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SINET connections to Europe and US

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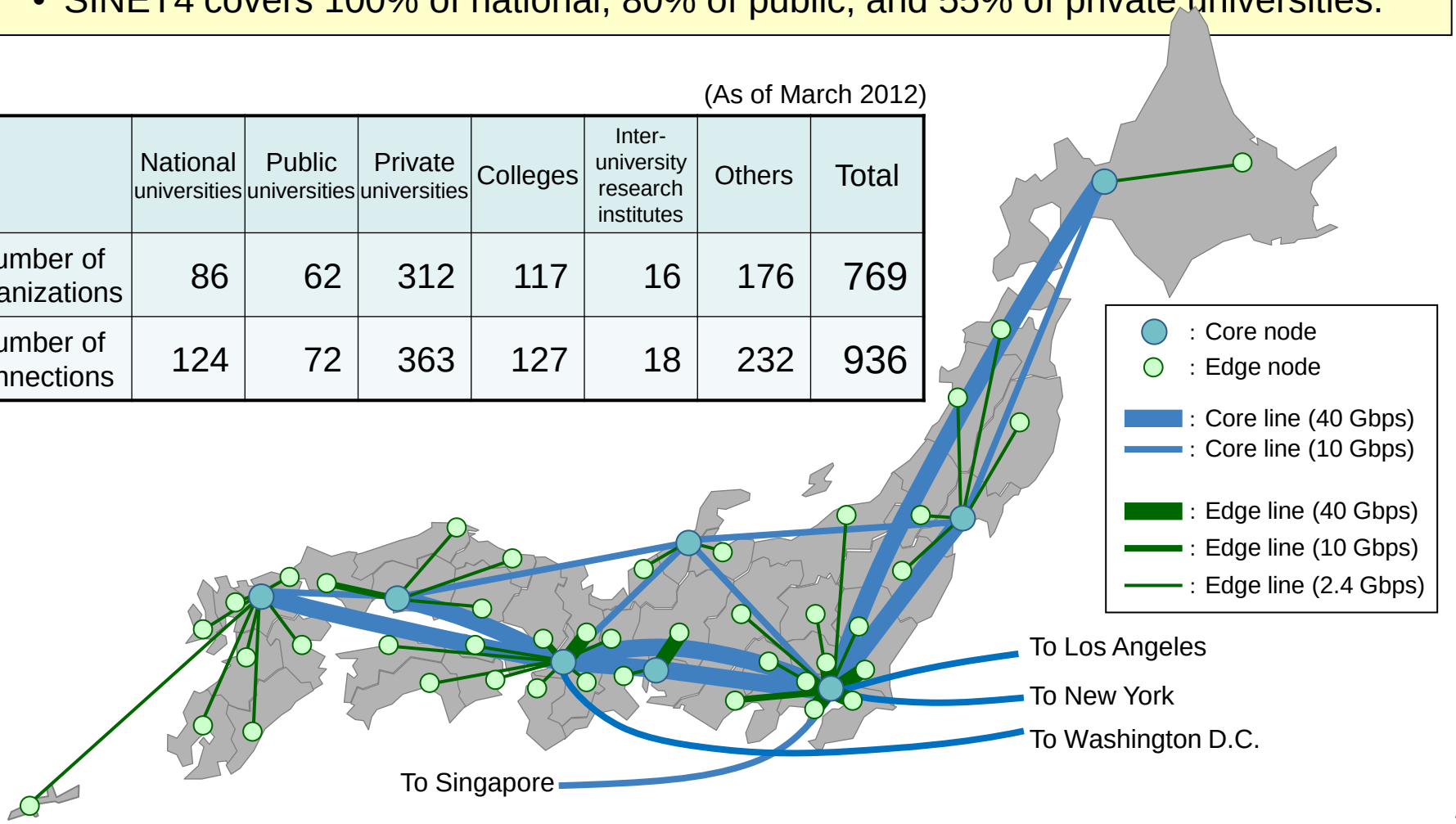
Science Information Network (SINET)

- Academic backbone network for more than 700 universities and research institutions and more than 2 million users.
  - SINET4 covers all 47 prefectures.
  - SINET4 covers 100% of national, 80% of public, and 55% of private universities.

