

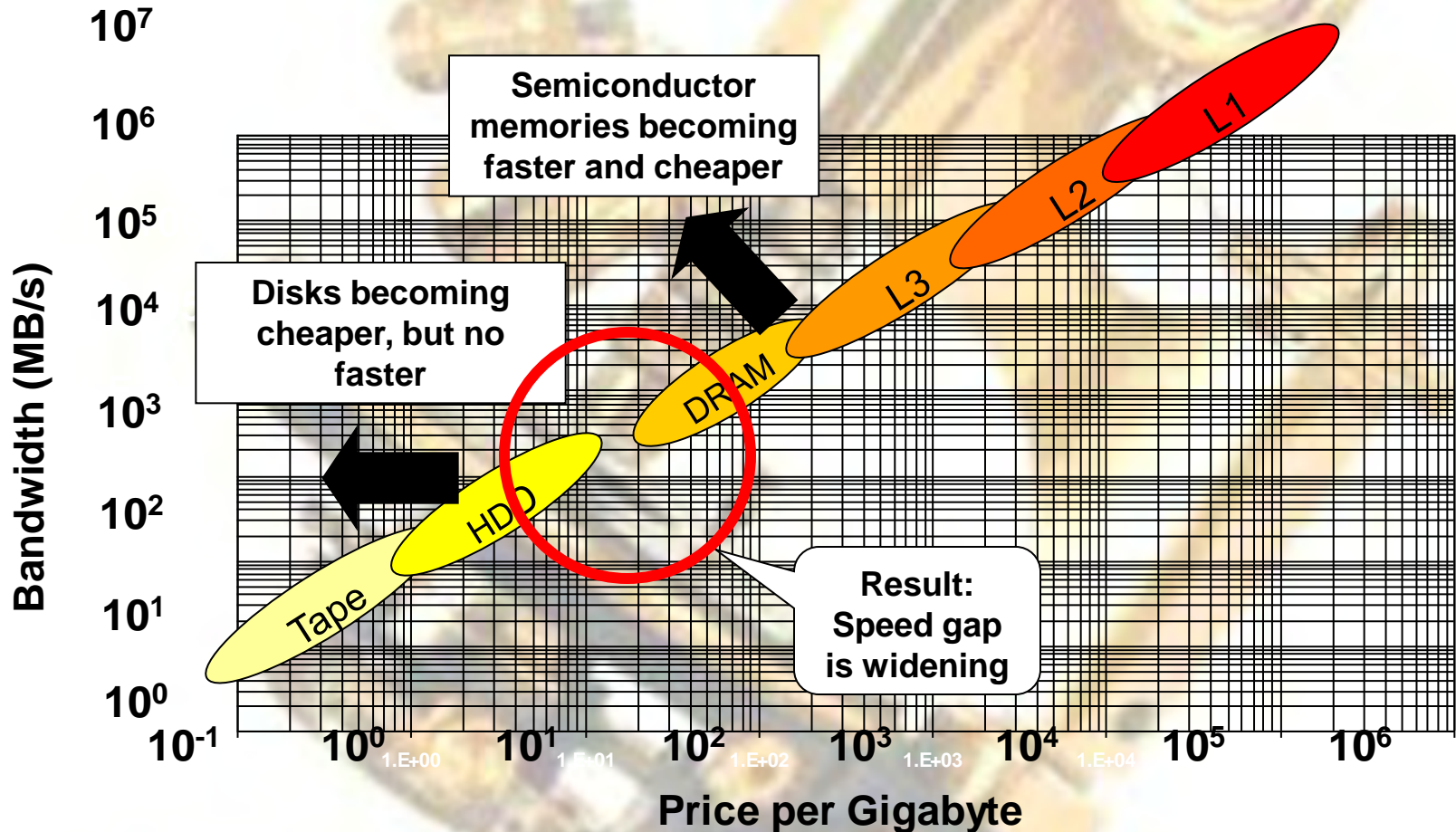
# Flash as Cache In Client Computing

Jim Handy



