

Why and How SSDs are Economical

Jim Handy

OBJECTIVE
ANALYSIS



SSDs Can be Economical Depending on Your Environment

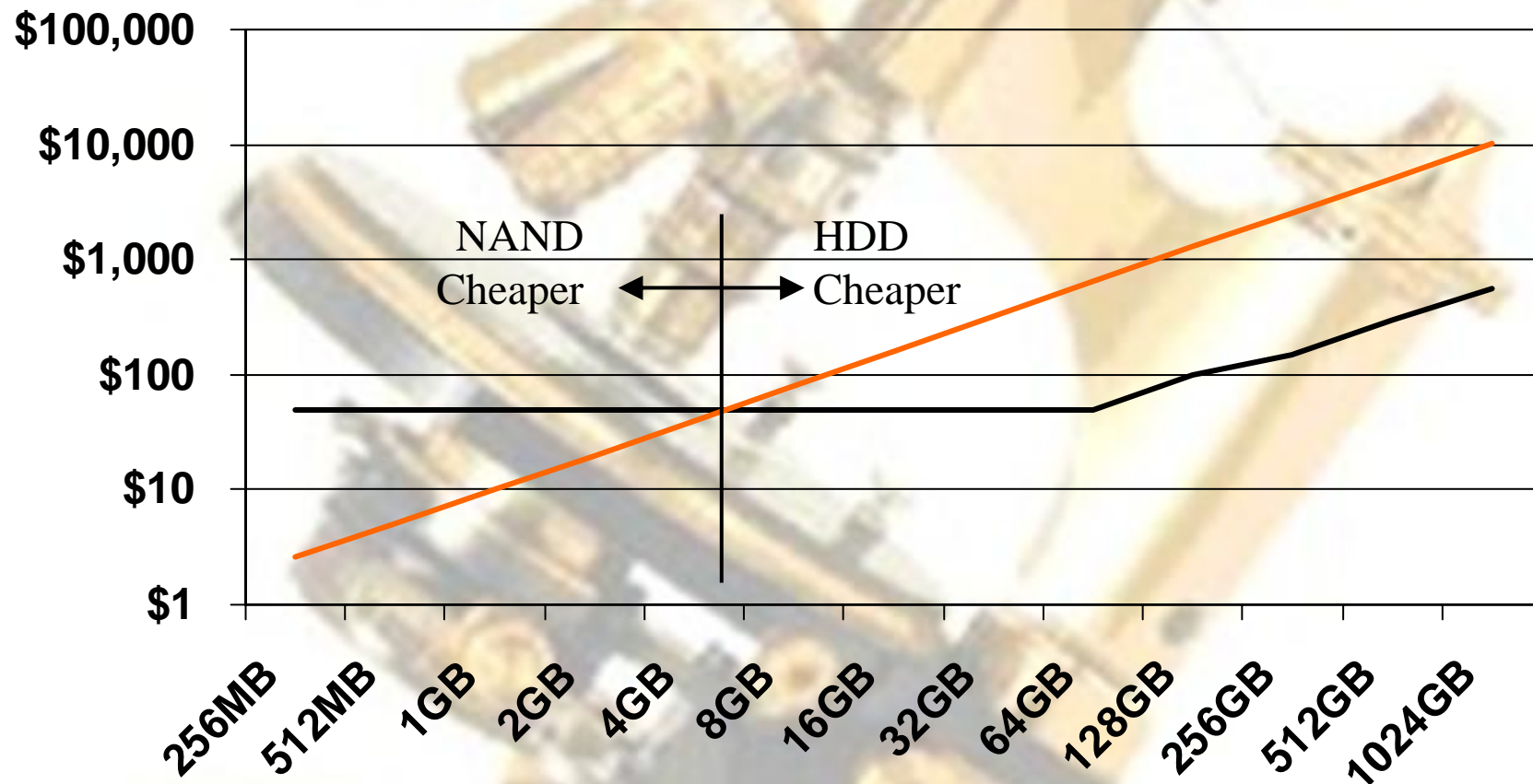
1. Low-cost laptops
2. Notebook computers
3. Desktop computers
4. Enterprise servers

Problem 1)

“We need to meet a price point, even if we have to sacrifice storage capacity!”