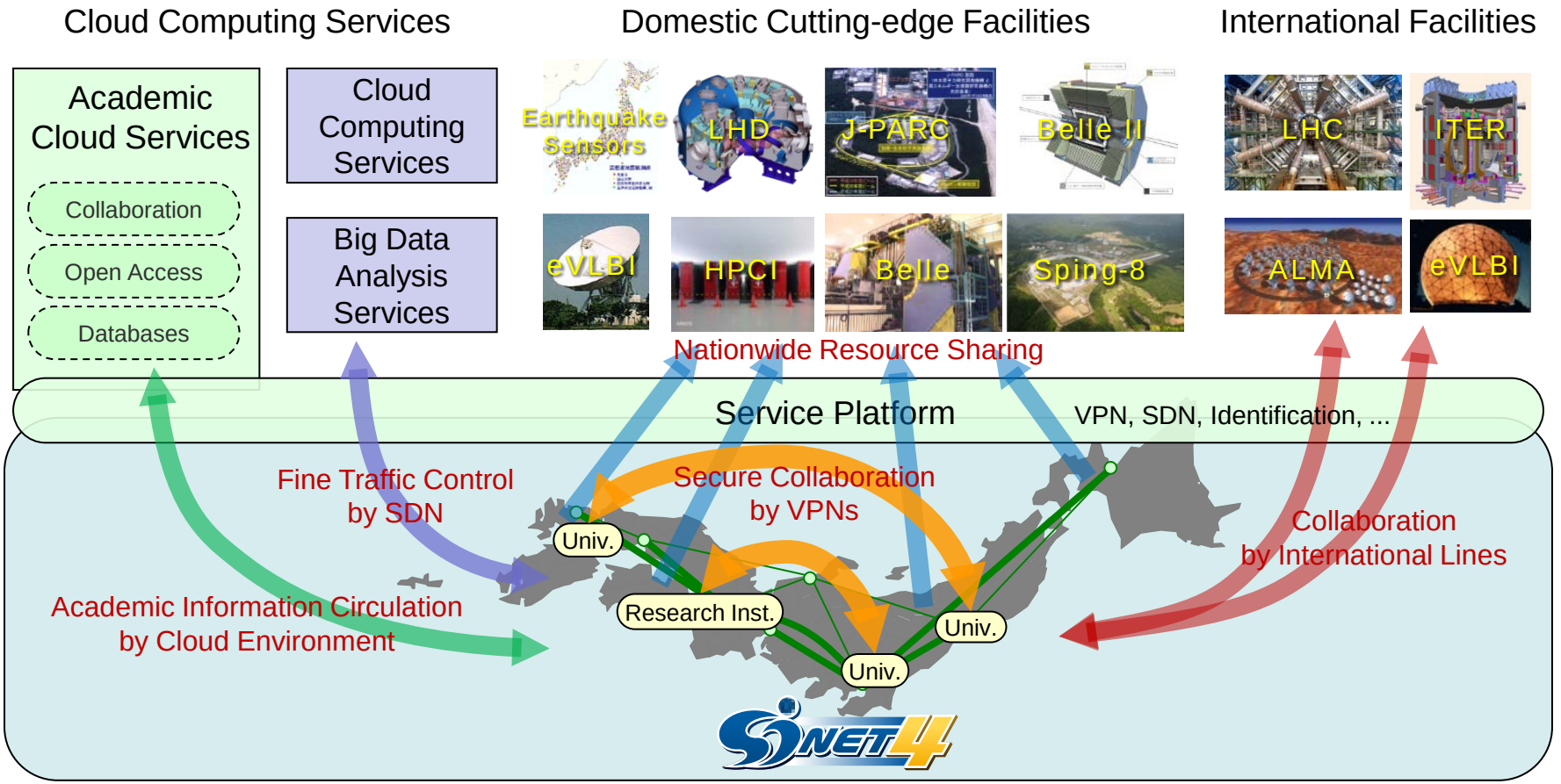
(As of March 2012)

	National universities	Public universities	Private universities	Colleges	Inter-university research institutes	Others	Total
Number of organizations	86	62	312	117	16	176	769
Number of connections	124	72	363	127	18	232	936



Advanced Infrastructure for Research and Education

- Facilitating nationwide resource-sharing of cutting-edge experimental devices, super-computers, and other research resources.
- Fostering secure collaboration among user organizations by high-performance VPNs.
- Promoting cloud computing services and upper-layer services.



