  MPEG-2 compressed HDV Sender   |  OpenFlow Switch with NetFPGA |  FlowVisor           |
|  MPEG-2 compressed HDV Receiver |  OpenFlow Production Switch   |   |
|  End host (traffic generator)   |  OpenFlow@ETRI (ATCA)         |   |
|  End host                       |  |   |

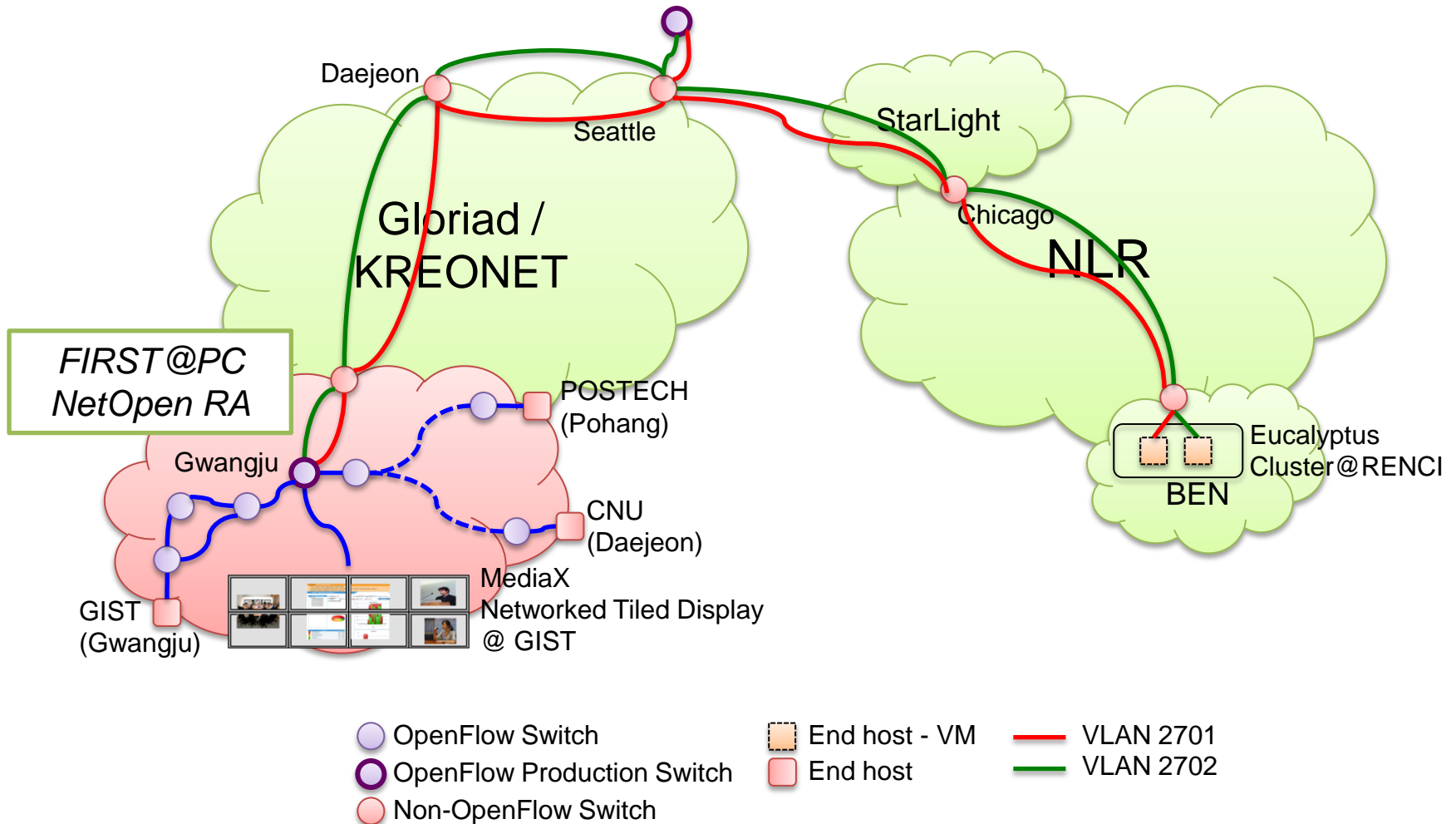
# OF-FIRST@PC & OF-KREONET



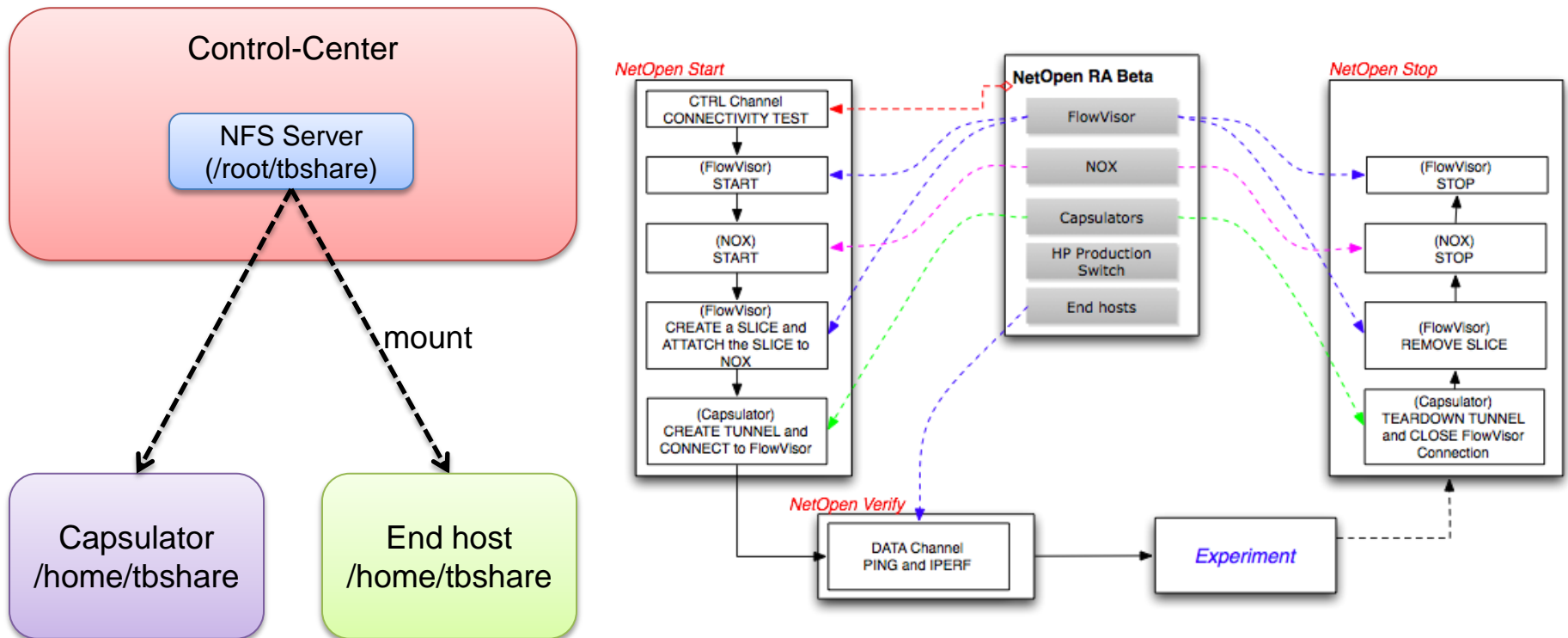
# OF-FIRST@PC & OF-KREONET



# OF-FIRST@PC & RENC1,USA



# Centralized Management for OF-FIRST@PC

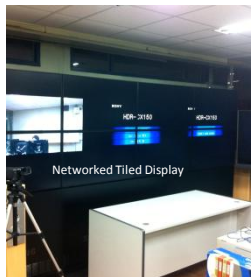
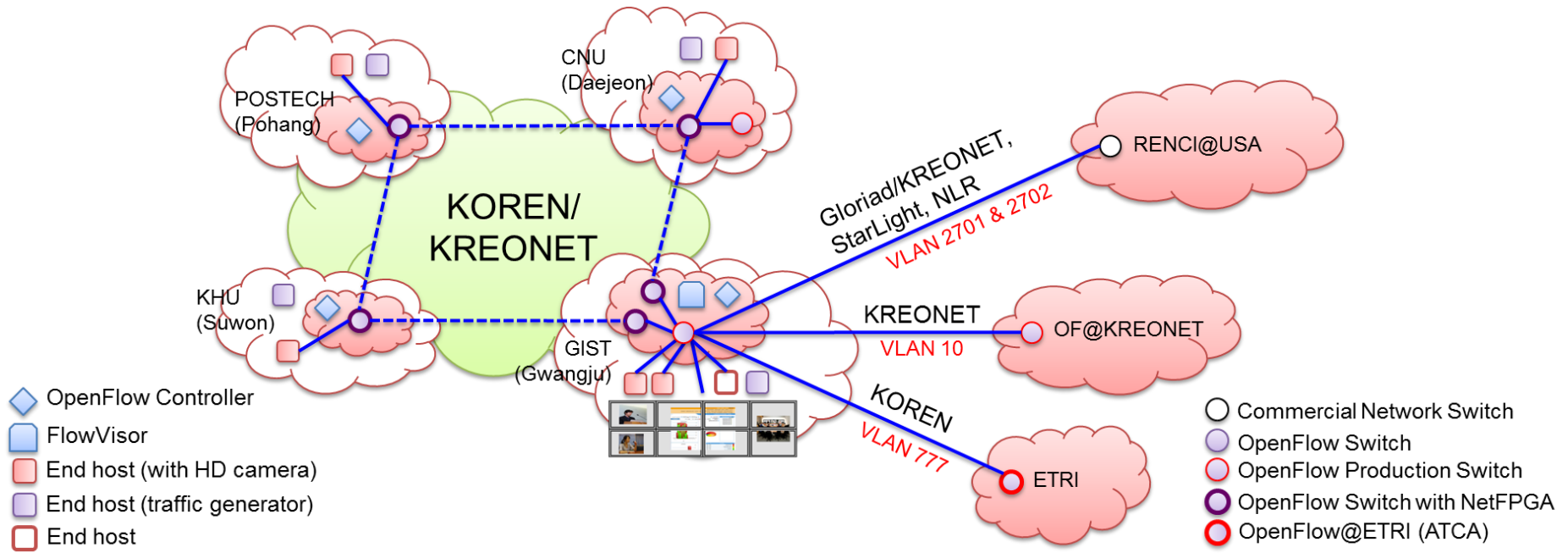




