



CXL Market Update

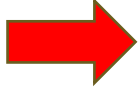
Jim Handy

OBJECTIVE ANALYSIS



**AI LEADERSHIP
FORUM**

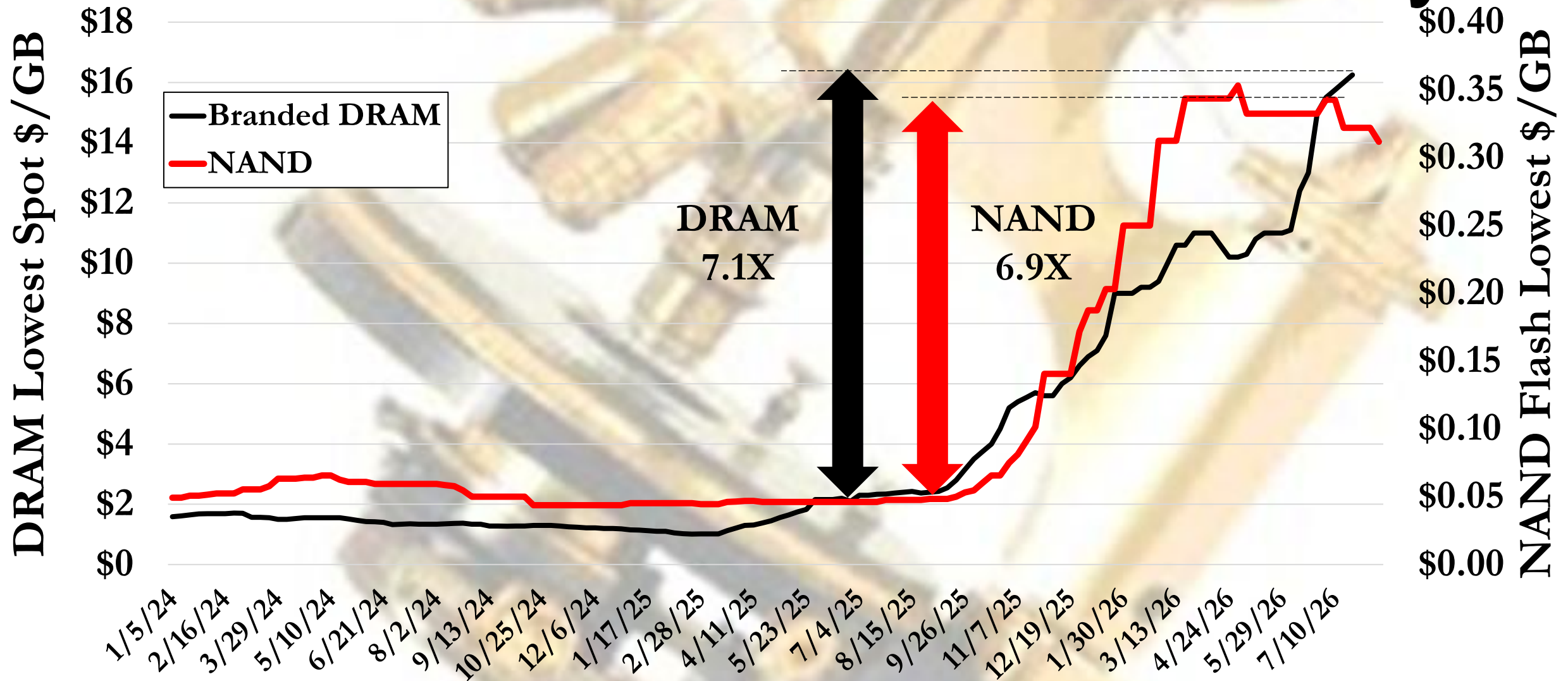
Which CXL Features Are Popular?

- 
- Large memories
 - High bandwidth
 - Supports any memory type or speed
 - Memory pools
 - Shared memory
 - Fabrics
 - Coherency