SINET4 Services

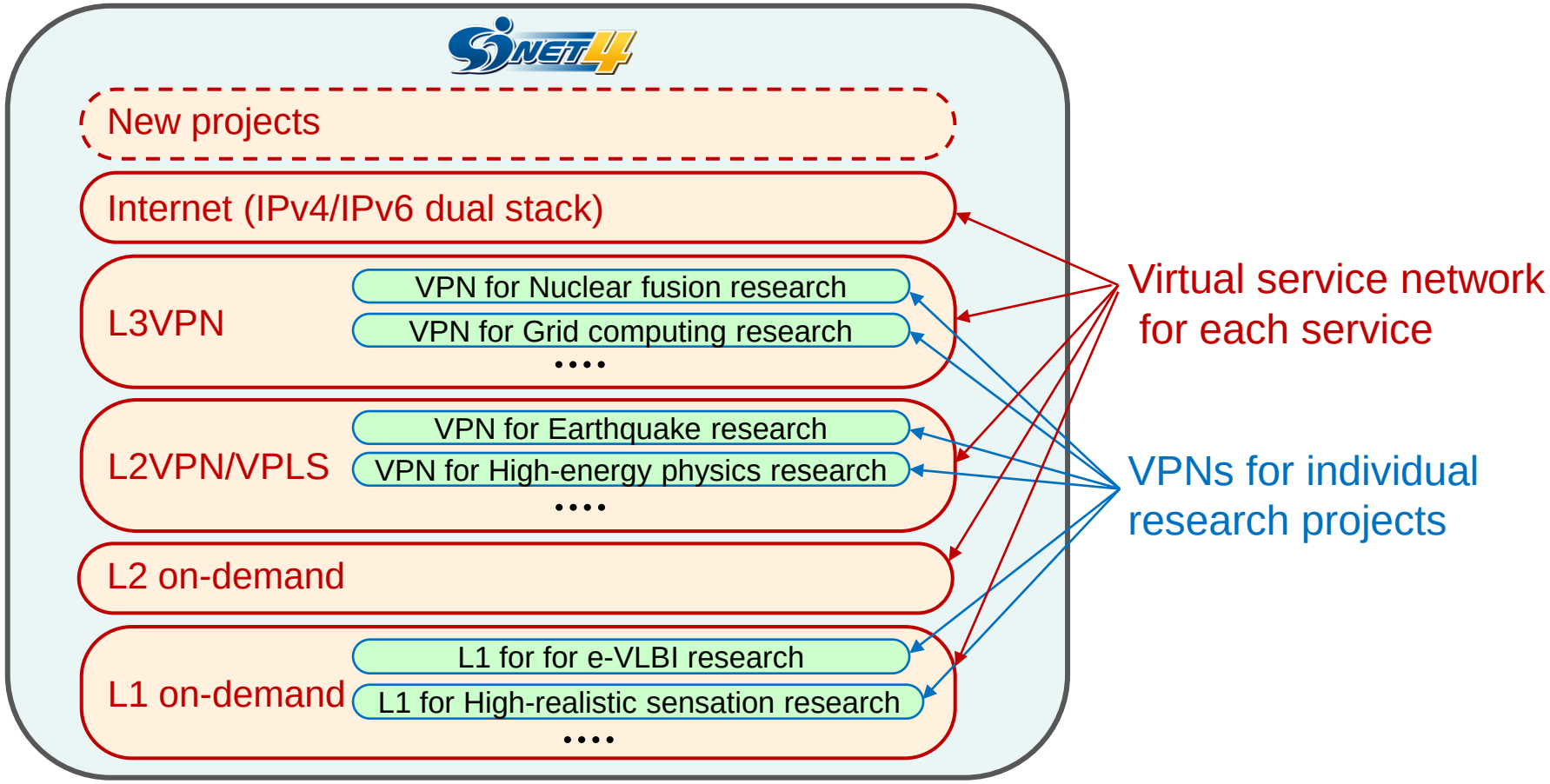
◆ SINET4 needs to provide the following variety of multilayer network services.

Service Menu		Status	Note
Layer-3 Service	Commercial Internet access	✓	Via IXs and global ISPs
	IPv6	✓	Native/dual-stack/tunnel
	IPv4 full-route information	✓	
	IPv6 multicast (+QoS)	✓	
	Application-based QoS	✓	
	L3VPN (+QoS)	✓	
Layer-2 Service	L2VPN/VPLS (+QoS)	✓	Fastest growing service
	L2VPN/VPLS on-demand	Planned	For several projects
Layer-1 Service	L1 on demand	✓	Over 1,000 paths were setup/released so far
Other Service	Performance measurement	✓	
	Traffic measurement	✓	
	Private Cloud support	✓	

