FiRST @ETRI : Virtualized Programmable Platform Update

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ETRI Contribution in Spiral-2

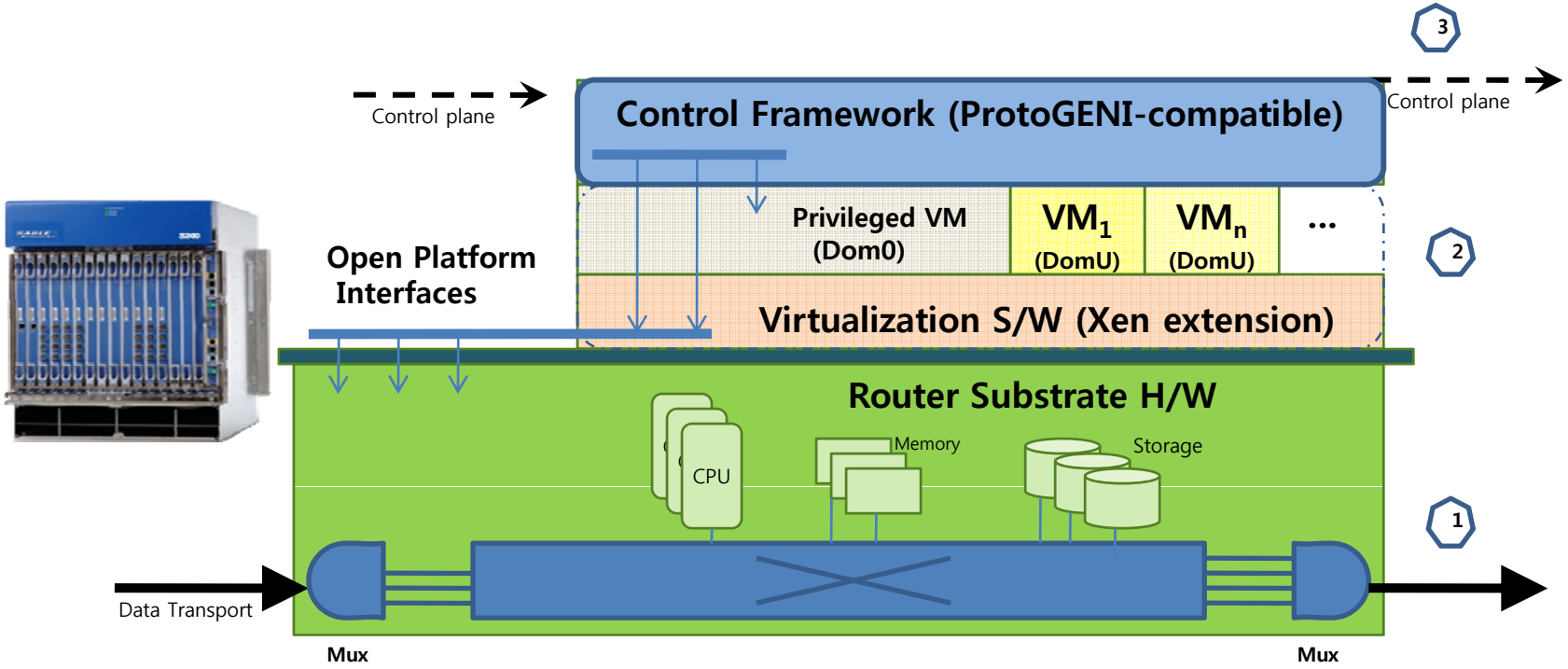
- Cluster C Integration Proposal
  - The objective is to build protoGENI control framework in ETRI platform and extend this framework for federated controls across national boundaries (e.g., GENI – Korea).
    - ETRI will develop a virtualized programmable router platform for its own, based on protoGENI control framework.
  - Since ETRI platform is an entirely different hardware platform from the one Emulab normally manages, ETRI plans to implement a ProtoGENI compatible Component Manager interface for ETRI platform.
    - ETRI researchers will be able to use a common API to create slices and allocate resources on any of protoGENI-based federated testbeds (Cluster C team) across national boundaries.