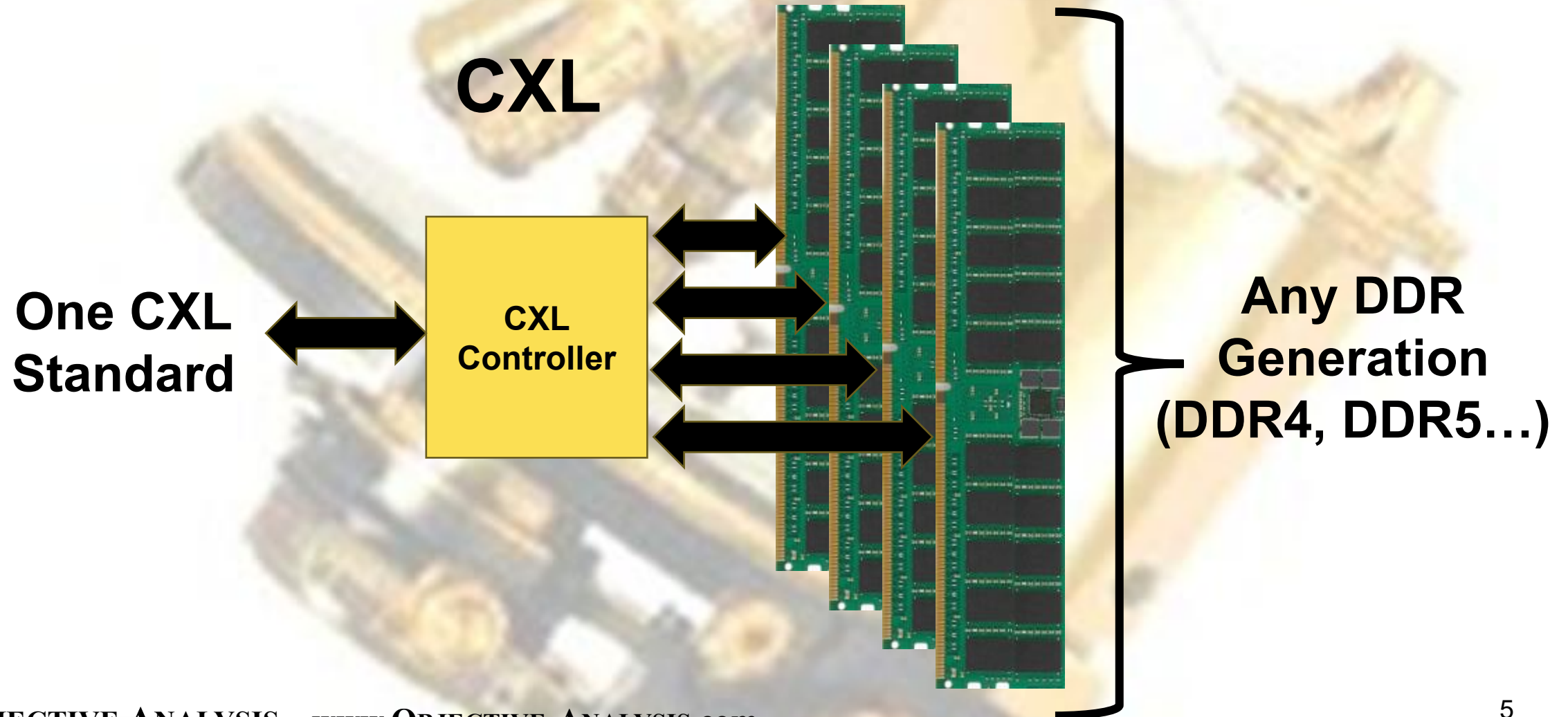
AI Sheds a New Light on DRAM

- DRAM's **expensive!**
 - Today's contract prices are about 3X 2024 pricing
- DRAM's hard to get
 - OEMs signing years-long purchase agreements
 - Some are even being told to look elsewhere
- Meanwhile, it's a key performance bottleneck

DRAM's Now Scarce & Costly



CXL Hides DDR Differences



Hyperscalers Harvesting DDR4

- DDR4 is salvaged from decommissioned servers
- CXL cards fit the DDR4 into DDR5-based servers
- Caching software manages hot & cold data
 - Cold → DDR4 on CXL
 - Hot → Host's DDR5