VPN: Virtual Private Network

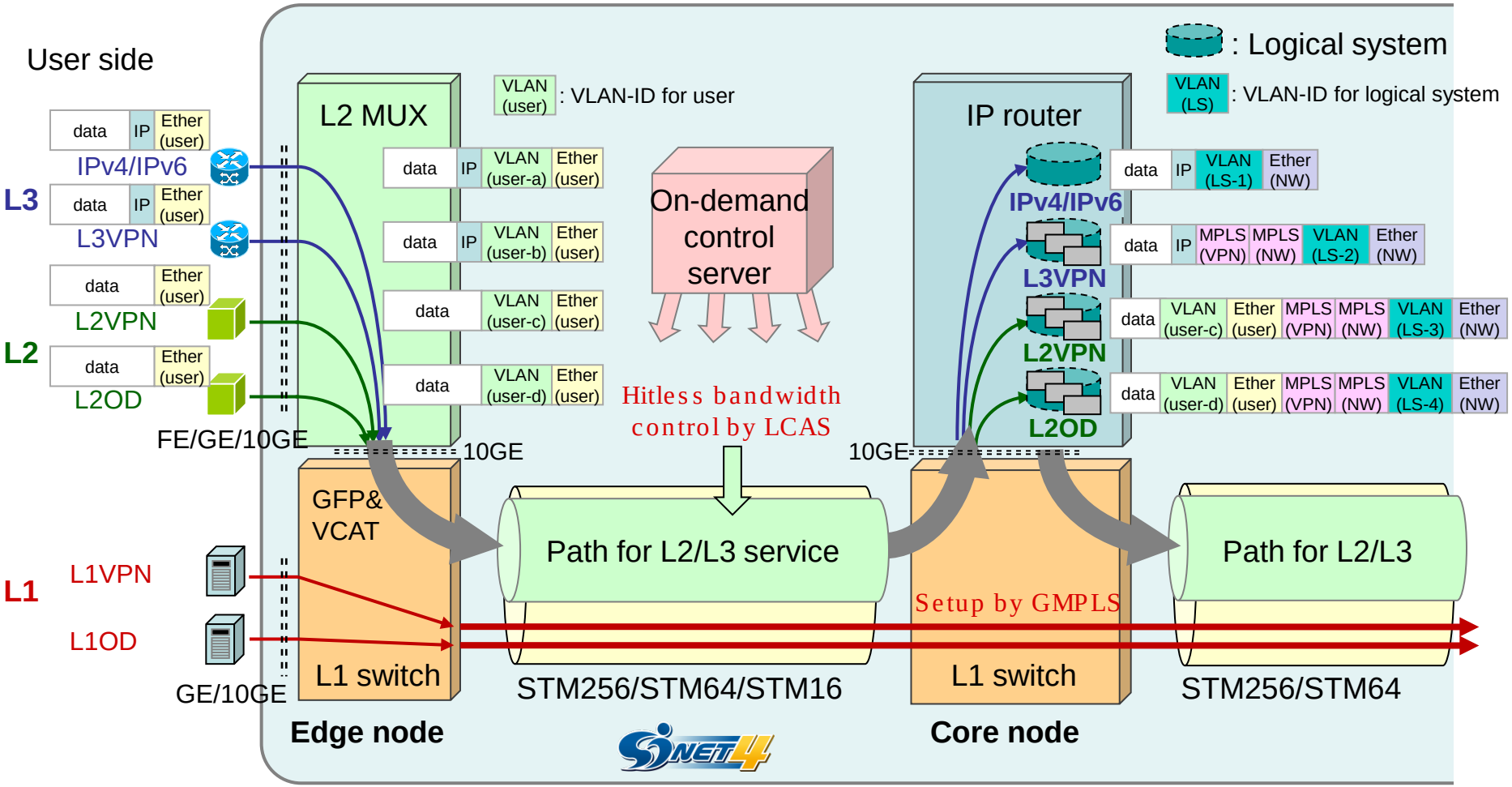
Multilayer Network Service Provision

- SINET4 provides a variety of multilayer network services on a single network platform.
- It forms virtually separated service networks for each service group, in order to allow each network service to grow independently and to avoid any instability due to functional upgrades or failure recovery actions of co-existing network services.



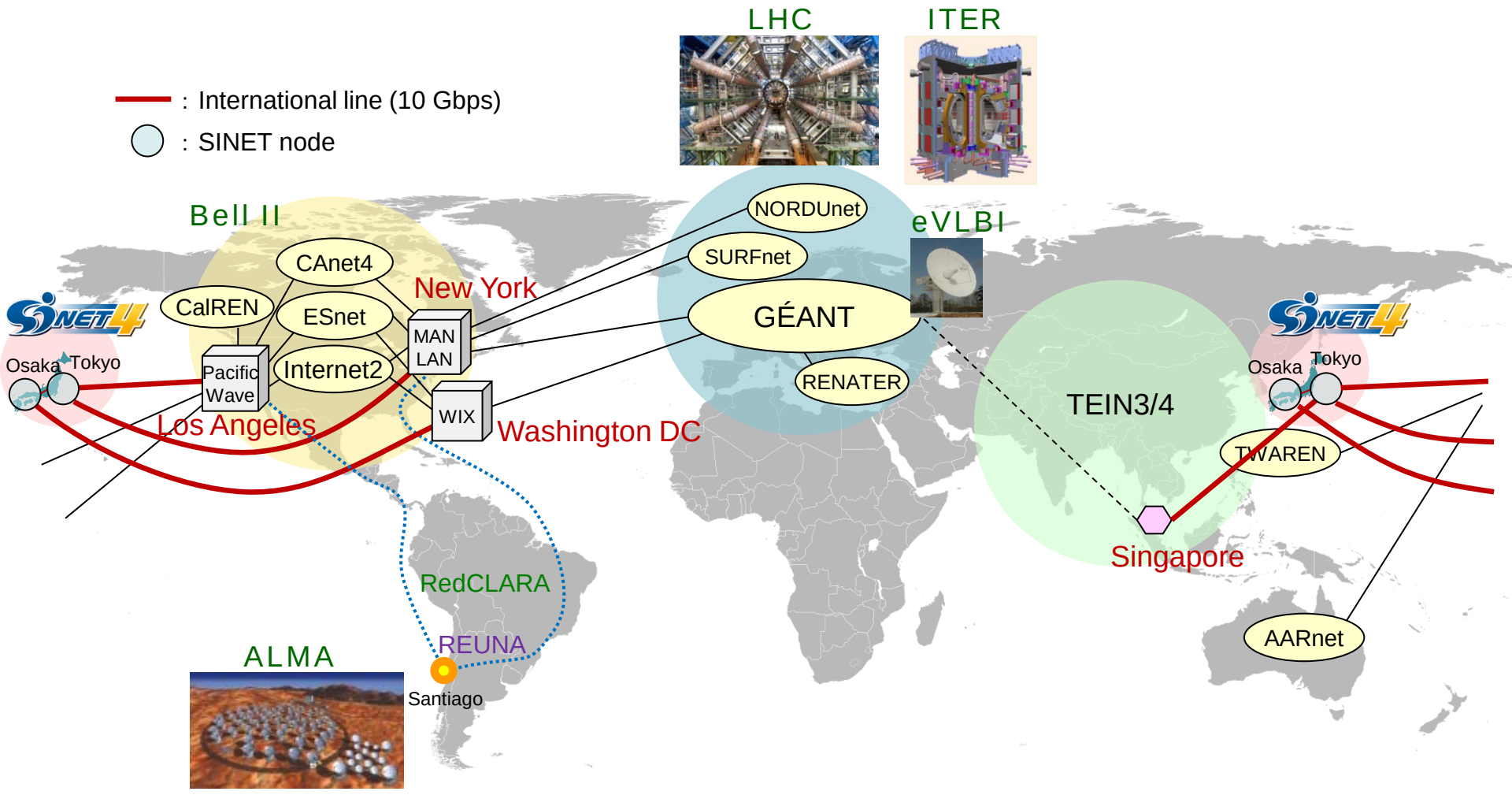
Technical Design of SINET4

◆ SINET4 combines advanced networking functions in order to provide multilayer network services with dynamic resource assignment. On-demand control servers were developed for dynamic layer-1/2 paths and flexible bandwidth assignment.

