Demonstration of a Distributed Router

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Centralized Monolithic Router

- Open source PC-based router
  - Starting point for system design work
Distributed Router Architectures

• Investigate distributed and modular router designs
  - Network system *composed* of several *modules* communicating through open well-defined interfaces over an internal network

• Improve scalability, flexibility, and availability
Modular Distributed Router

• What mechanisms (protocols, interfaces) are needed in order to modularize and decentralize a router?

• How should many functional modules interoperate to form a distributed router?
  - Distributed control as well as decentralized forwarding!
System Design

- CE implements control functions, typically on a CPU
- FE implements forwarding functions, ASIC/FPGA/NPU/CPU
- Two internal networks – control and data (use IP inside the NE)
- Open source S/W, off-the-shelf H/W
System Implementation

- Forz protocol for physical separation between modules
  - Association (Hello/Bye msgs for heartbeats, capabilities, etc - dynamic)
  - Configuration (carry configuration information between CEs and FEs)
  - Data transfer (switch data packets FE-FE, CE-FE)
Demonstrator

- Five elements connected to a network
  - Regular laptops
- Middleware (Forz protocol)
- Configuration tool makes elements form a distributed router
- Appears as one single router
  - Existing tools can be used for configuration and management
- Graphical tool to illustrate association and data transfer