Meta's Vistara DDR4 Paper

CXL DDR4 provides real performance improvements

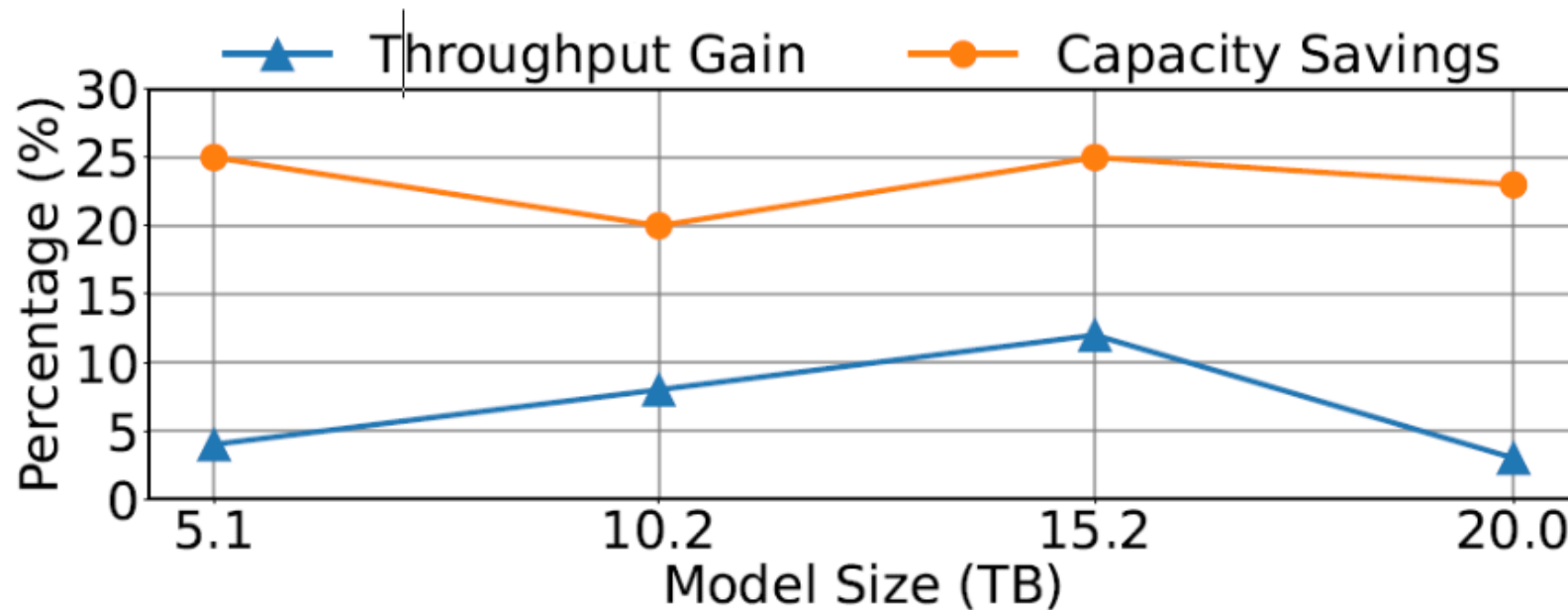


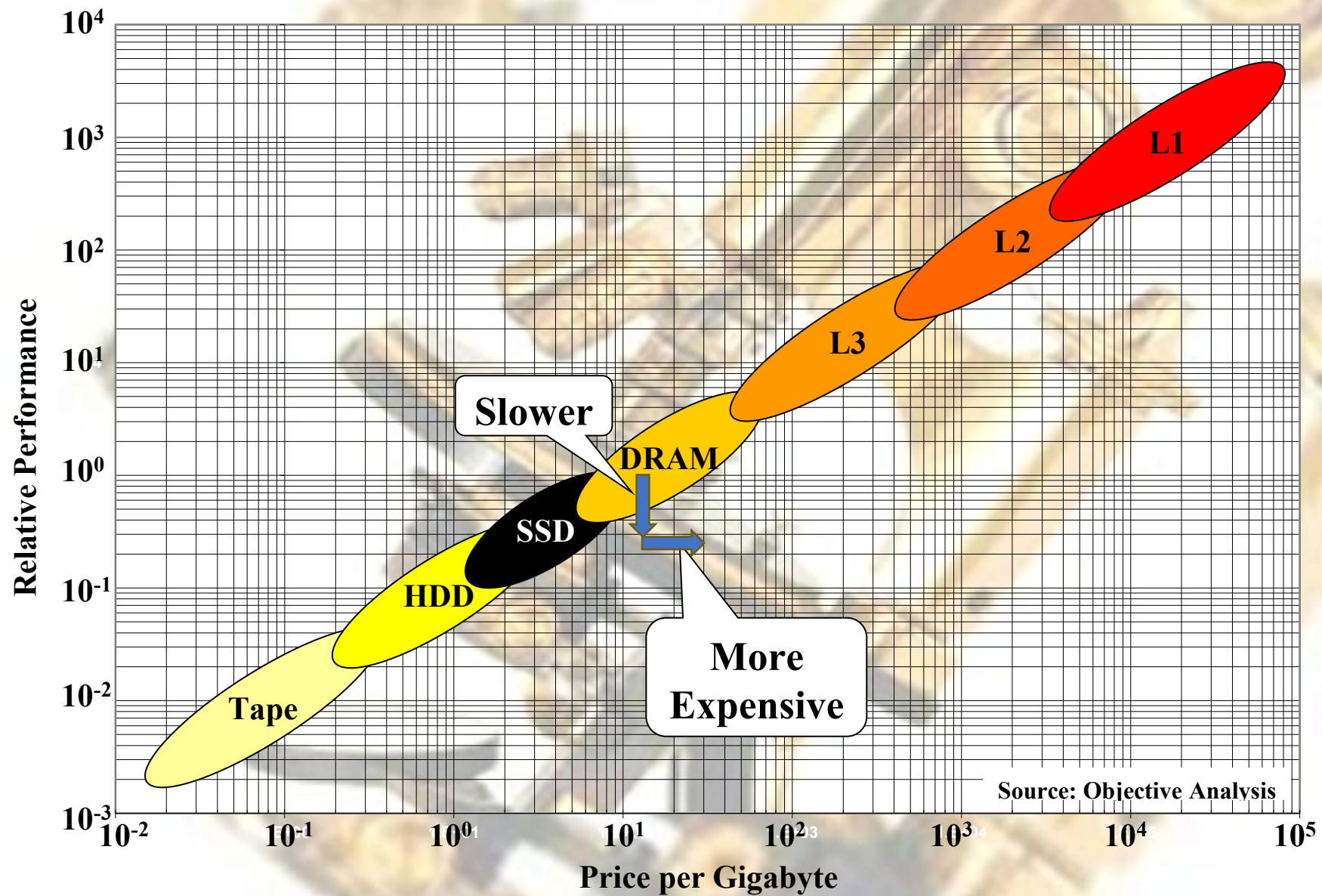
Fig. 12. Improvements in throughput and compute capacity requirements with Vistara CXL device as we scale the model size.