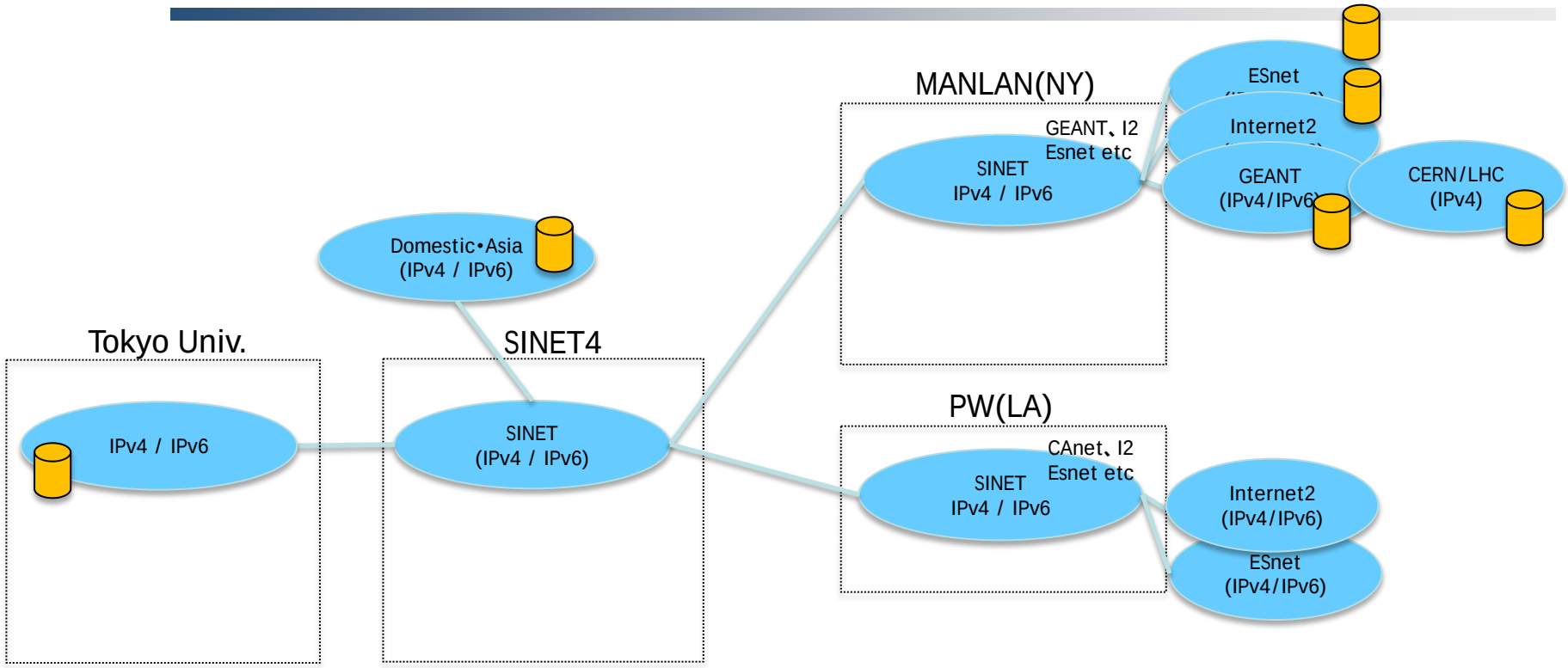


Infrastructure for International Research Projects

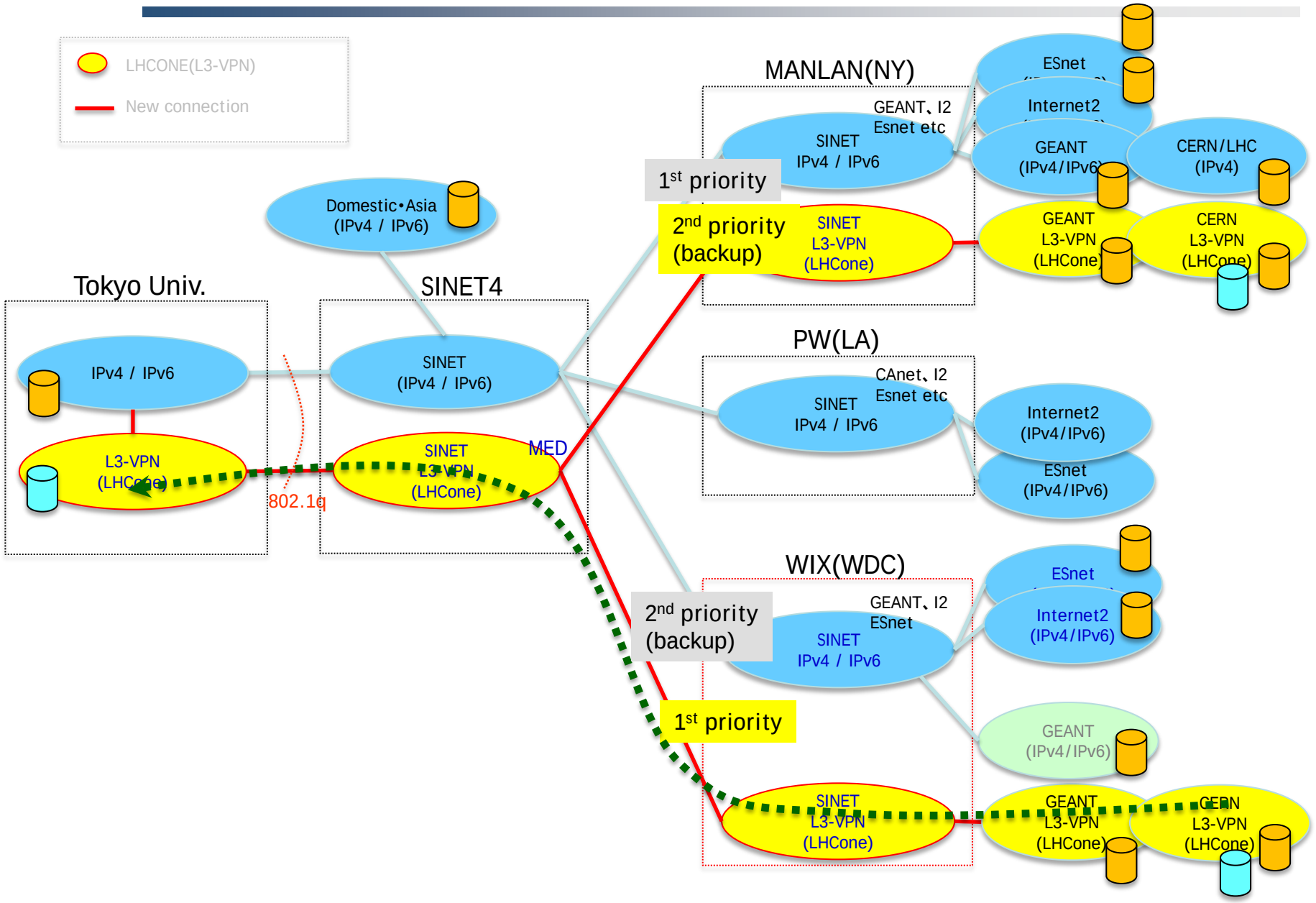
- SINET supports many international research projects by its international lines (three 10-Gbps lines to U.S.A. and one 10-Gbps line to