Early Performance Results

OCP F2F
24 January 2018

Exos 2X14 & Exos 2X16z with MACH.2™ Multi-Actuator Technology

What & Why?

IOPS/TiB dropping as HDD capacity increases.

Dual-actuator leverages HDD hardware technology.

Media is separated into two groups of platters, each with its own independent actuator, read channel, and disk manager.

Data path is essentially independent, management and reporting path is mostly common.

Single Lane SAS

LUN0   LUN1

cache

Channel & Servo

Channel & Servo

HDD System
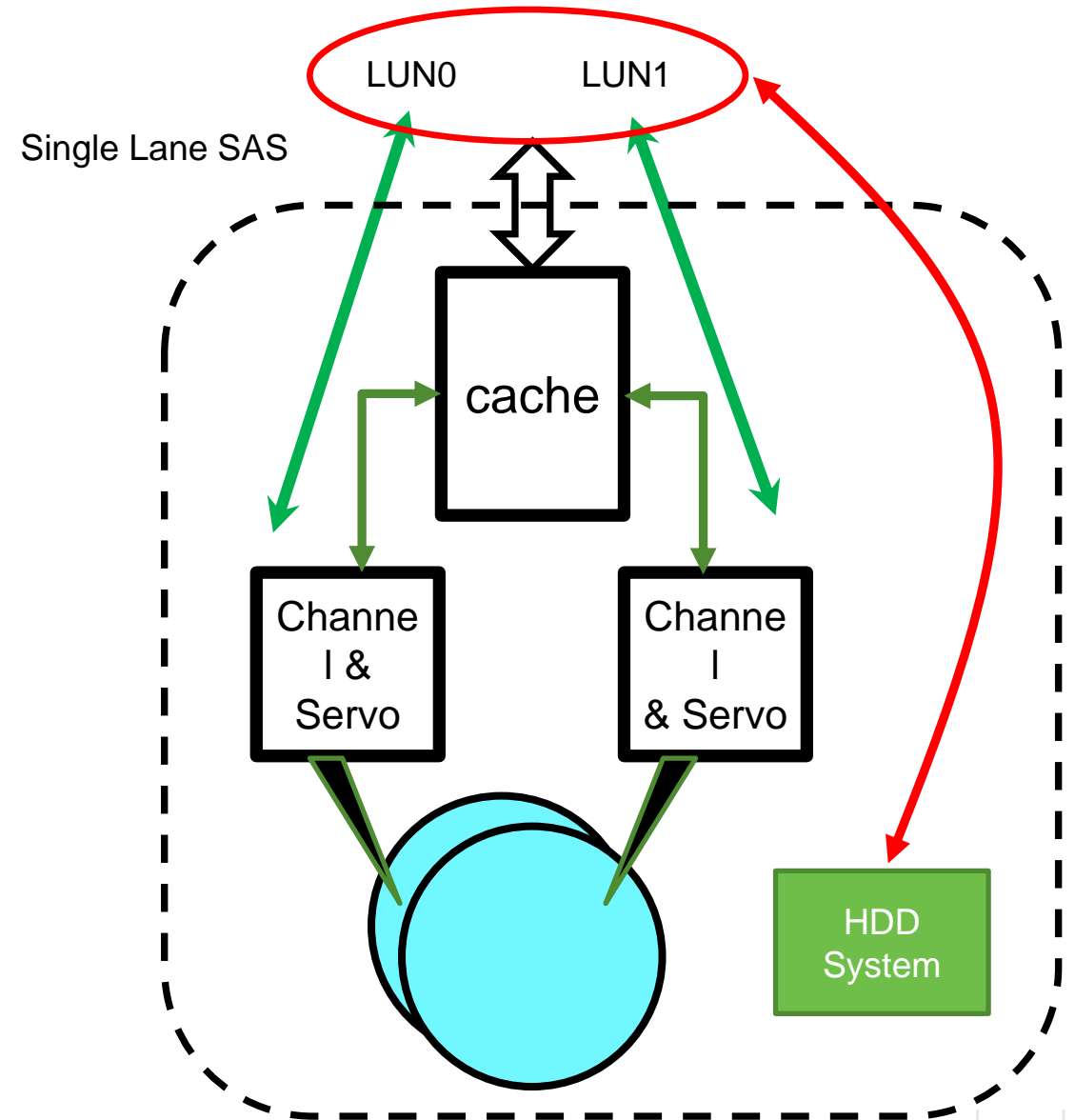
Device Based Across LUs

Data path

- SYNCRONIZE CACHE - flush the entire cache to both LUs

Mgmt, Info, Status

- TUR, Log/Mode Sense/Select,

- FORMAT UNIT, START STOP, REMOVE I_T NEXUS

- Reman (REMOVE ELEMENT AND TRUNCATE)
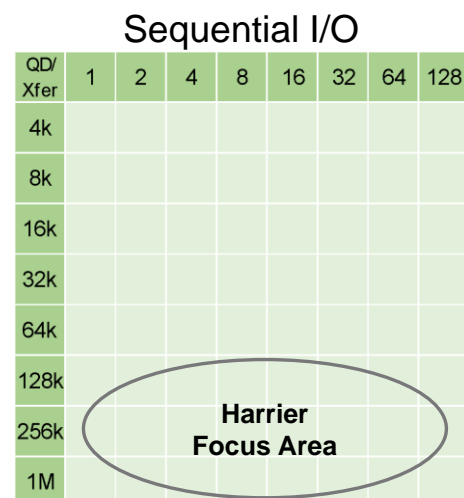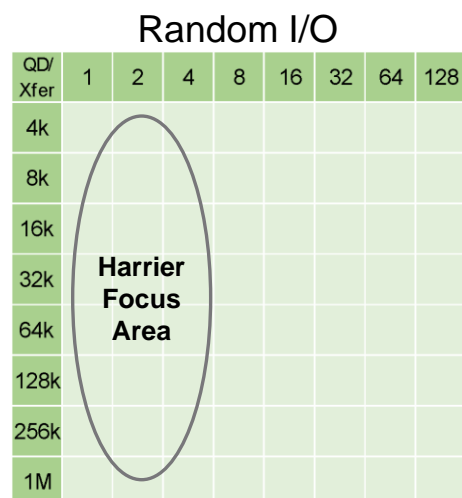
Security

- Sanitize

- SECURITY PROTOCOL IN

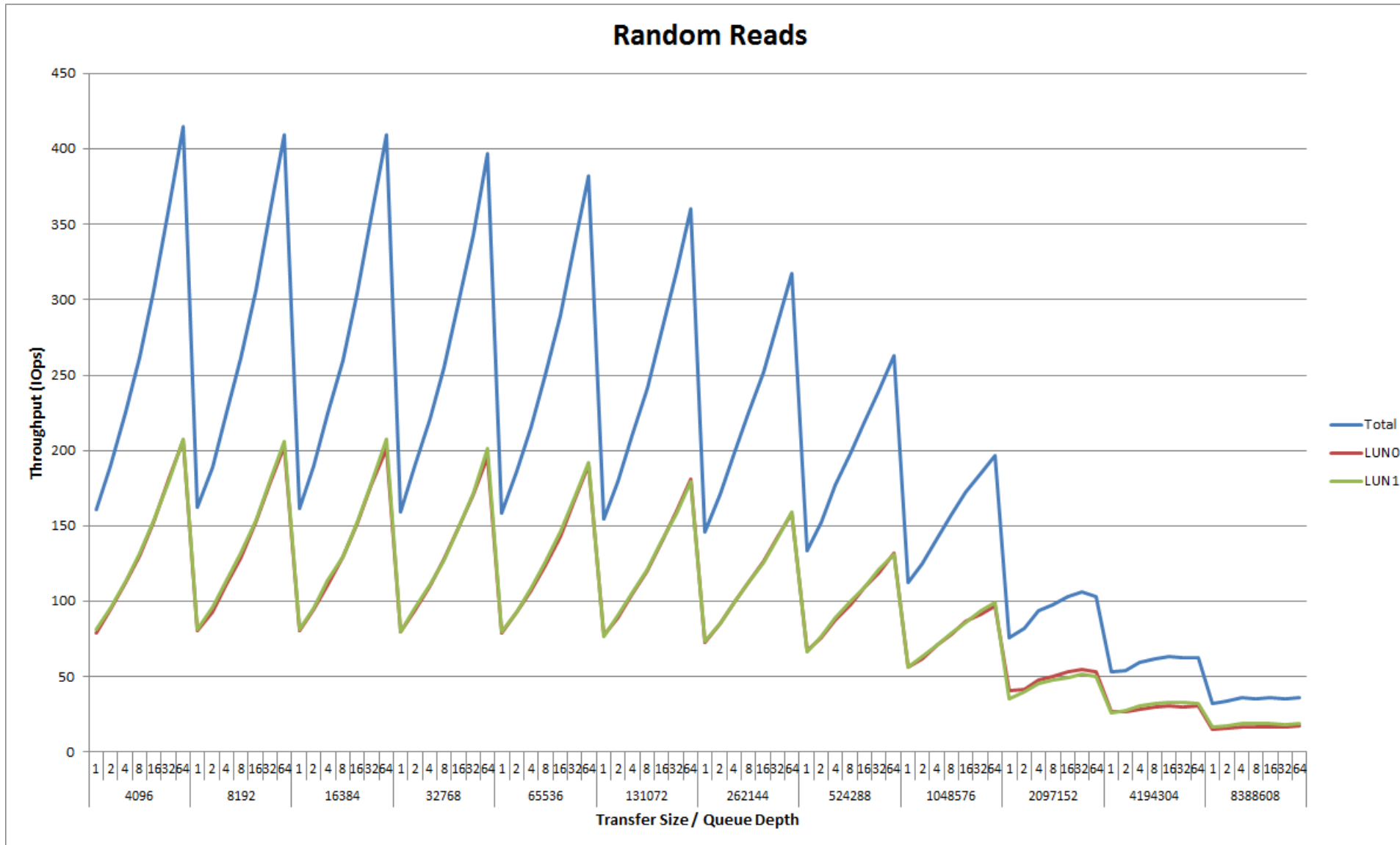HDD requiring coordinated commands to both LUs might cover most of these.