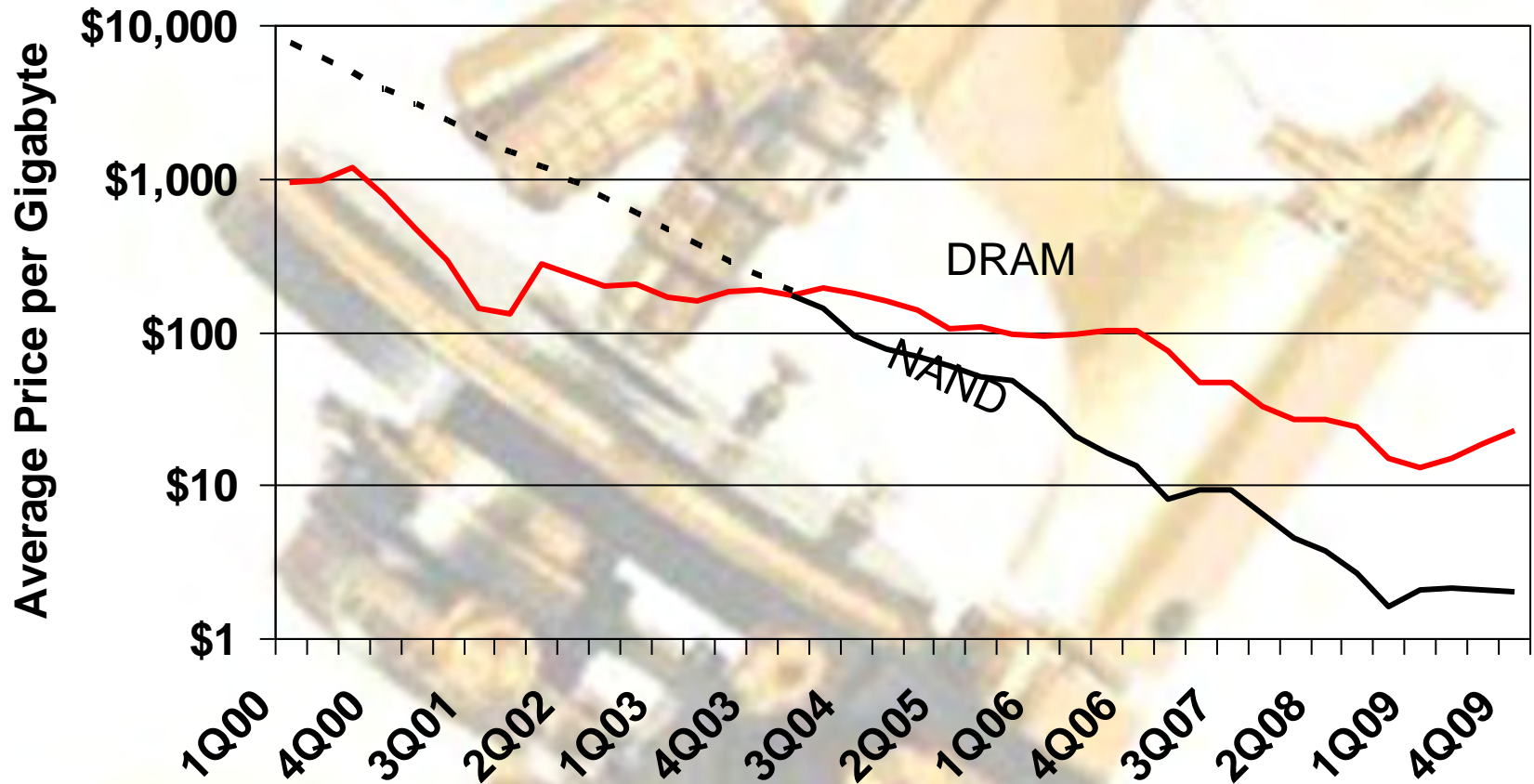
OBJECTIVE ANALYSIS – Semiconductor Market Research