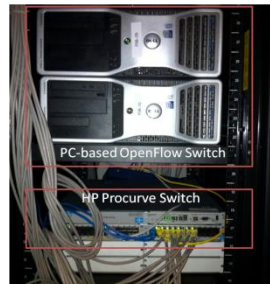
# **APPENDIX**

# FIRST@PC Preliminary Integrated Testbed

(NetOpen RA v0.3 + MediaX RA v0.2 + OMX Service Control v0.3 + OpenCF O&M v0.0)



MediaX RA: Display nodes, Camera

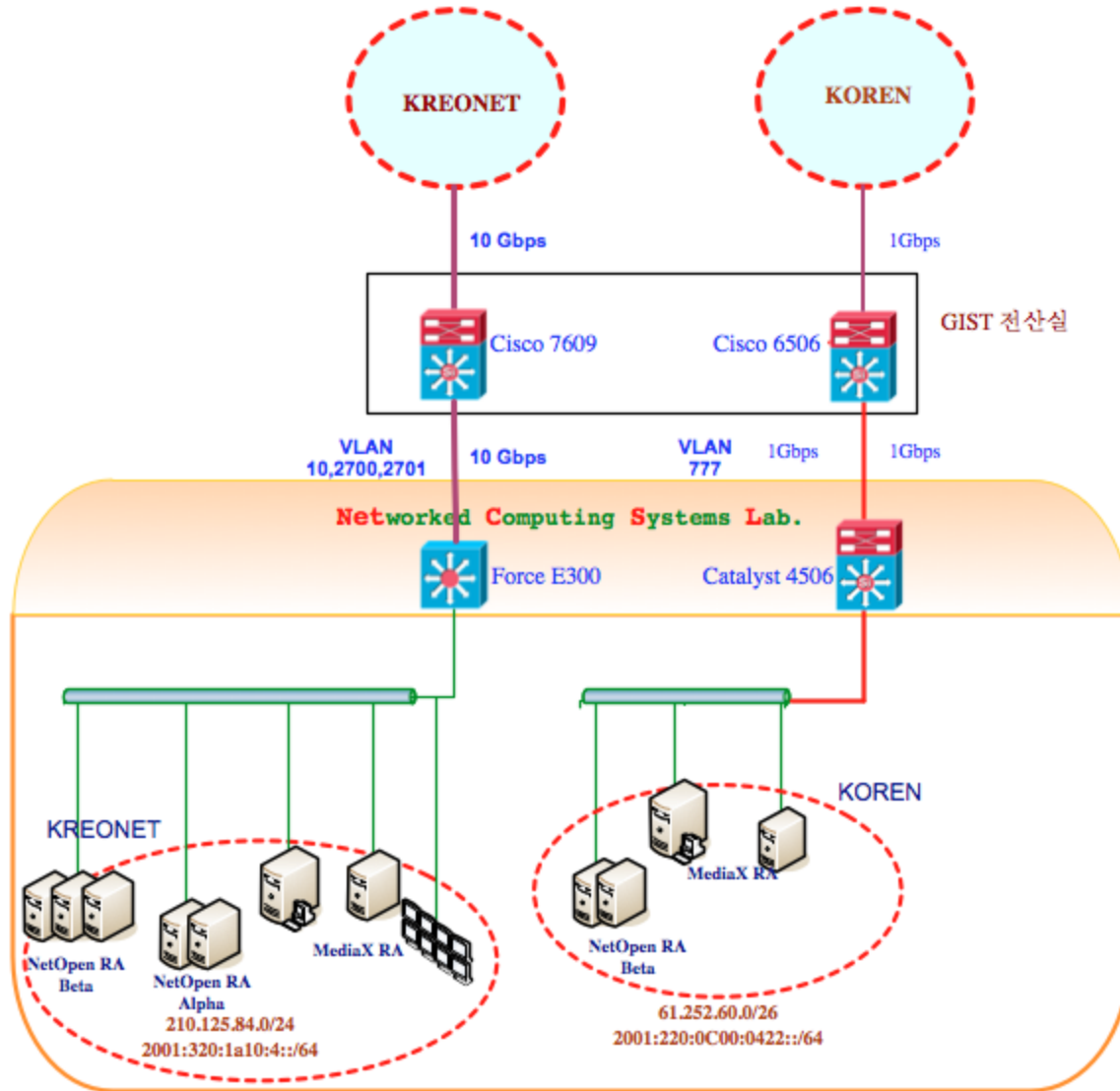


NetOpen RA: Switch nodes



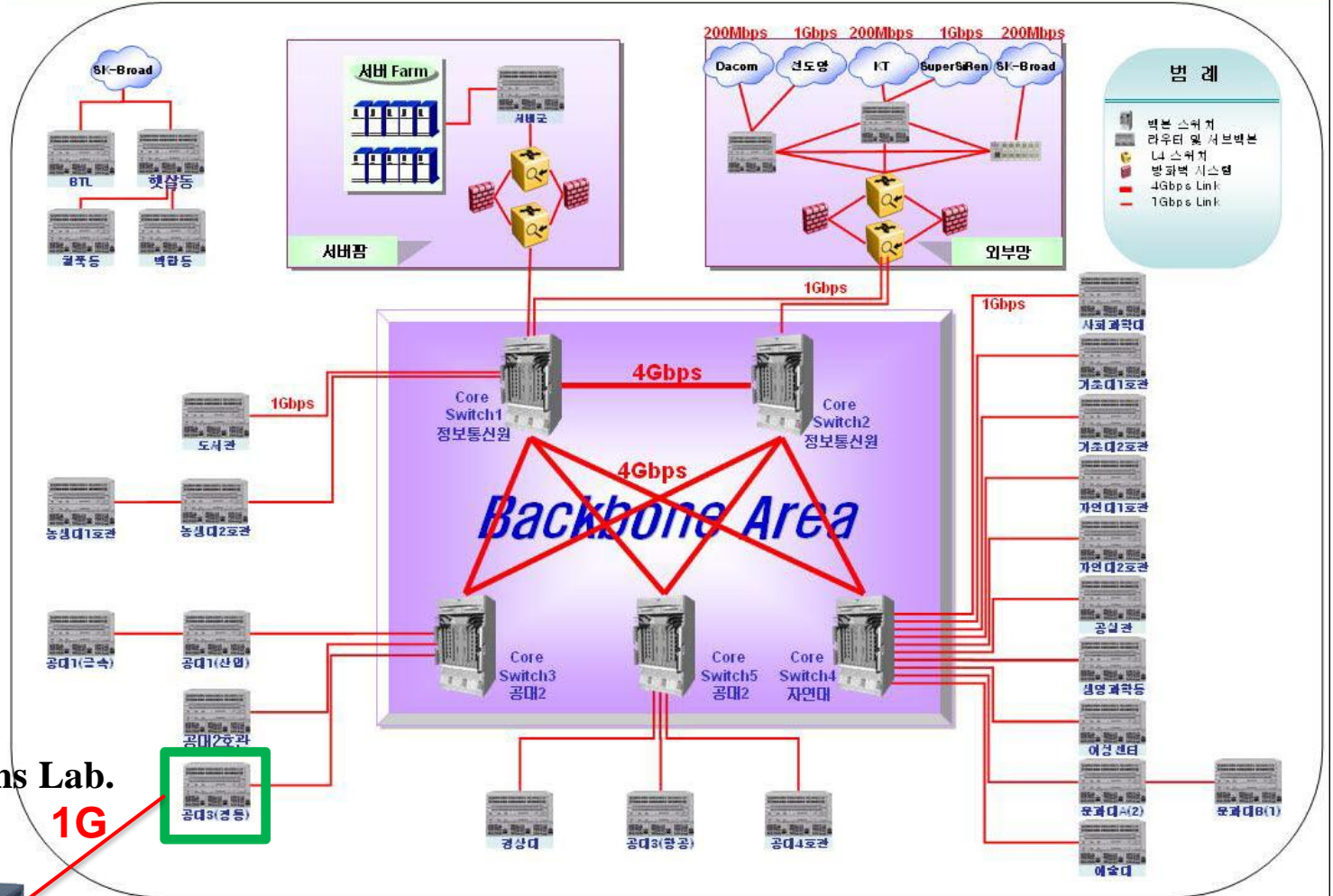
MediaX RA: Media Processing nodes

# GIST



# CNU (KOREN)

## 충남대 정보통신망 구성도



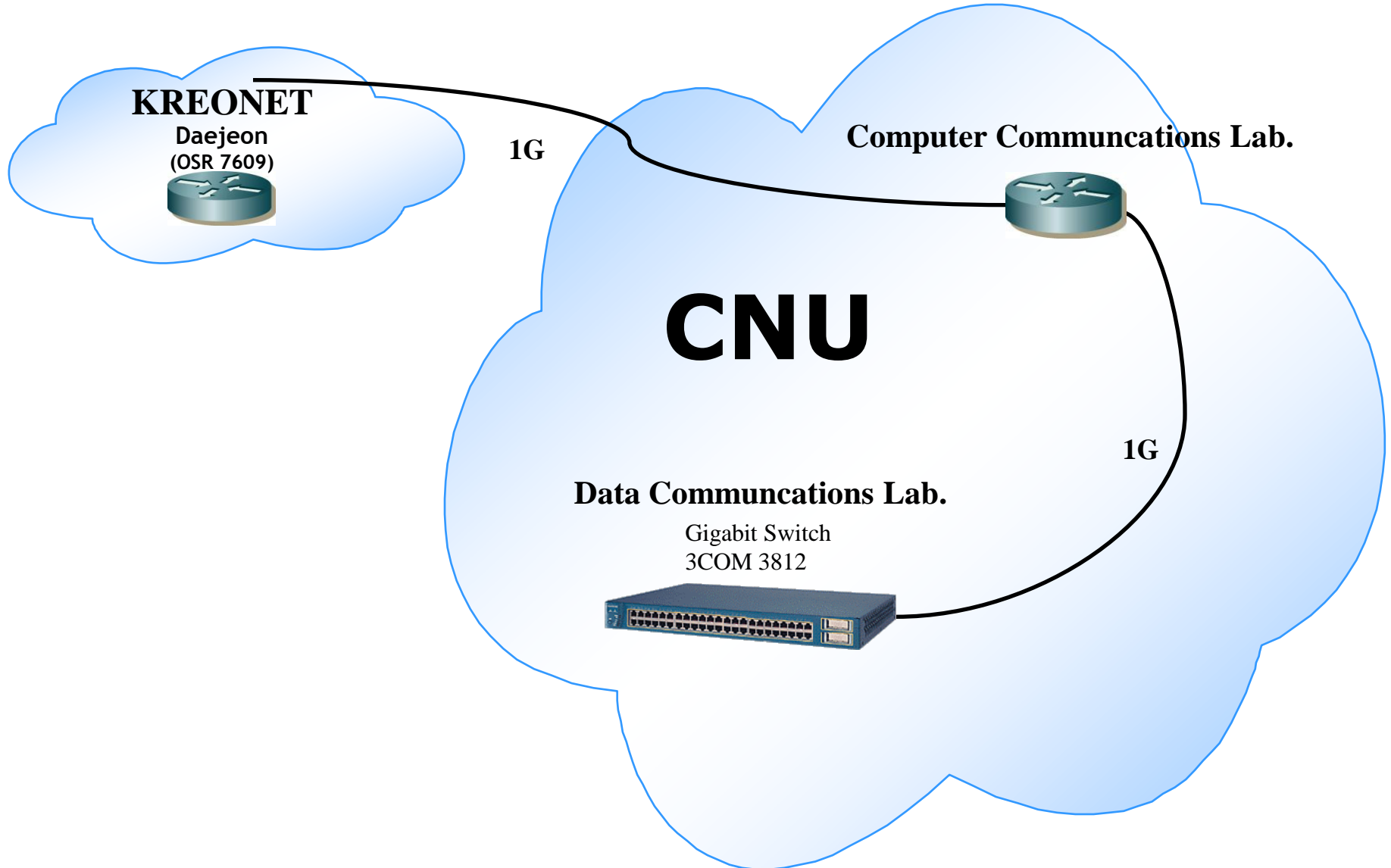
Data Communications Lab.

