A Technique for Moving Large Datasets over High-Performance Long Distance Networks

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Network Overview

• Easily configurable dedicated network

• 2 dedicated lambdas (1 for each loop endpoint)
  – 9.6 Gbps
Impedance Matching

• Analogy to Transmission Line Impedance Matching
  • Consider a transmission line composed of 3 segments connected at 4 points
  • The Impedance at the connection points must be matched properly in order to maintain maximum amplitude of the signal from one end to the other
  • An impedance mismatch results in a decrease in the signal strength/amplitude and signal noise from reflections at the mismatched interfaces
Serial Ordering

<<TargetThread>>

<<QThread>>
gt0

<<QThread>>
gt1

<<QThread>>
gt2

<<Operating System>>
POSIX I/O API

Assign(op0)

Walt(lock)

Issue(op0)

Assign(op1)

Assign(op2)

Walt(lock)

Walt(lock)

Issue(op1)

Complete(op0)

Complete(op1)

Release(lock)

Release(lock)

Release(lock)

Perform(op0)

Perform(op1)

Perform(op2)

Complete(op2)
Loose Ordering
File Transfer Performance Sunnyvale Loop

![Graph showing file transfer performance](image)

- **XDD**
- **XDD Serial**
- **BBCP**
- **GridFTP**

**Bandwidth (MB/s)** vs. **Threads**
File Transfer Multi-host Performance

Two source endpoints and two destination endpoints
Future Work

• Further exploration serial scheduling

• 40Gbit networks
  – Multi-NIC works now

• Parallel file system transfer scheduling

• Zero copy networking
  – Infiniband
  – UDT

• Dynamic Thread Matching

• Multiple file copy
Thank You!