Roadmap for Controls Integration

- **Step 1. Private Domain**
  - **Holding our own domestic control center**
  - **Maintain ProtoGENI-compatibility (Cluster C)**
- **Step 2. Domain (Clearinghouse) Federation**
  - **GENI (ProtoGENI, Utah) <-> ETRI Domain**
    - Engaged in an international federation trial with the GENI
    - Migrate our nodes and slices to an independent GENI authority and vice versa.

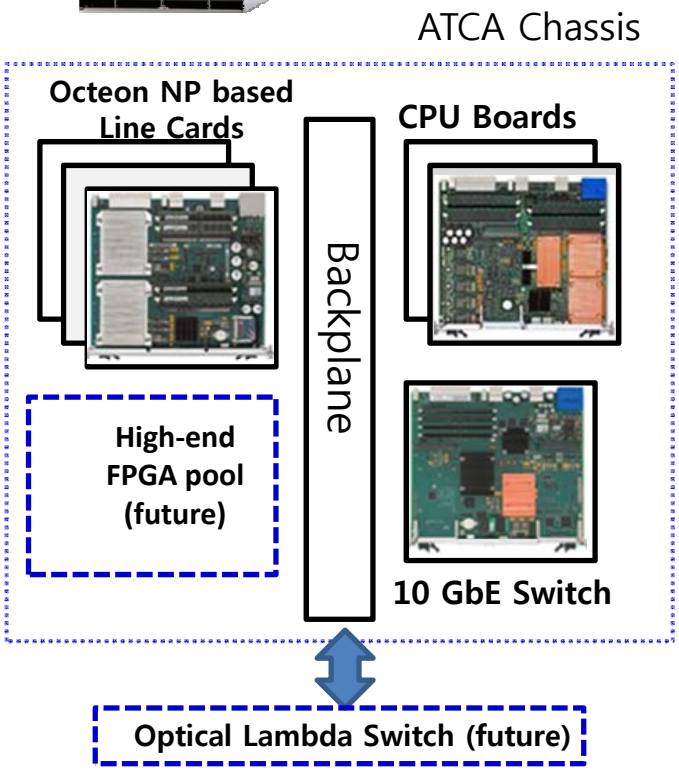
FiRST Future Internet Research for Sustainable Testbed