Gigabit Switch  
3COM 3812

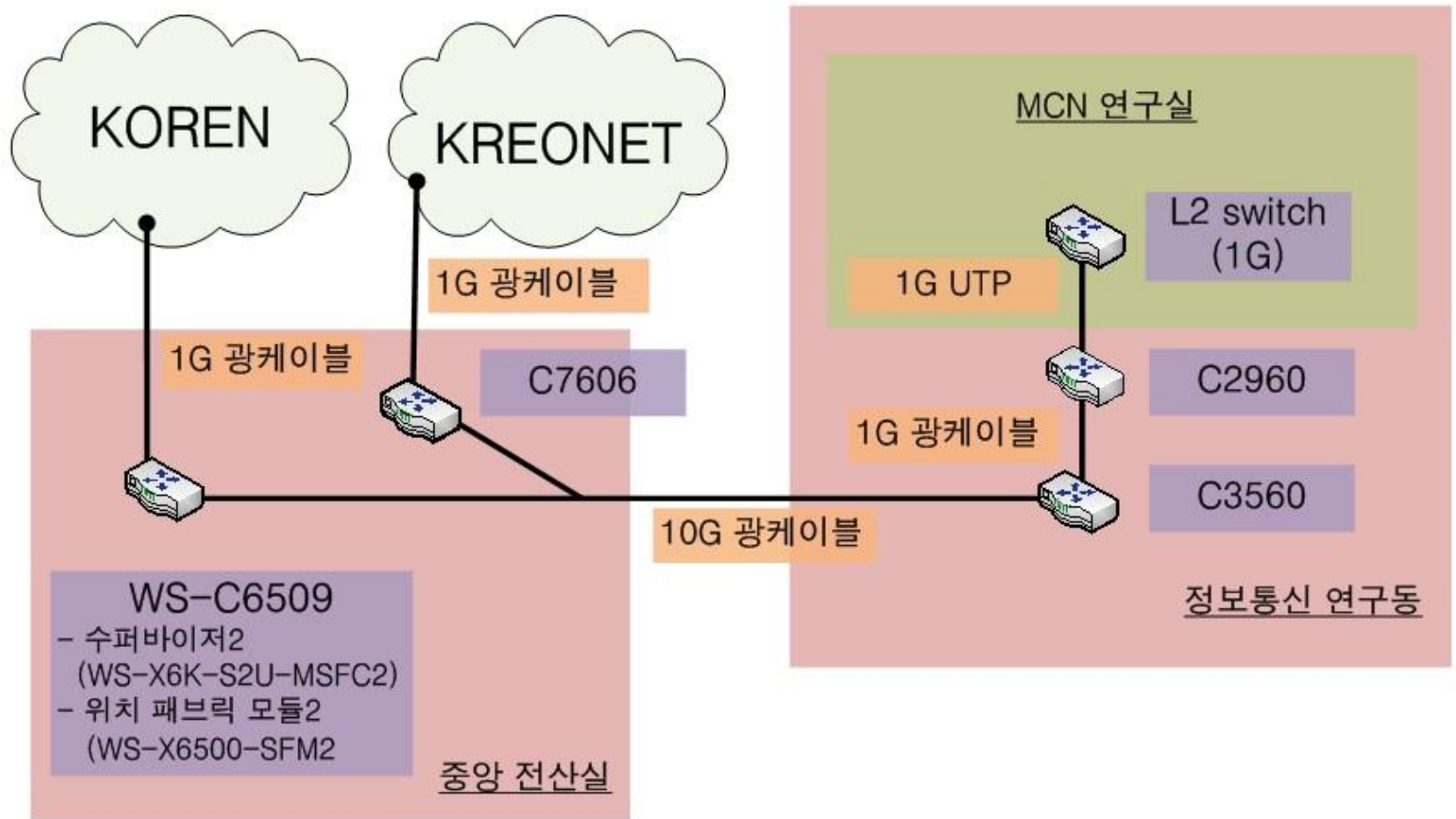


1G

# CNU (KREONET)

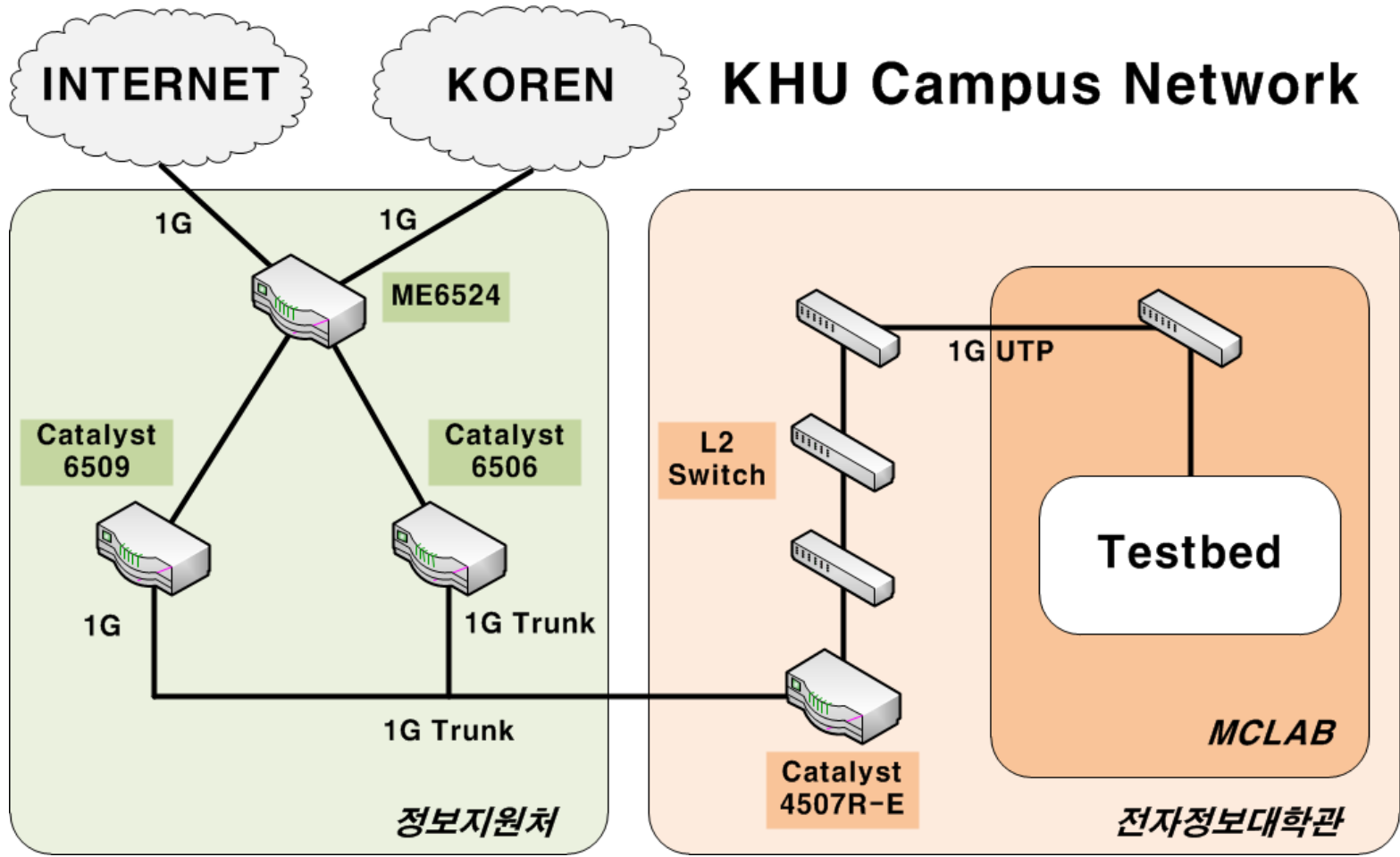


# Postech Network Configuration

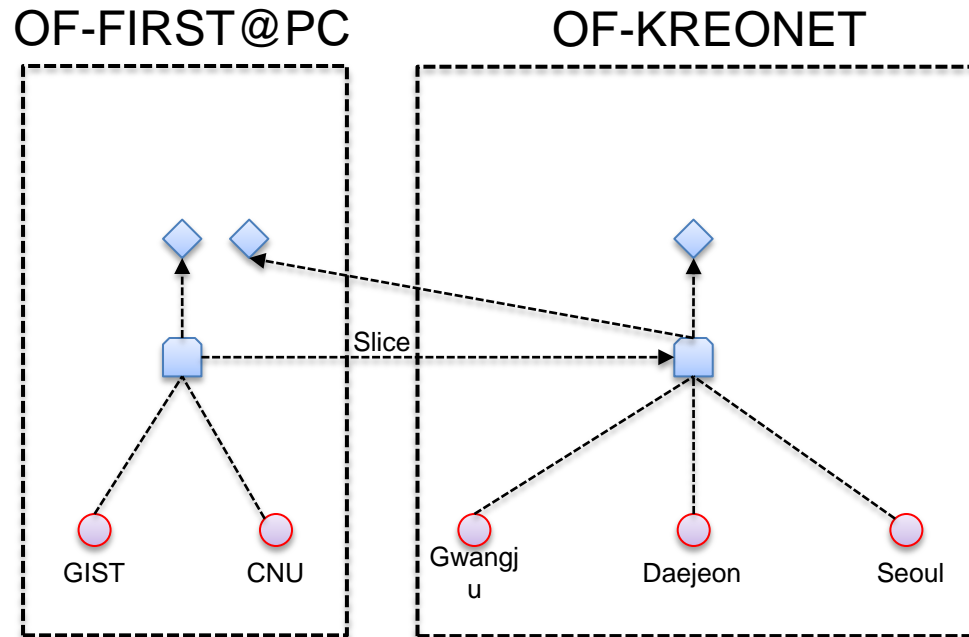


