# SIG NewGrad
# Research Overview

*Martin Swany*

**UNIVERSITY OF DELAWARE.®**

---

# Networked Systems and Clusters and Grids, Oh My!

- New horizons in computing
- World-wide resource sharing
- Aggregating systems to solve larger problems
- Distributed systems as the rule
- Truly networked operating environments
- Ubiquitous connectivity

# The Computational Grid

- A new paradigm in distributed computing
  - Initially targeted high-performance scientific computing
  - Growing support in industry
- Computational "power" available from anywhere in the network
  - Like the electrical power grid
- Computing and storage as utilities
- Ubiquitous and high-quality networks enable this evolution

# Clusters of Systems

- Parallel computing has long been a staple of high-performance computing
- Originally specialized systems such as the Cray were the only viable solution
- Recently, clusters of commodity systems have become a viable alternative
  - Particularly when augmented with high-performance network hardware
- These systems are economically viable but much work remains to be done

# Network Support for Distributed Computing

- Ubiquitous networking has changed the way we live
- Networks should evolve to provide new services to make this easier
- Inversion of system power
- Specialization of services

# System Support for Networking

- Despite a great deal of research, systems are still designed with networking as something of an afterthought
- Systems must evolve to take better advantage of networks
- Much work remains for moving large amounts of data efficiently
  - One-sided communication
- Linux's sendfile() is a good starting point
  - Larger description of intent

# Current Project Sampler

- Cluster Optimization (Kiwi)
- Logistical Session Layer
- Phoebus
- Grid Forum Network Measurement
- Modeling and Prediction
- Mercury



**LSL vs. Direct Transfers from U. Del to UCSB (LSL depots at WASH and LOSA)**