DRAM Market Realities

- DRAM is a commodity
- Everyone competes on price
 - Shortages cause price increases
 - Oversupplies cause price collapses
- Shortages and oversupplies are inevitable
- Hyperscaler AI demand cannot grow forever

Which CXL Features Are Popular?

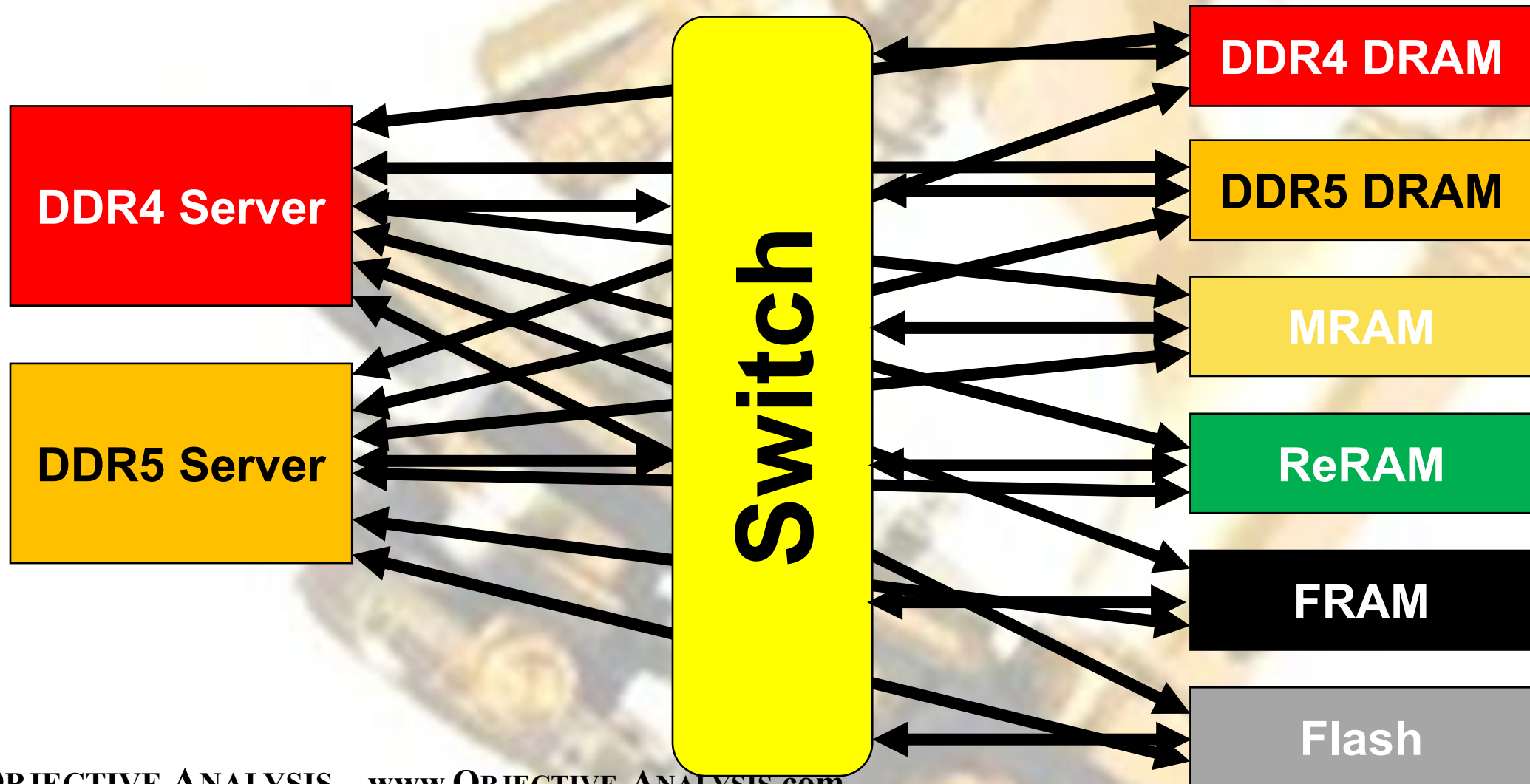
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Any Memory Talks to Any Server