# The DRAM/HDD Speed Gap



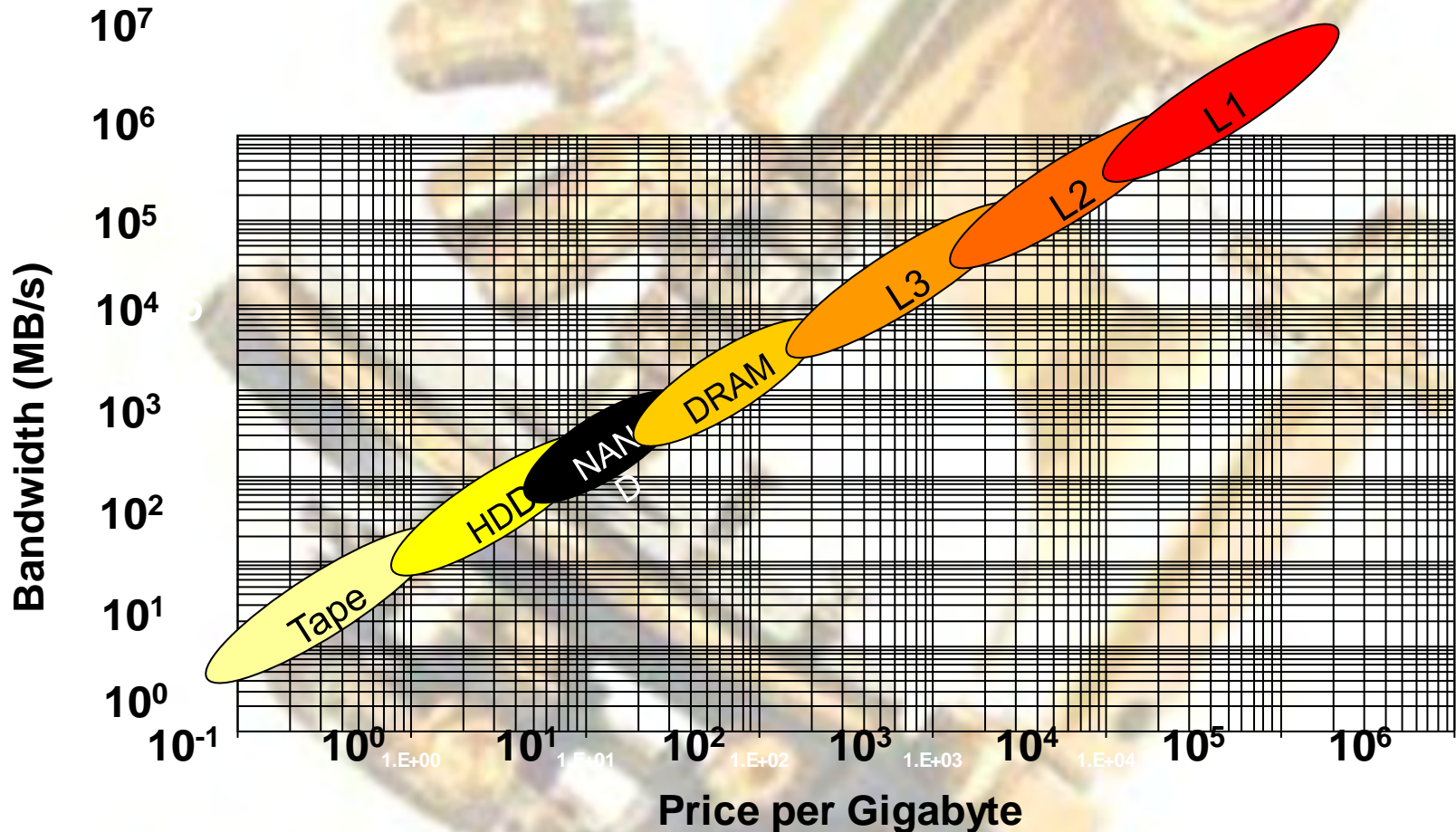
From: *Solid State Drives in the Enterprise*