SSDs Can Be The Cheaper Alternative

Cost of Storage



From: *The Solid State Disk Market: A Rigorous Look*

OBJECTIVE ANALYSIS – www.OBJECTIVE-ANALYSIS.com

Who Needs Cheap Mass Storage?

- MP3 players
- Cell phones/smartphones

Good!

Low cost

OLPC/Classmate PC

– Mobile Internet Device - MID

Problem 2)

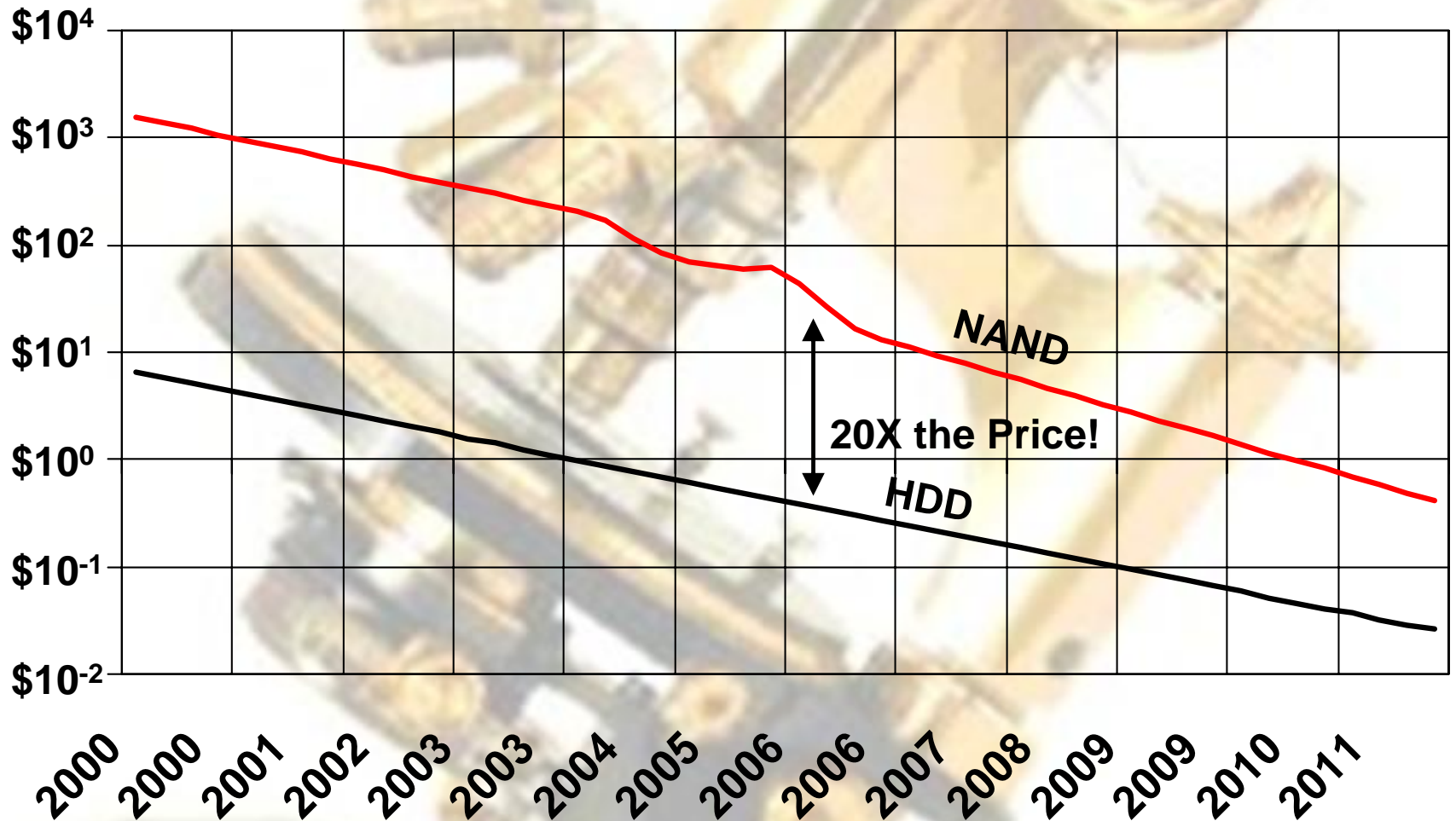
“Let’s add an SSD option to our new line of Notebook PCs”

What Notebook Buyers Look For

- Price same or lower than last time
- More of everything else
 - Gigahertz
 - (Cores?)
 - Megabytes of main memory
 - Gigabytes of disk space
 - Larger screen size
 - Features, features, features!

