Problem Statement and Architecture Document Updates

Tom Talpey

Network Appliance

Outline

- Documents
- Problem Statement
- Architecture
- Going forward

Problem Statement Document

- Newly updated:
  - draft-romanow-rdma-over-ip-problem-statement-01.txt
- Authors
  - Allyn Romanow, Cisco
  - Jeff Mogul, HP
  - Tom Talpey, NetApp
  - Steph Bailey, Sandburst
- Originally published February, 2002
- Discussed at 53rd IETF (Minneapolis)

Architecture Document

- Newly updated:
  - draft-bailey-roi-ddp-rdma-arch-01.txt
- Authors
  - Steph Bailey, Sandburst
  - Tom Talpey, NetApp
- Originally published February, 2002

Document Outlines

- Companion documents to each other
- The Problem Statement:
  - Defines and quantifies "The Problem"
  - Introduces DDP/RDMA concepts
- The Architecture:
  - Defines an abstract architecture
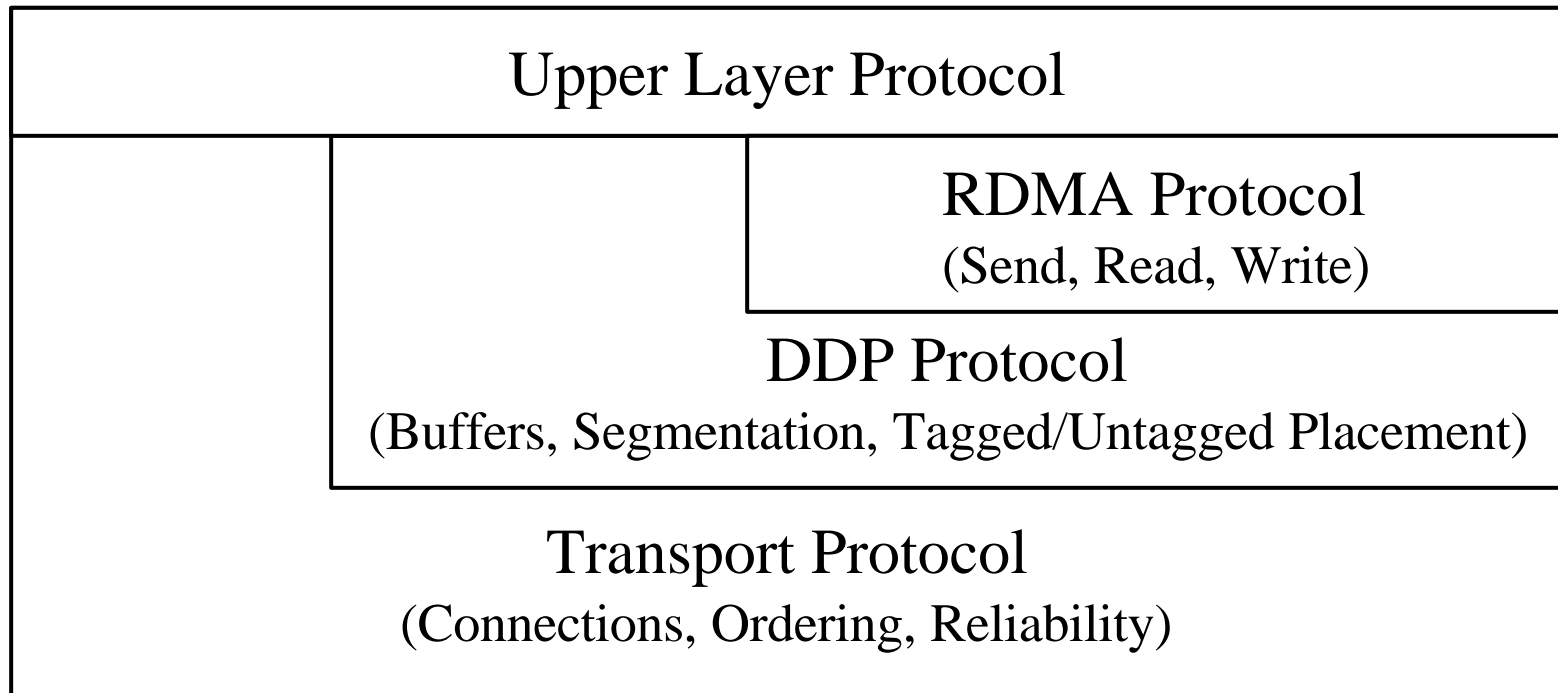 - Explores definitions and concepts

The Problem

- I/O Overhead and memory bottleneck
  - Highspeed networks continually outstrip the memory bus
  - Data copies worsen this
    - 3x memory bandwidth, cache pollution, etc.
  - Problem exists at 1Gbps, 10Gbps coming soon
  - Copy avoidance and TCP offload don't achieve zero-copy to the application
  - A general solution is required.

A Conceptual Framework

- Direct Data Placement:
  - Information, carried with each transport operation, allowing the receiver to safely place the data in its final location in memory.

- Remote Direct Memory Access:
  - Semantics allowing access by peers to selected local memory, employing Direct Data Placement techniques.

Protocol Layering

Upper Layer Protocol

RDMA Protocol
(Send, Read, Write)

DDP Protocol
(Buffers, Segmentation, Tagged/Untagged Placement)

Transport Protocol
(Connections, Ordering, Reliability)

Going Forward

- The Problem Statement is mostly done.
- Architecture issues
  - (not necessarily limited to Arch. document)
  - Ordering of placement, delivery
    - Behavior atop varying transports
  - Steering Tag details
    - Scope, capabilities
  - Security considerations and threat analysis