Helios: Fully distributed OpenFlow controller platform

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Architecture
- Scalable for large experiments (1 million flow handling demonstrated)
  - Module is instantiated as a process and deployed on arbitrary host at runtime
- Multiple researchers cooperate via “service” on a single Helios instance
  - Running module maintenance without stopping infrastructure operation
- Function modules in C and scenario script

Core functions
- Messaging framework
  - Service repository
  - Multiple host version (*)
- Application framework
  - OpenFlow (v1.0)
- Logging and configuration
- Module management

Modules provided
- OpenFlow interface
  - Switch slicing (*)
- OpenFlow message distributer
- Path manager
  - Shortest path calculation
  - Automatic reroute on path failure
- Topology manager
- Learning L2 switch
- Shortest path L2 routing
- IP network emulation with ACL (*)
- Database for centralized information sharing (*)

(*) Under development

Demonstration
- Millions of concurrent flow handling
- Multi-path load-balancing and core-stateless flow handling (Source Flow)

Helios usage example for this demo

Real-time Flow Monitor (in front of you)

Testbed @ NEC