Singapore) in collaboration with its partners such as Internet2, GÉANT, TEIN, and so on.



LHC Traffic - current



LHC Traffic using L3VPN(LHCone) -1st step(now testing)



Route control (LHCone/GEANT)

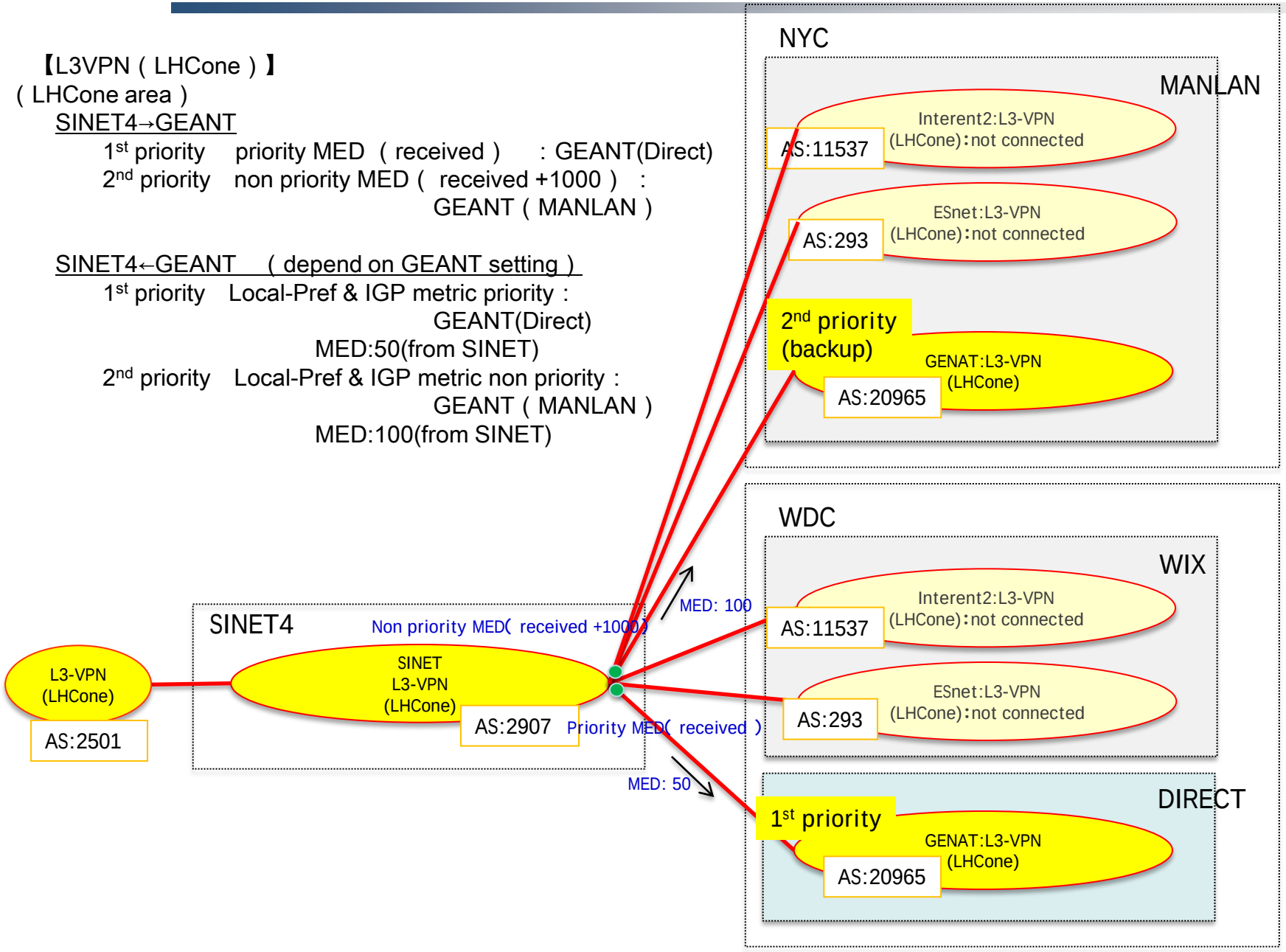
【L3VPN (LHCone) 】
(LHCone area)