Report: New Memories—Not Just for AI

- Covers all new memory types
- Profiles over 175 companies
- Over 300 pages, 200 figures, & 34 tables
- Tech, market, & equipment forecasts
- Purchase for immediate download

*Coughlin
Associates*

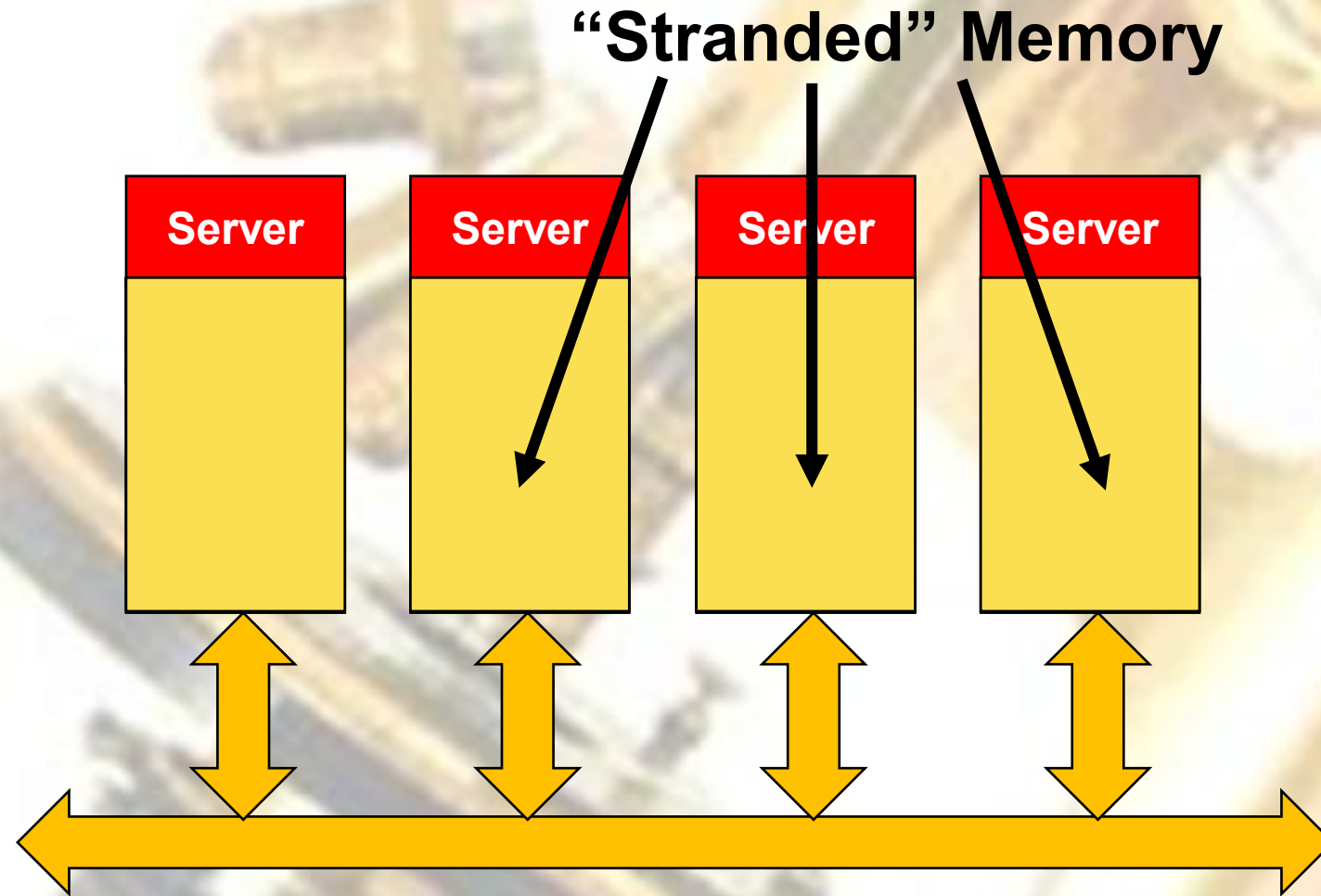


Now Available

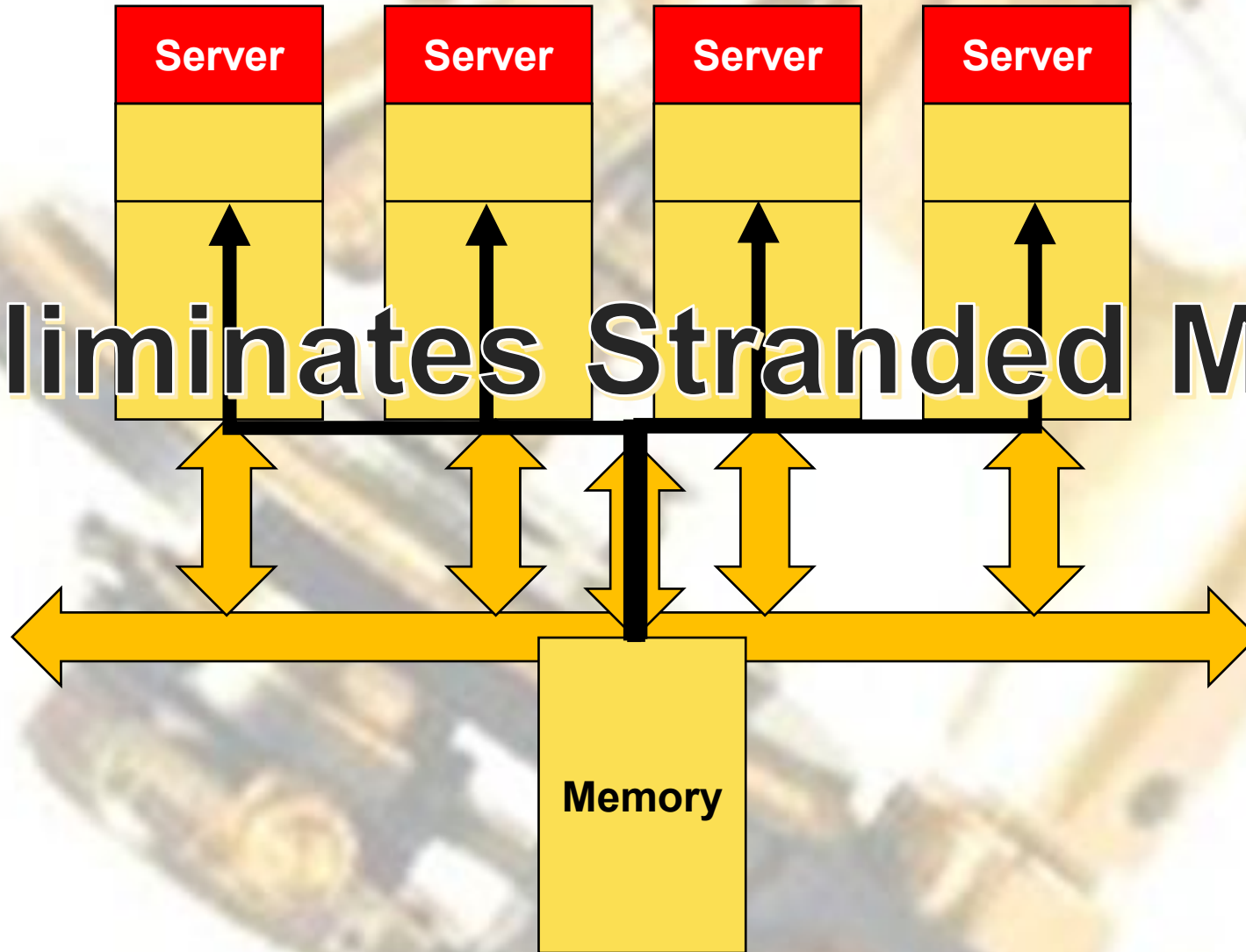
<https://Objective-Analysis.com/reports/#Emerging>
<http://www.TomCoughlin.com/techpapers.htm>

