Experimental Needs for High Performance Network Research

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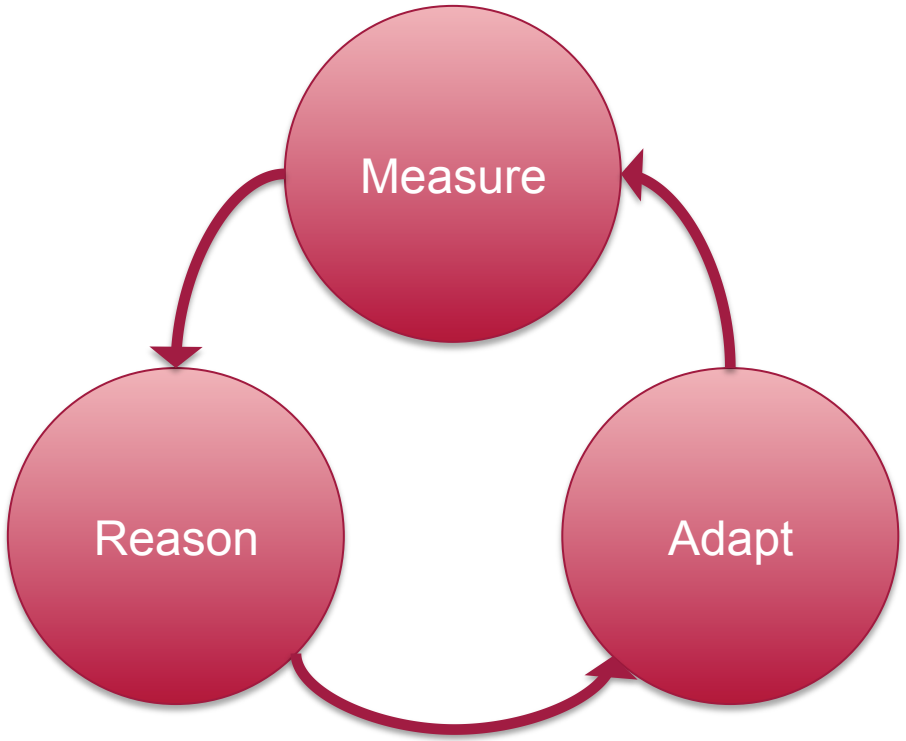
Research Overview

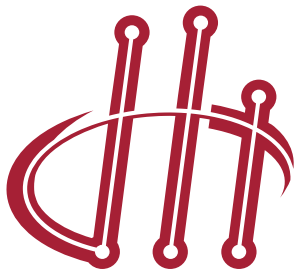
Goal: Evolve network architectures for high-performance distributed computing

- Measure
  - Network measurement with perfSONAR and Periscope
- Reason
  - Network models
  - Graph algorithms
- Adapt
  - Alter network topology
  - Protocol optimization or translation



The Data Logistics Toolkit

- CC-NIE funded integration project with U. Tennessee and Vanderbilt U.
- Logistics - *the management of the flow of resources from the point of origin to the point of consumption*
- The DLT integrates local and distributed storage infrastructure, file transfer software, network acceleration, performance monitoring and tuning
- The DLT software distribution supports the creation of data distribution and transfer overlays



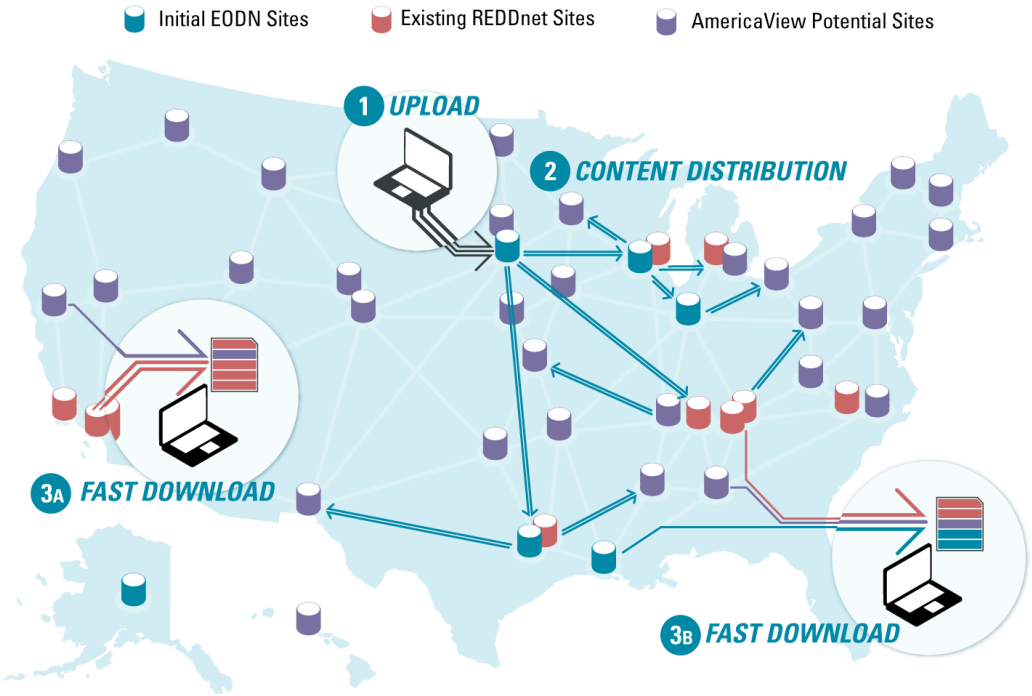
Data Logistics Toolkit

Experiment #1: Phoebus

- Phoebus is an open source WAN accelerator
  - Included in the DLT
- Measurements indicate that a direct TCP connection isn't performing well enough
- Locate or create a Phoebus Gateway
- Alter network topology if necessary
- Ideally, create traffic-engineered L2 paths and burst with e.g. RDMA over Ethernet
- Requires: high-performance software-defined network (10G), bare-metal or tuned VM

Experiment #2: EODN

- Earth Observation Depot Network
  - Collaboration with AmericaView and USGS to distribute satellite imagery
- Key application in GENI Intelligent Data Movement Service (IDMS) experiment
- Requires: long-running partition of resources, storage, external connectivity



Measurement

- Key problem in experimental systems work!
- Even with involvement in GENI GEMINI Instrumentation and Measurement effort, getting measurements of the sort that we want is a challenge