SINET4→GEANT

1st priority　priority MED (received)　: GEANT(Direct)
2nd priority　non priority MED (received +1000) :
GEANT (MANLAN)

SINET4←GEANT　(depend on GEANT setting)

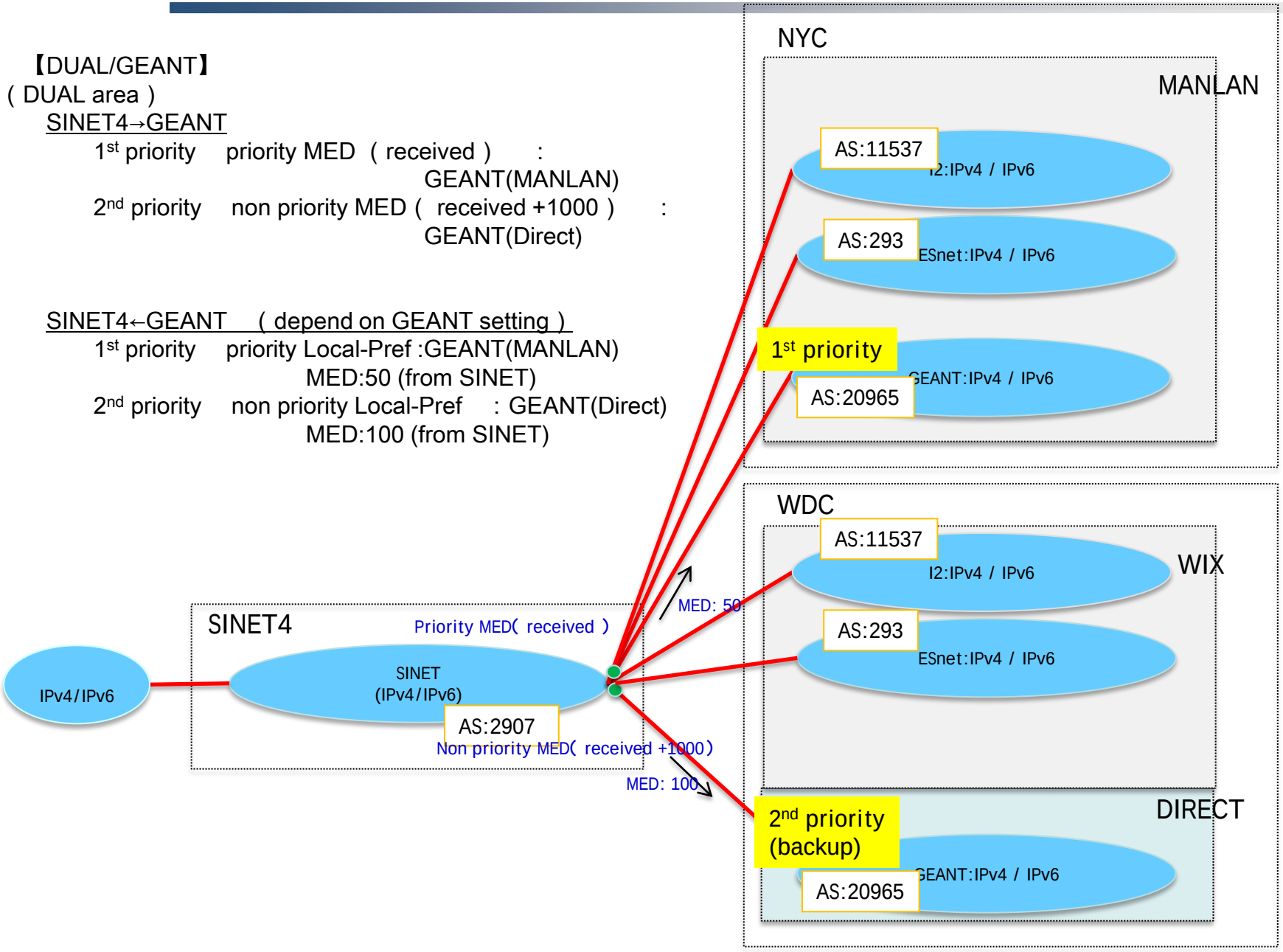
1st priority　Local-Pref & IGP metric priority :
GEANT(Direct)
MED:50(from SINET)
2nd priority　Local-Pref & IGP metric non priority :
GEANT (MANLAN)
MED:100(from SINET)