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CXL Eliminates Stranded Memory



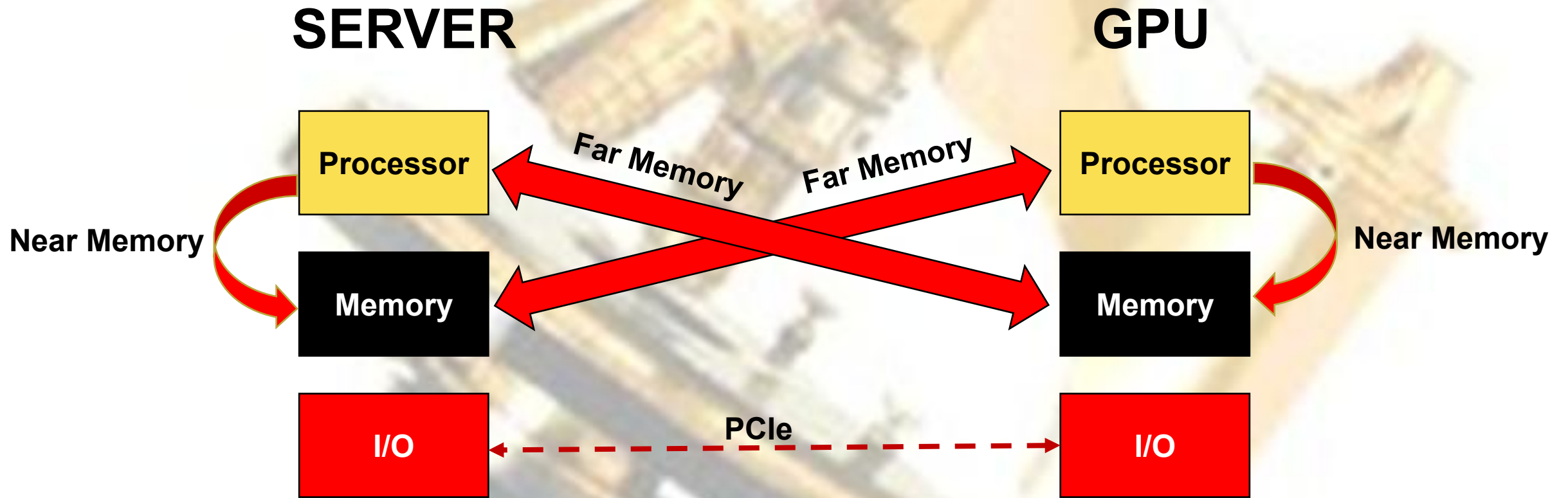
Stranded Memory is Costly!

- Memory is AI's biggest bottleneck
- DRAM prices are astronomical
- DRAM is in short supply
- Memory pools offer some relief

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DMA's Are Fast!

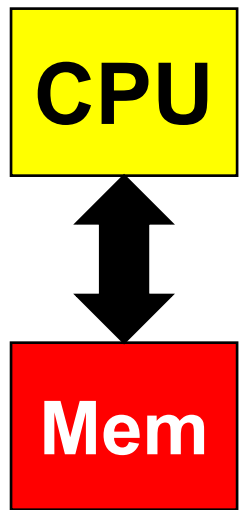


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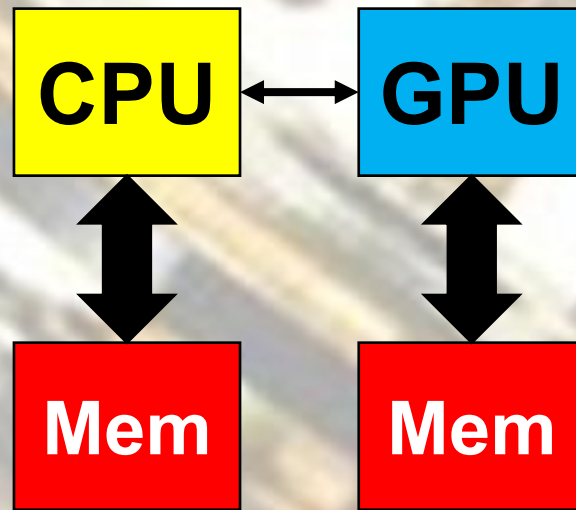
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Fabrics Boost Data Transfer