NAND Unlikely to Match HDD \$/GB

Price per Gigabyte



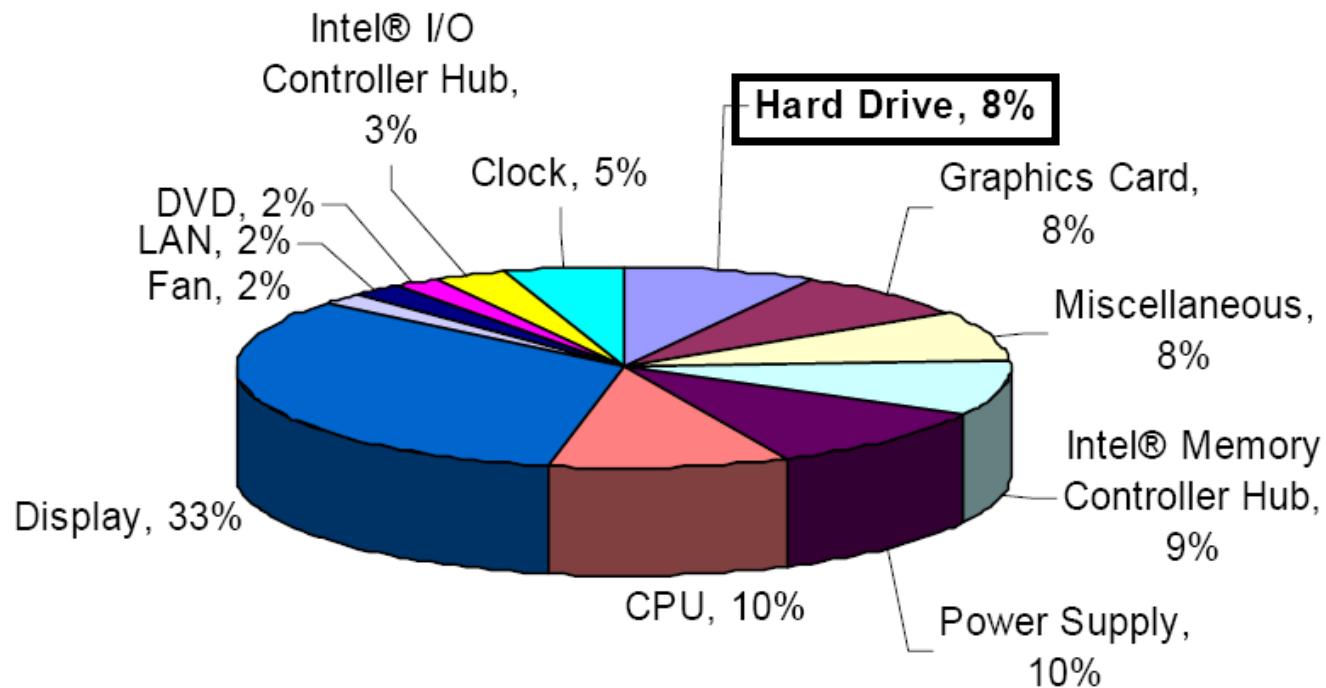
From: *Understanding the NAND Market*

The SSD Feature Sell



- Longer battery life
- Faster:
 - Boots twice as fast
 - Faster overall operation
- More rugged
- No disk crashes

Longer Battery Life?



Source: Intel

The SSD Feature Sell



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Is Solid State *Really* More Reliable?

	HPC1	COM1	COM2
HDD	30.6%	18.1%	49.1%
Memory	28.5%	20.1%	3.4%
Power Supply	1.6%	34.8%	10.1%
All Other	39.3%	27.0%	37.4%

Source: Carnegie Mellon paper: *Disk Failures in the Real World*



Baad!

Problem 3)

“OK, then let’s use SSDs in our Desktop line!”

