Linux Clusters Institute: Introduction to Networking

Ben Matthews, Software Engineer, NCAR
Types of Cluster Networks

• High-Speed Interconnect
• Internet/External Access
• Management/Boot/Lights-Out
Requirements

• High-Speed Interconnect
  • Low Latency
  • High Bandwidth
  • Reliable
  • User software support (MPI, etc)
Requirements

• Internet/External Access
  • Bandwidth
  • Access to/from external sites
  • Security
  • Reliable
Requirements

• Management
  • Cheap
  • Reliable Hardware/Software Support
    • PXE
    • IPMI
  • Secure (Isolation from users)
External

• Ethernet
• Many Vendors
  • Arista
  • Cisco
  • Juniper
  • Mellanox
Interconnect

- InfiniBand
  - Mellanox
- OmniPath (Intel)
- Cray
- Ethernet
Management

• Cheap GigE usually good enough
• NIC may or may not be shared with Lights-out management
• Should meet the requirements of your cluster manager (xCAT, SMC, HP CMU, Bright, Cobbler/Puppet)
• VLAN support desirable for isolating insecure hardware (managed switches, IPMI, etc)
Software

• Network gear exists to support your software – consider what you want to run before buying network hardware (or any hardware)
• MPI?
• Other middleware?
• RDMA? TCP? ...?
Questions?
Extra Time: Physical Layer