# KHU

## KHU Campus Network



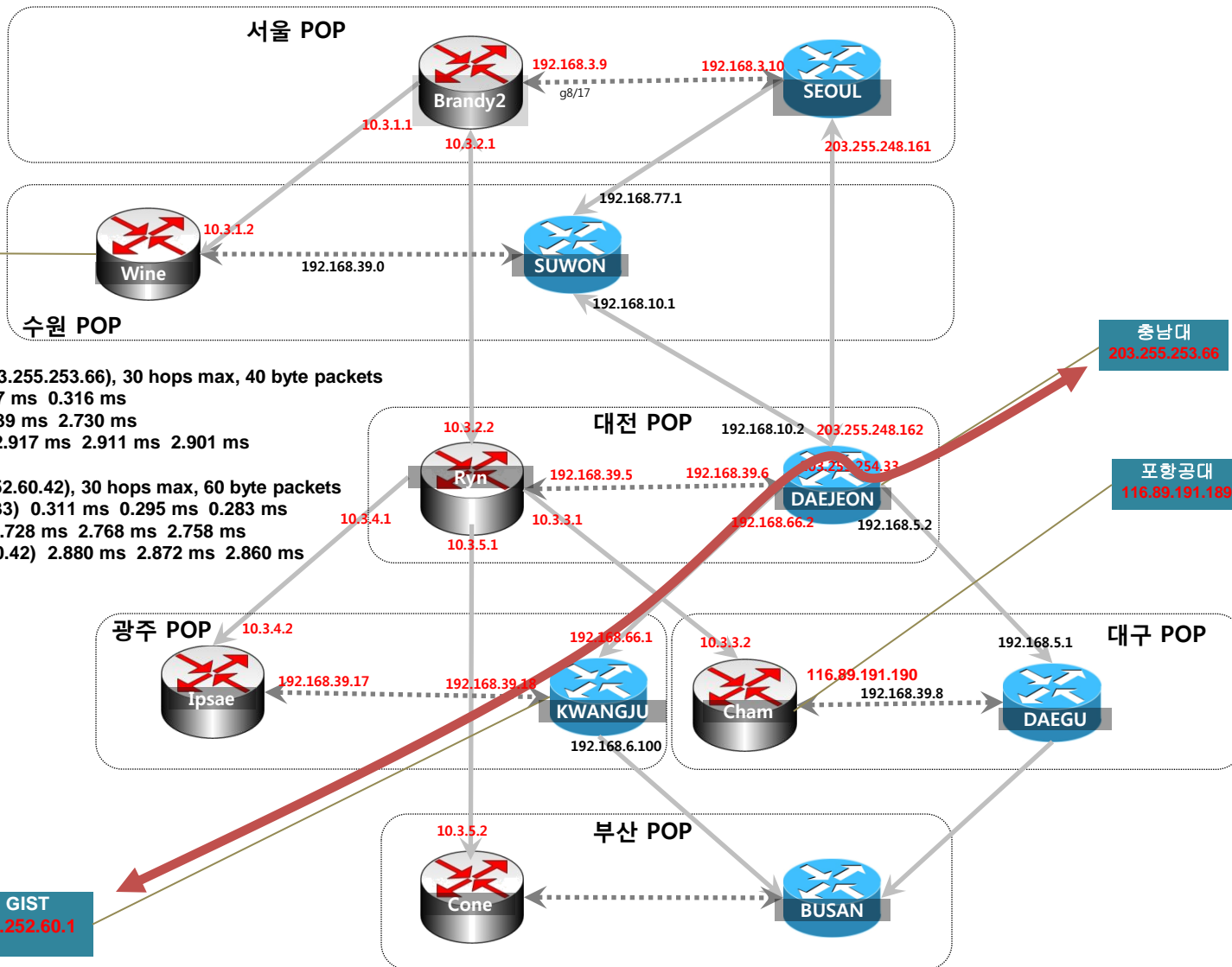
# FlowVisor Configuration for OF-FIRST@PC & OF-KREONET



- OpenFlow Switch
- OpenFlow Production Switch
- OpenFlow Switch with NetFPGA
- ◇ OpenFlow Controller
- FlowVisor



# GIST and CNU



traceroute to 203.255.253.66 (203.255.253.66), 30 hops max, 40 byte packets

- 1 (61.252.60.1) 0.304 ms 0.287 ms 0.316 ms
- 2 (192.168.66.2) 2.701 ms 2.739 ms 2.730 ms
- 3 end01.cnu (203.255.253.66) 2.917 ms 2.911 ms 2.901 ms