@ETRI Platform



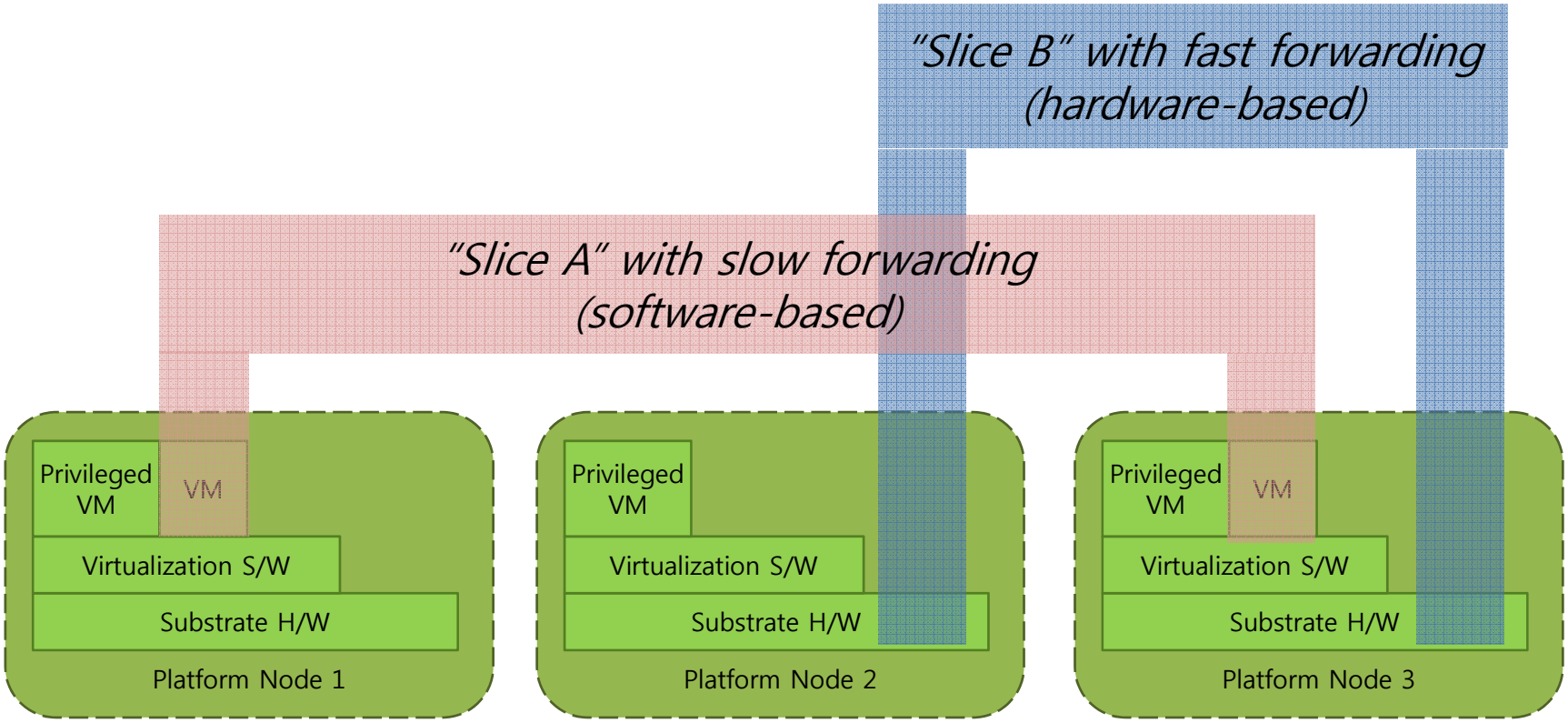
ETRI Platform H/W Spec.

- COTS blades – ATCA
- Octeon Processor



Cards	Specification
Line Card	- Dual Octeon NP 5860 - 2x 10GbE, 10x 1GbE
Ethernet-switch Card	- 16-slot 10GbE and 100/1000Base-T fabric switch - More than 100Gbps of external connectivity - Non-blocking Layer 2 switching
Processor Card	- Intel Xeon dual core - Dual 1GbE Ethernet controller - 2x 10/100/1000Base-T