Performance Goals

Enable higher capacity drives in data centers by enabling IOPs/TB improvements in typical workloads

- Implement independent actuators to provide random access in parallel
  – Focus on low queue depths
- Implement independent read and write paths to allow data transfers in parallel
  – Focus on long transfer lengths
- Manage power to enable drives to function in existing infrastructure

Random I/O

QD/Xfer	1	2	4	8	16	32	64	128
4k								
8k								
16k								
32k		**Harrier Focus Area**						
64k								
128k								
256k								
1M								

Sequential I/O

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Early Harrier 14TB Performance: Random Reads

Random Reads

✓ Dual Actuator drive doubles the performance across the all Queue Depths and Transfer Sizes

✓ Most application workloads like to operate at lower QDs and smaller transfer sizes to satisfy latency sensitive IO, which is where Dual Actuator solves a critical pain point
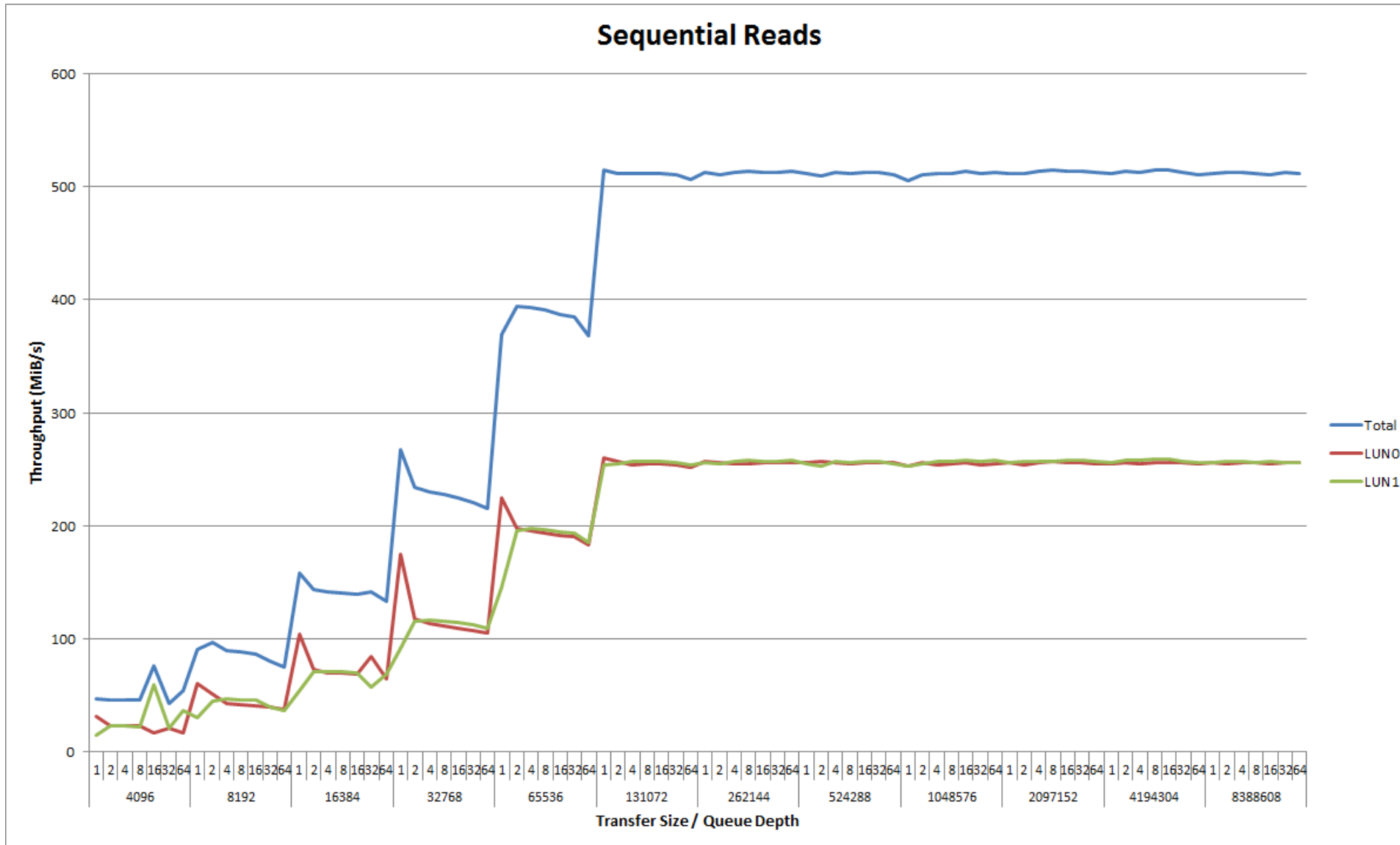
Early Harrier 14TB Performance: Random Writes
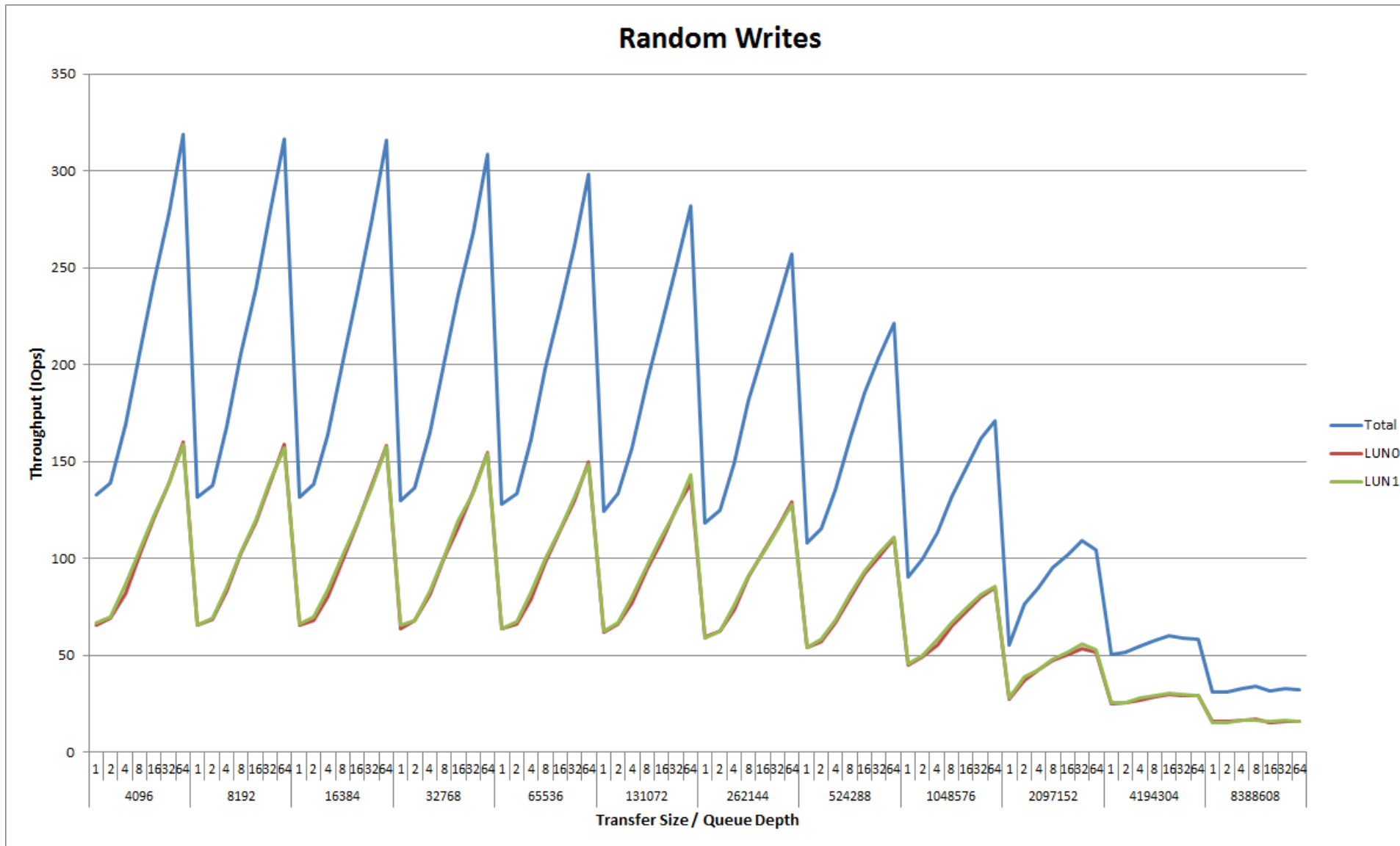
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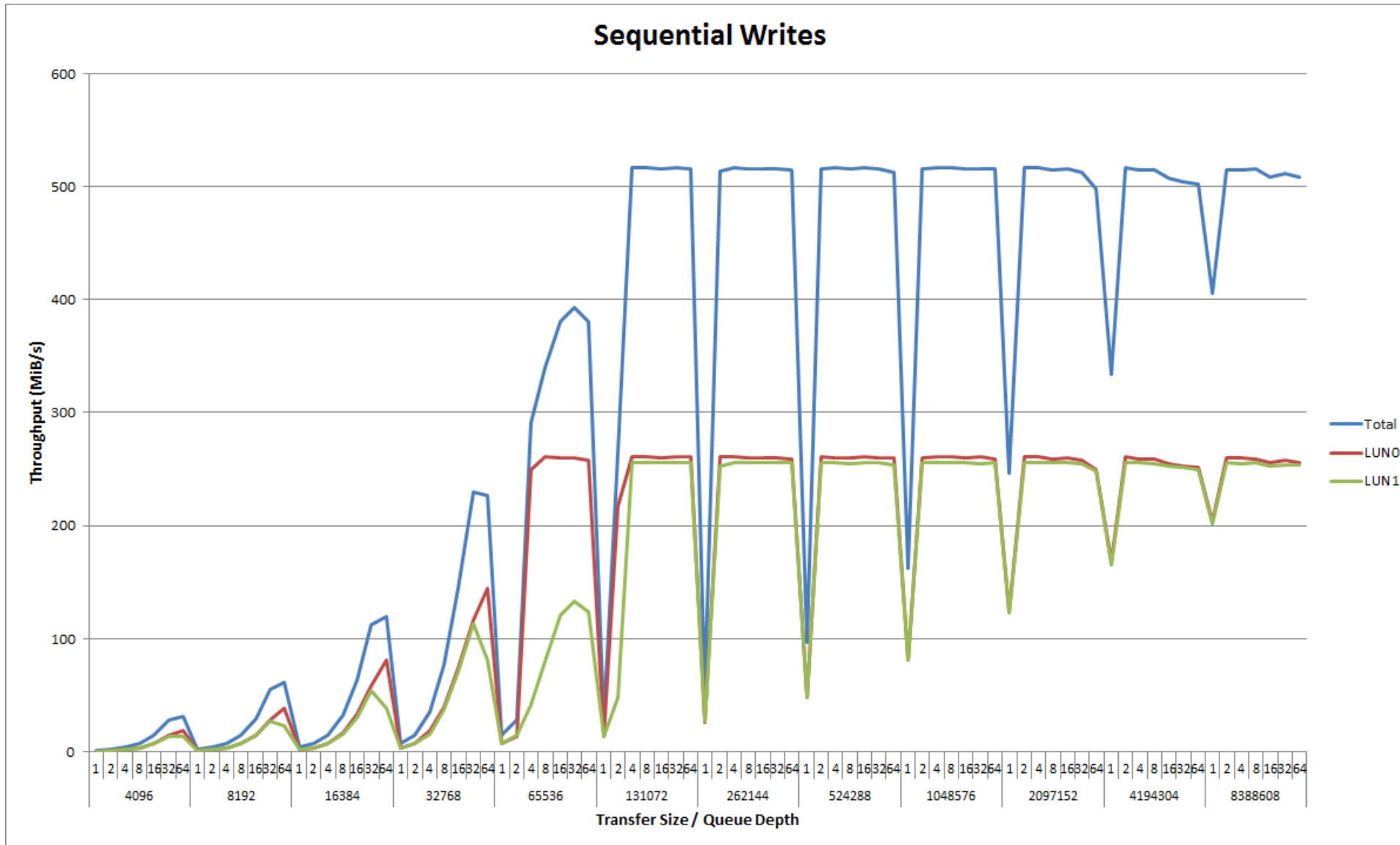
Early Harrier 14TB Performance: Sequential Reads

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