The SSD Feature Sell



- Longer battery life
- Faster:
 - Boots twice as fast
 - Faster overall operation
- More rugged
- No disk crashes

SSD Features that are Important to the Desktop

- ~~Longer battery life~~
- ~~Faster~~
 - ~~Faster write speeds~~
 - ~~Faster overall operation~~
- ~~More rugged~~
- ~~No disk crashes~~

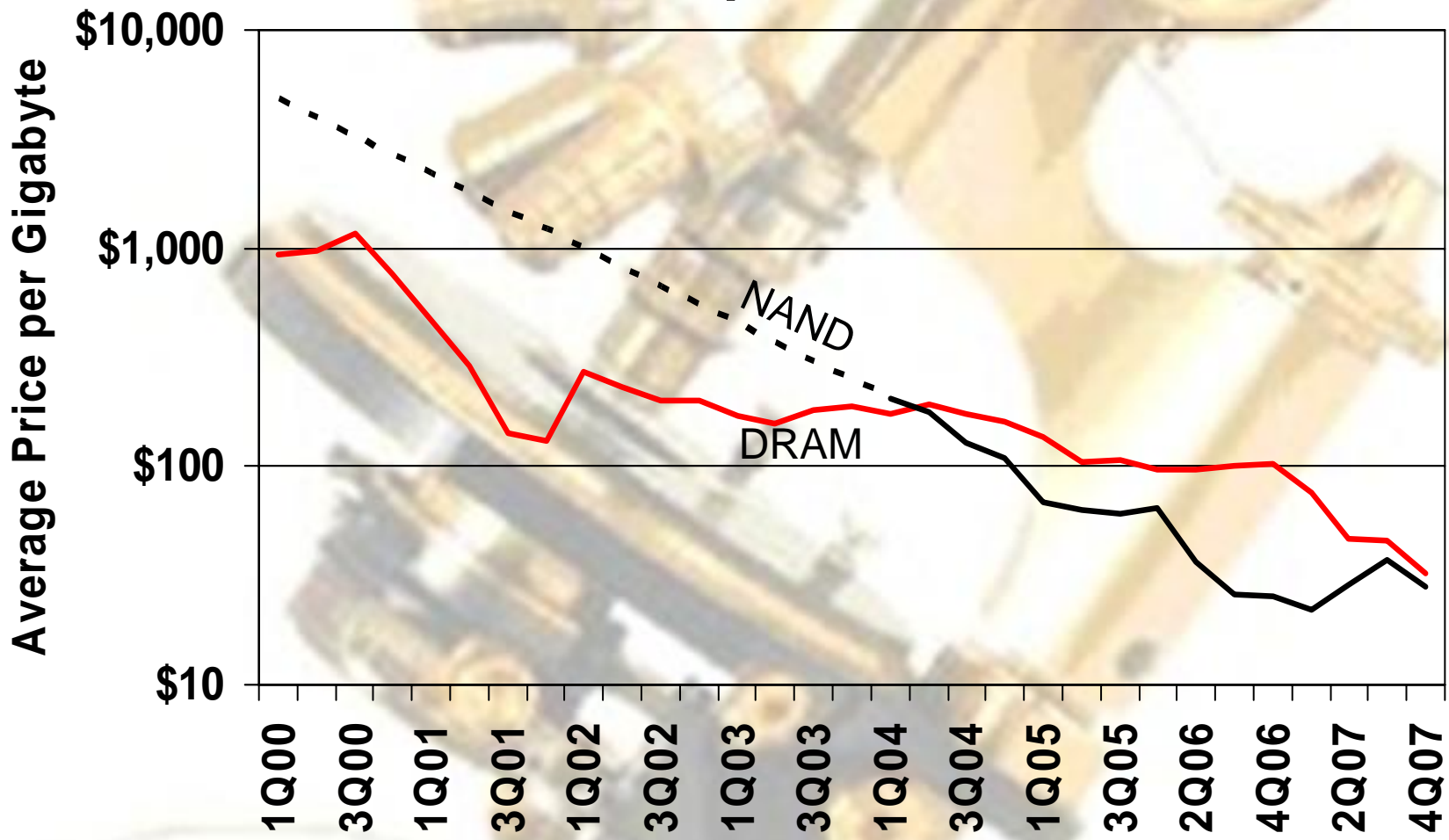
Bad!