Two Types of Slicing : Slow Forwarding vs. Fast Forwarding



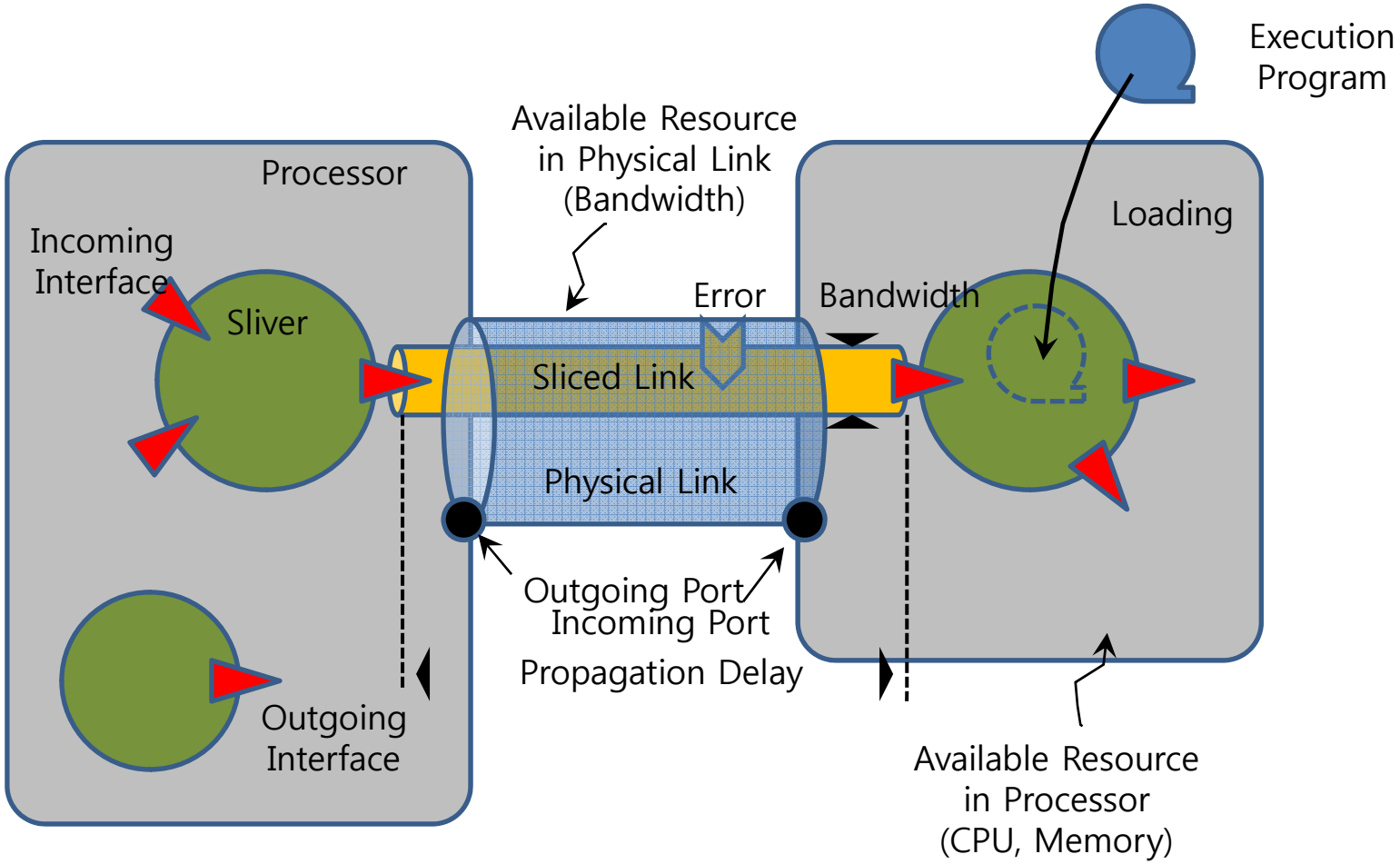
Open Platform Interfaces

- Open Programmable APIs for Researchers
  - E.g., To support hardware-based packet processing
    - work_request_sync() /* get_work */
    - send_packet_prepare() /* packet building */
    - send_packet_finish() /* packet sending */
    - …
- Open Platform APIs for Component Management
  - To control and manage the platform's (hardware) resources.

Platform APIs for Component Management

- Create-Sliver
- Define-Sliver-Rspec
- Check-Sliver-Available-Rspec
- Allocate-Sliver-Rspec
- Delete-Sliver-Rspec
- Delete-Sliver
- Create-Interface
- Define-Interface-Rspec
- Check-Interface-Available-Rspec
- Allocate-Interface-Rspec
- Delete-Interface-Rspec
- Delete-Interface
- Create-Link
- Define-Link-Rspec
- Check-Link-Available-Rspec
- Allocate-Link-Rspec
- Delete-Link-Rspec
- Delete-Link
- Query-Processor-Utilization
- Query-Memory-Utilization
- Query-Link-Utilization
- Load-Program
- Unload-Program
- Start-Program-Execution
- Stop-Program-Execution