# NAND Shot Past DRAM's Price per GB



From: *Hybrid Drives: How, Why, & When?*

# Now NAND Fits in Computers



From: *Solid State Drives in the Enterprise*



# NAND Unlikely to Match HDD \$/GB

Price per Gigabyte

\$10<sup>4</sup>

\$10<sup>3</sup>

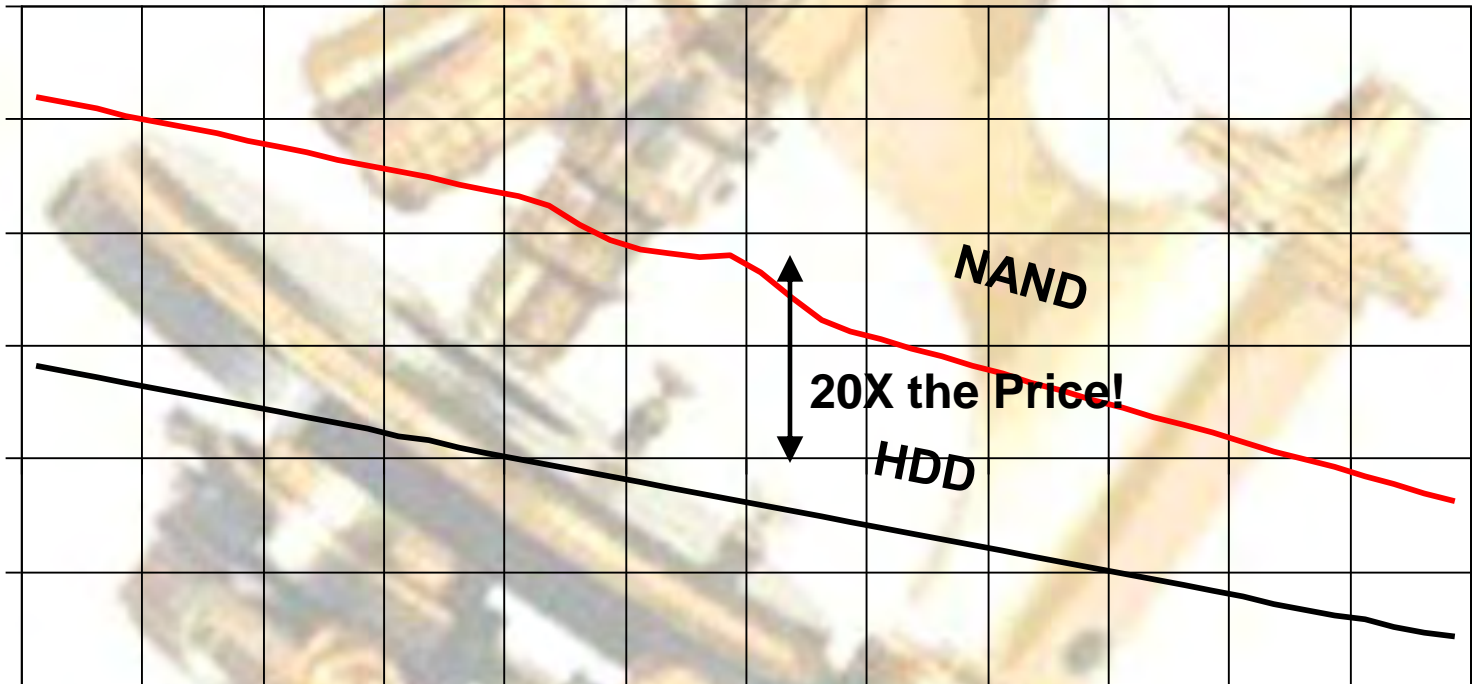
\$10<sup>2</sup>

\$10<sup>1</sup>

\$10<sup>0</sup>

\$10<sup>-1</sup>

\$10<sup>-2</sup>



2000 2000 2001 2002 2003 2003 2004 2005 2006 2006 2007 2008 2009 2009 2010 2011

From: *Understanding the NAND Market*

# Managing Tiered Storage



- Manual
  - Indexes
  - Roots
  - Journal Files
  - Databases/Programs
- Automatic
  - Sun – ZFS
  - EMC – Symetrix
  - IBM – z/OS
  - Seagate – Momentus XT
  - NVELO – Dataplex