Problem 4)

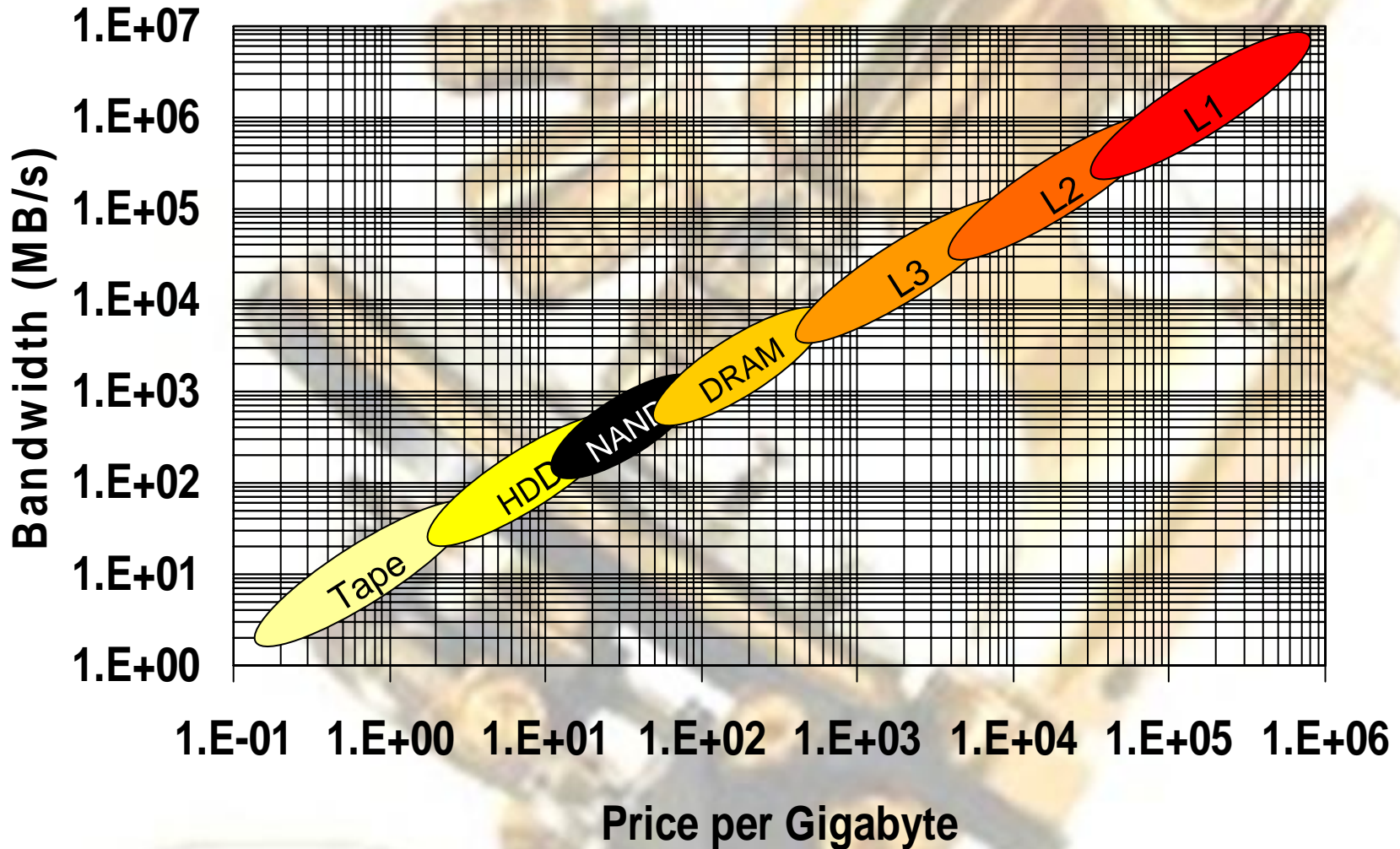
**Something Interesting is
Happening Here!**

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*

An SSD Can Save Money In an Enterprise Server!

- IT managers go to extremes for throughput:
 - Enterprise HDDs
 - 10K & 15K RPM
 - Fewer tracks = lower capacity but faster access
 - High price: \$300 to \$1,000+
 - RAID
 - Over provisioning & striping
 - Short stroking
- These jack up the system's price
- One SSD can often replace several HDDs

An SSD Saves More than Money

GOOD!

- Space
- Power
- Cooling
- Maintenance

SSDs: A Good Choice & A Bad Choice

- Good
 - Low-Cost PC (OLPC or MID)
 - Enterprise Server
- Bad
 - Notebook PC
 - Desktop PC



Thank You!

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