Route control (DUAL/GEANT)

【DUAL/GEANT】
(DUAL area)
SINET4→GEANT
1st priority priority MED (received) : GEANT(MANLAN)
2nd priority non priority MED (received +1000) : GEANT(Direct)

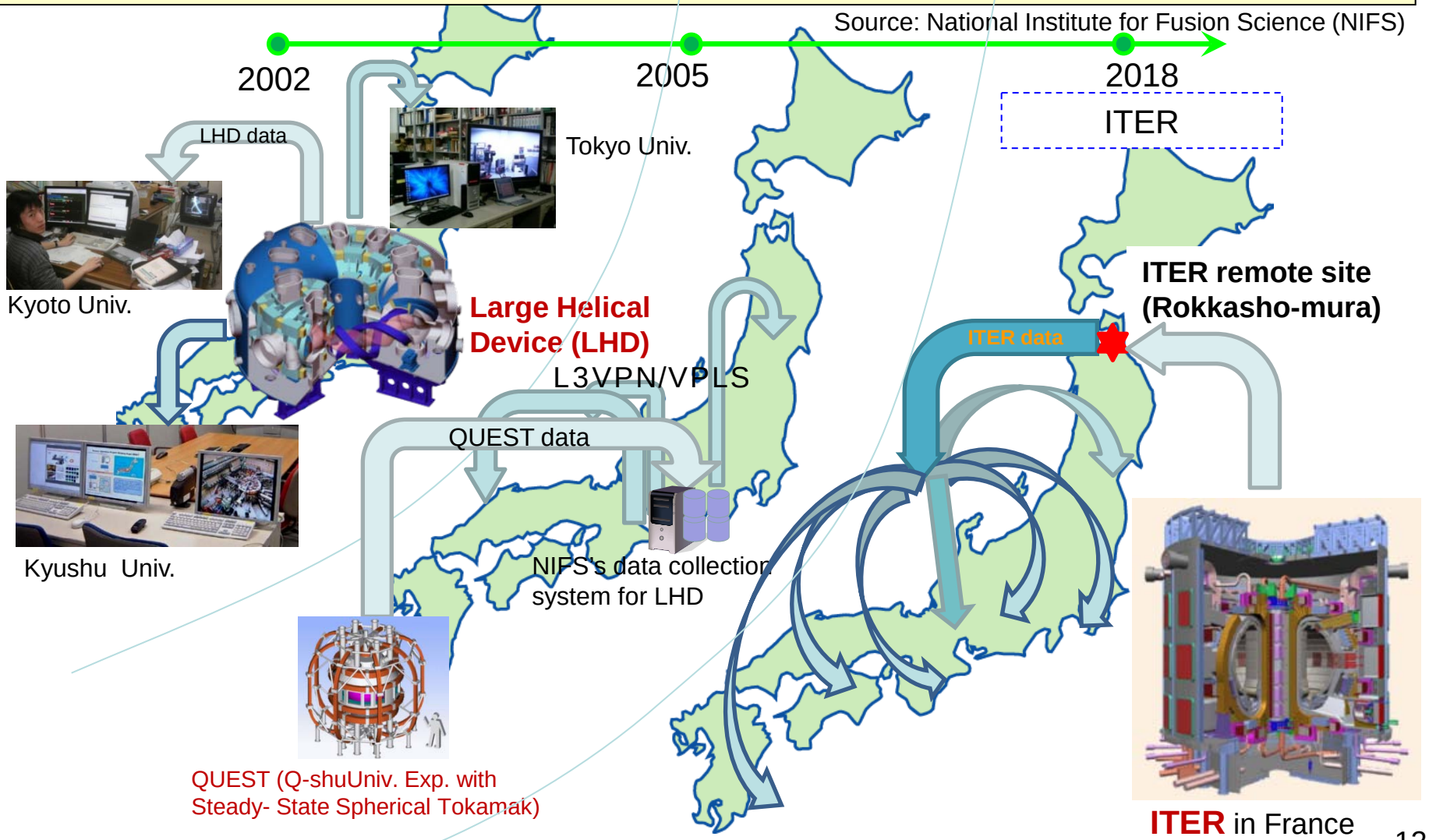
SINET4←GEANT (depend on GEANT setting)
1st priority priority Local-Pref :GEANT(MANLAN)
MED:50 (from SINET)
2nd priority non priority Local-Pref : GEANT(Direct)
MED:100 (from SINET)



Usage Example in Nuclear Fusion Science

- Large Helical Device (LHD) and its measure data are shared among universities and NIFS through SINET VPN, and the data volume has been increasing.
- Rokkasho-mura, the remote site of ITER, is open for supercomputer simulations.

Source: National Institute for Fusion Science (NIFS)



Thank you very much!