End-to-End Slice Creation



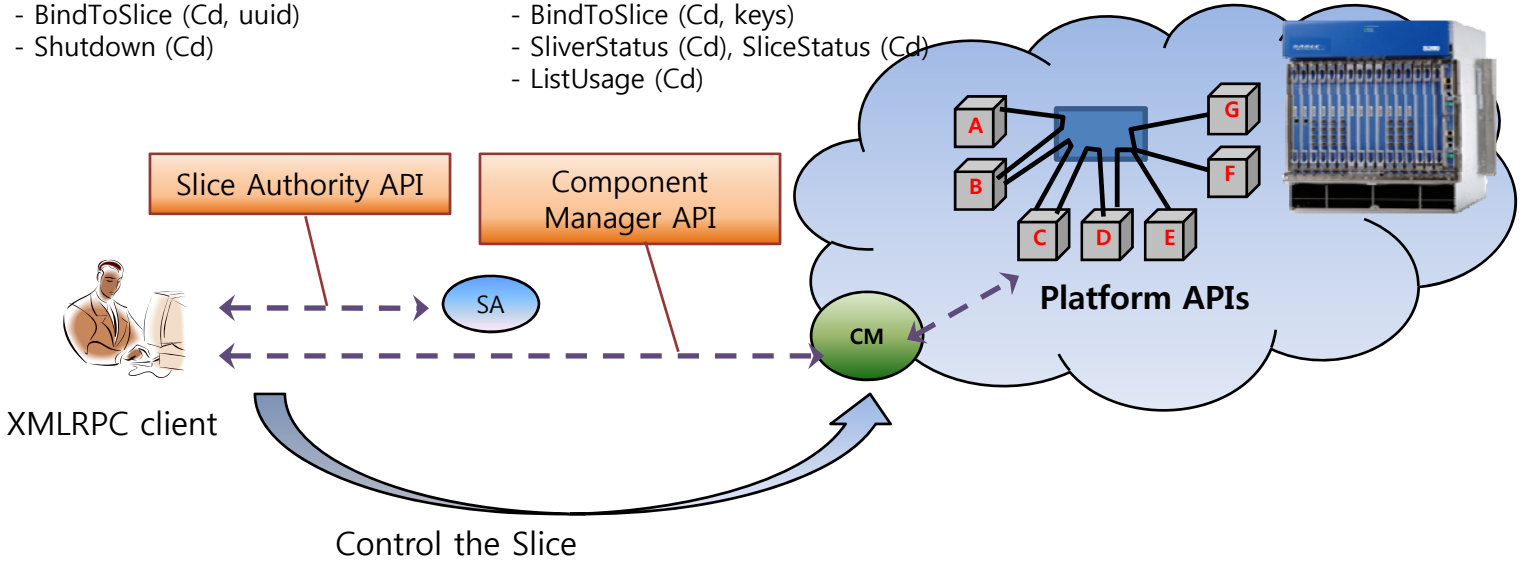
ProtoGENI Controls Integration

Slice Authority APIs
- **GenCredential** (Cd, uuid, type)
- Resolve (Cd, uuid, type)
- **Register** (Cd, hrn, type)
- Remove (Cd, uuid, type)
- DiscoverResources (Cd, rspec)
- GetKeys (Cd)
- BindToSlice (Cd, uuid)
- Shutdown (Cd)

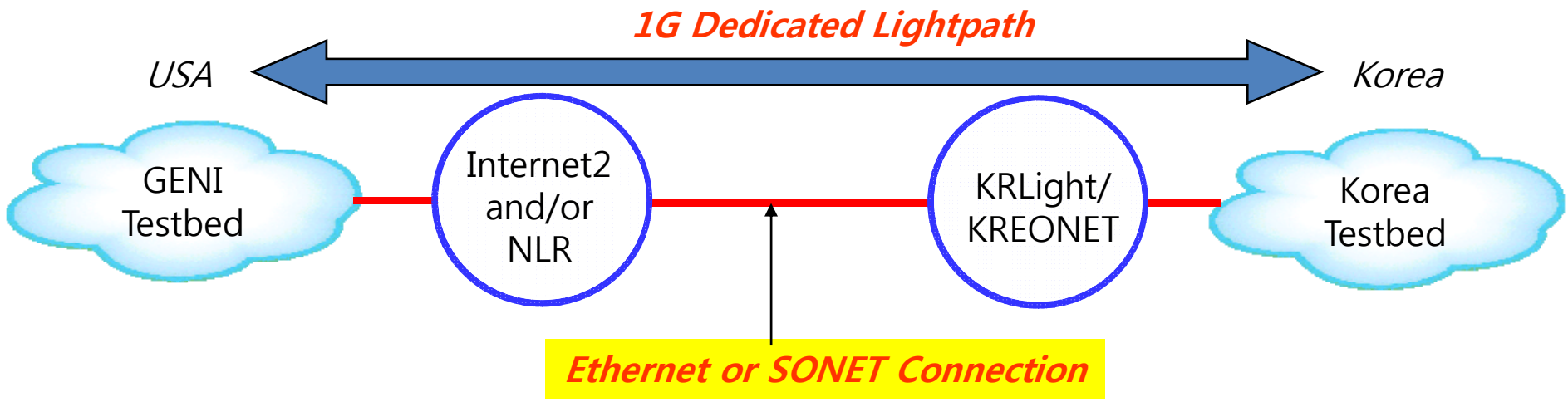
Component Manager APIs
- Resolve (Cd, uuid, type)
- **DiscoverResources (Cd)**
- GetTicket (Cd, rspec)
- **RedeemTicket (ticket, keys)**
- UpdateSliver (Cd, rspec, keys)
- ReleaseTicket (ticket)
- **StartSliver (Cd)**
- DeleteSliver (Cd)
- DeleteSlice (Cd)
- GetSliver (Cd)
- BindToSlice (Cd, keys)
- SliverStatus (Cd), SliceStatus (Cd)
- ListUsage (Cd)

