Disaggregation Engine

MANGOBOOST

MangoBoost's **patent-pending** Disaggregation Engine (MB-DA) offers RDMA capability and accelerated disaggregation based on RDMA.

Key Features

RDMA engine

- Standard RoCE v2 protocol
- Zero copy data transfer @ 100 Gbps
- Support 32 QPs & 256 MRs
- Provide Infiniband compatible driver

NVMe over RoCE-v2

- Compatible with linux NVMeoF driver
- NVMeoF target offloading
  - o Zero CPU cycle at target
- Fully saturate 8 remote NVMe SSDs

Remote storage virtualization

- Expose remote SSDs as local NVMe interface to the host (NVMe emulation)
- Seamless & hardware-accelerated NVMe → NVMeoF command translation

Misc.

- Allows custom IP integration using standard AXI interfaces
- Written in C-based HLS (AMD Vivado)
- SystemC version available soon (Siemens Catapult HLS) for portability to other FPGA/ASIC targets
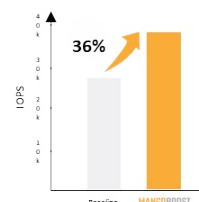
Application Use Cases

- Distributed storage server
- Big data applications, cloud computing
- High-performance computing (eg. scientific simulation, financial modeling)
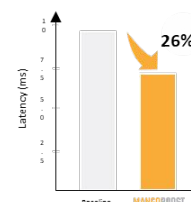
Case Study: SPECstorage 2020 on distributed storage server

- **Setup:** One NFS server with MB-DA, four remote storage servers with MB-DA and one NVMe SSD each. Intel Xeon Gold 6338 & 100Gbps network.
- MB-DA runs at 250 MHz, utilizing 311K LUTs, 524K FFs, 849 BRAMs, 277 URAMs
- Achieved 36% higher IOPS versus software baseline (tested with FIO)

I/O BANDWIDTH
NFS | Random R/W | bs=64k
36%
IOPS — Baseline | MANGOBOOST

AVERAGE LATENCY
NFS | Random R/W | bs=64k
26%
Latency (ms) — Baseline | MANGOBOOST

99% TAIL LATENCY
NFS | Random R/W | bs=64k
40%
Latency (ms) — Baseline | MANGOBOOST

MB-DS-001.1