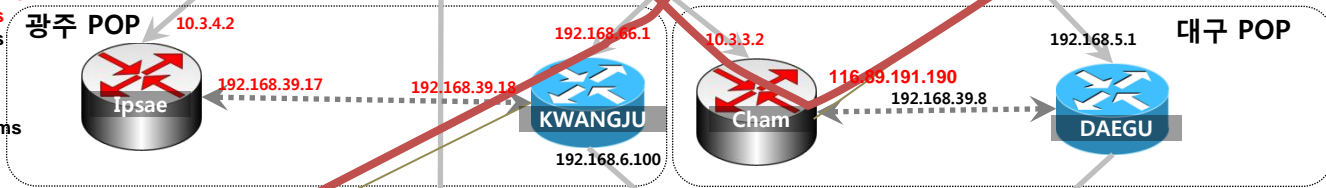
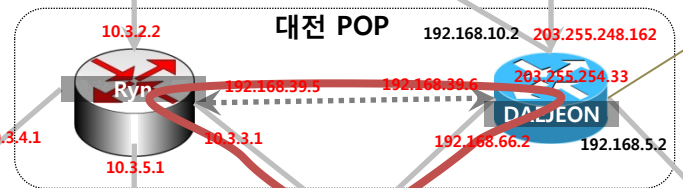
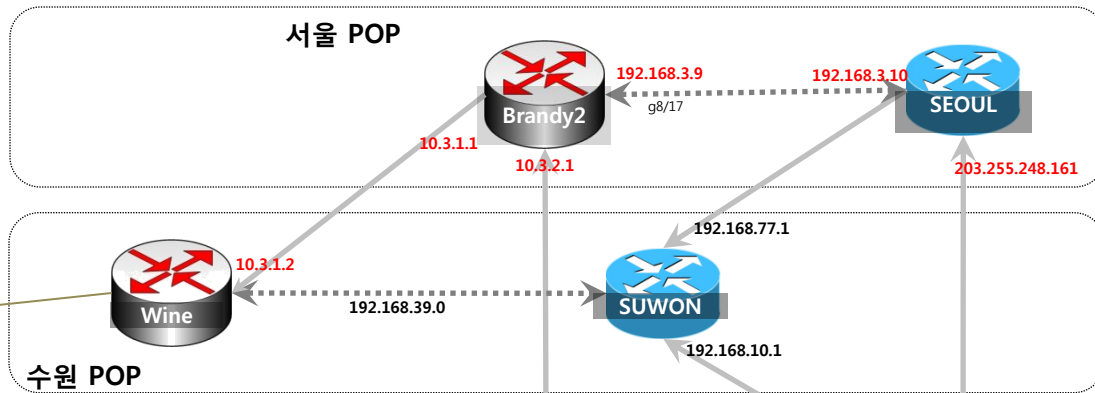
traceroute to 61.252.60.42 (61.252.60.42), 30 hops max, 60 byte packets

- 1 203.255.254.33 (203.255.254.33) 0.311 ms 0.295 ms 0.283 ms
- 2 192.168.66.1 (192.168.66.1) 2.728 ms 2.768 ms 2.758 ms
- 3 cap01.gist.koren01 (61.252.60.42) 2.880 ms 2.872 ms 2.860 ms





# GIST and POSTECH



tracert to 141.223.107.110 (141.223.107.110), 30 hops max, 40 byte packets

- 1 (61.252.60.1) 0.306 ms 0.284 ms 0.274 ms
- 2 (192.168.66.2) 2.702 ms 2.740 ms 2.730 ms
- 3 (192.168.39.5) 3.068 ms 3.107 ms 3.196 ms
- 4 (10.3.3.2) 5.331 ms 5.369 ms 5.407 ms
- 5 (116.89.191.189) 6.544 ms 6.629 ms 6.668 ms
- 6 (141.223.180.162) 6.857 ms 6.992 ms 6.723 ms
- 7 (141.223.254.148) 7.050 ms 7.227 ms 7.464 ms
- 8 end01.postech (141.223.107.110) 6.954 ms 6.948 ms 6.933 ms

tracert to 61.252.60.42 (61.252.60.42), 30 hops max, 60 byte packets

- 1 PIRLW-2.postech.ac.kr (141.223.107.99) 0.624 ms 1.070 ms 1.300 ms
- 2 141.223.254.147 (141.223.254.147) 0.535 ms 0.540 ms 0.528 ms
- 3 141.223.180.81 (141.223.180.81) 0.734 ms 0.713 ms 0.948 ms
- 4 116.89.191.190 (116.89.191.190) 2.181 ms 2.176 ms 2.403 ms
- 5 10.3.3.1 (10.3.3.1) 4.881 ms 5.118 ms 5.111 ms
- 6 192.168.39.6 (192.168.39.6) 5.094 ms 4.304 ms 4.288 ms
- 7 192.168.66.1 (192.168.66.1) 6.512 ms 6.501 ms 6.842 ms
- 8 cap01.gist.koren01 (61.252.60.42) 6.827 ms 6.828 ms 6.817 ms



GIST  
61.252.60.1

홍남대  
203.255.253.66

포항공단  
116.89.191.189

# NetOpen Connectivity via KOREN