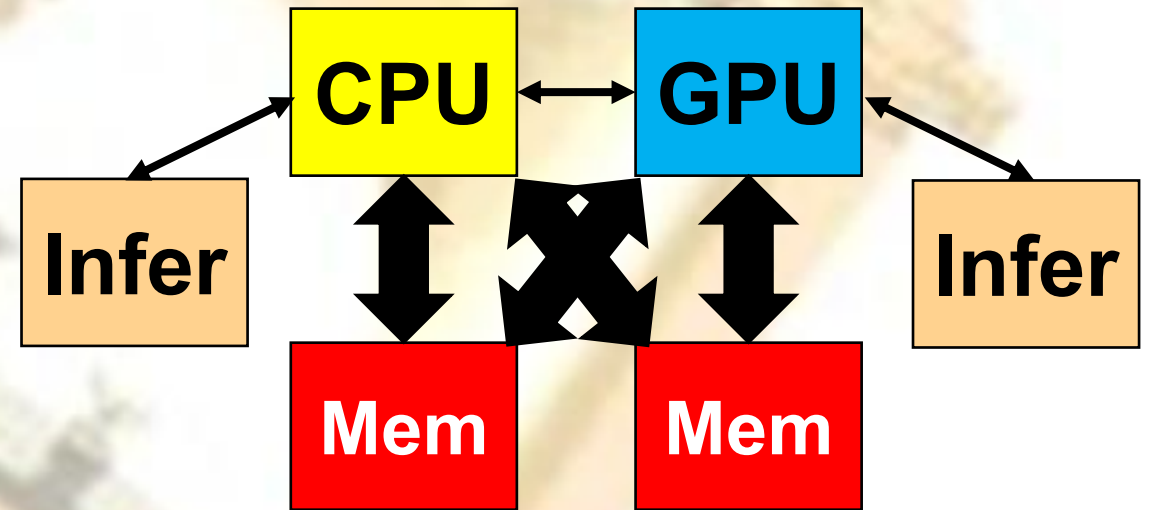
Yesterday



Today



Tomorrow

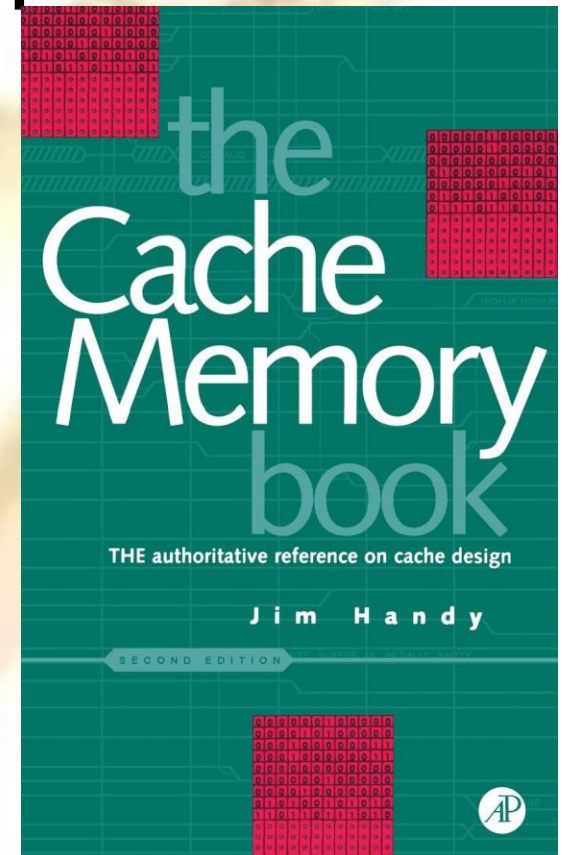


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Coherency Issue

- Shared memory can be cached in a processor
 - What happens when it's modified?
- Coherency mechanism assures that everyone's using the same data
 - Complicated algorithms
 - Described in detail in a book I know





A CXL Forecast

CXL Forecast: Slow Steady Growth



Long-Term Impact

- CXL saves money
 - Re-use DDR4
 - Reduce stranded memory
 - Improve performance
- Bank on further advantages later on

CXL Market Now Taking Shape



- New report from Objective Analysis
- Covers all perspectives
 - Where CXL is useful, and where it isn't
 - Demand drivers for CXL DRAM modules
 - Opportunities outside of DRAM
 - Forecast (Revenues, Units, ASP)
- Available for immediate download:
 - Objective-Analysis.com/reports