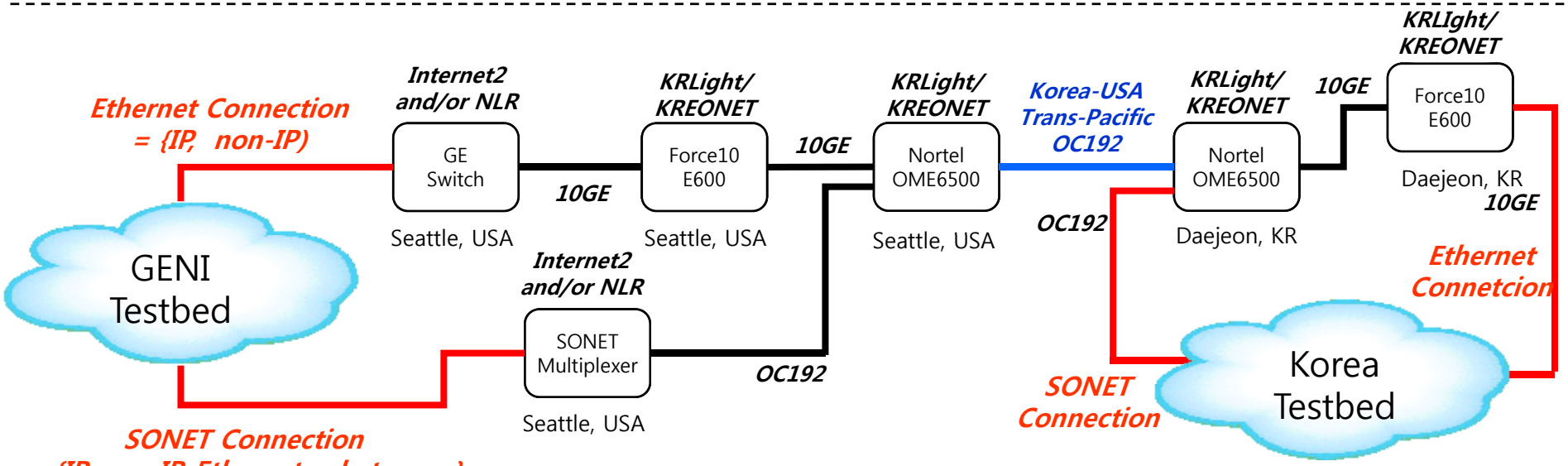
ProtoGENI mapper & wrapper

Platform APIs for Component Management
- •Create-Sliver
- •Define-Sliver-Rspec
- •Check-Sliver-Available-Rspec
- •Allocate-Sliver-Rspec
- •Delete-Sliver-Rspec
- •Delete-Sliver
- •Create-Interface
- •Define-Interface-Rspec
- •Check-Interface-Available-Rspec
- •Allocate-Interface-Rspec
- •Delete-Interface-Rspec
- •Delete-Interface
- ....



GENI-Korea Connectivity





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