3D XPoint Market Update

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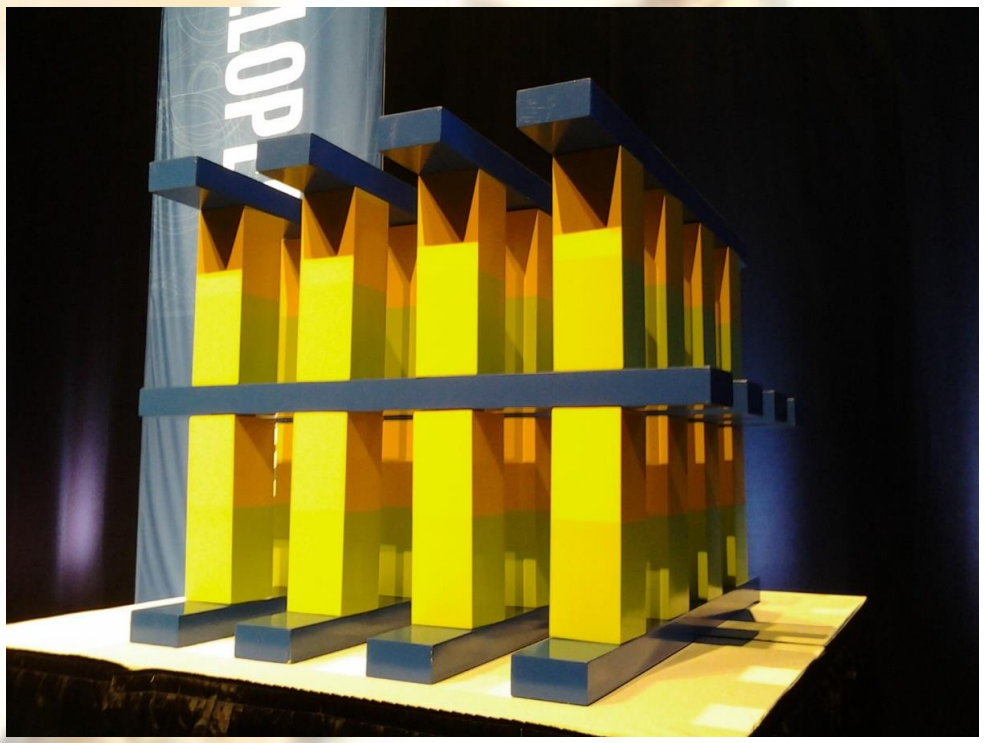
Objective Analysis

Some Things Can Be Predicted

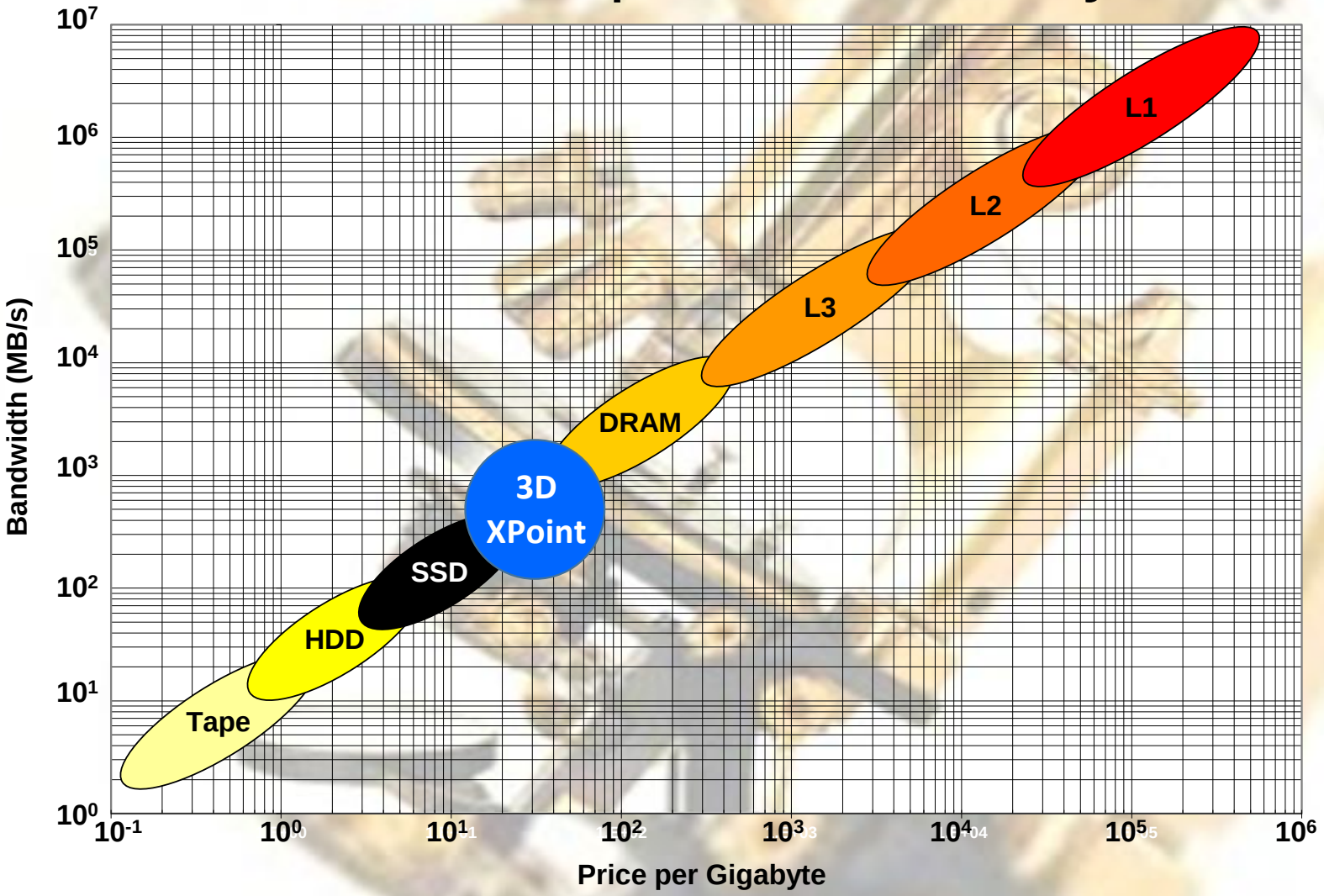
My FMS15 Presentation:

- XPoint cost problem
- Support issues
  - Software
  - Hardware
- Will take time to implement



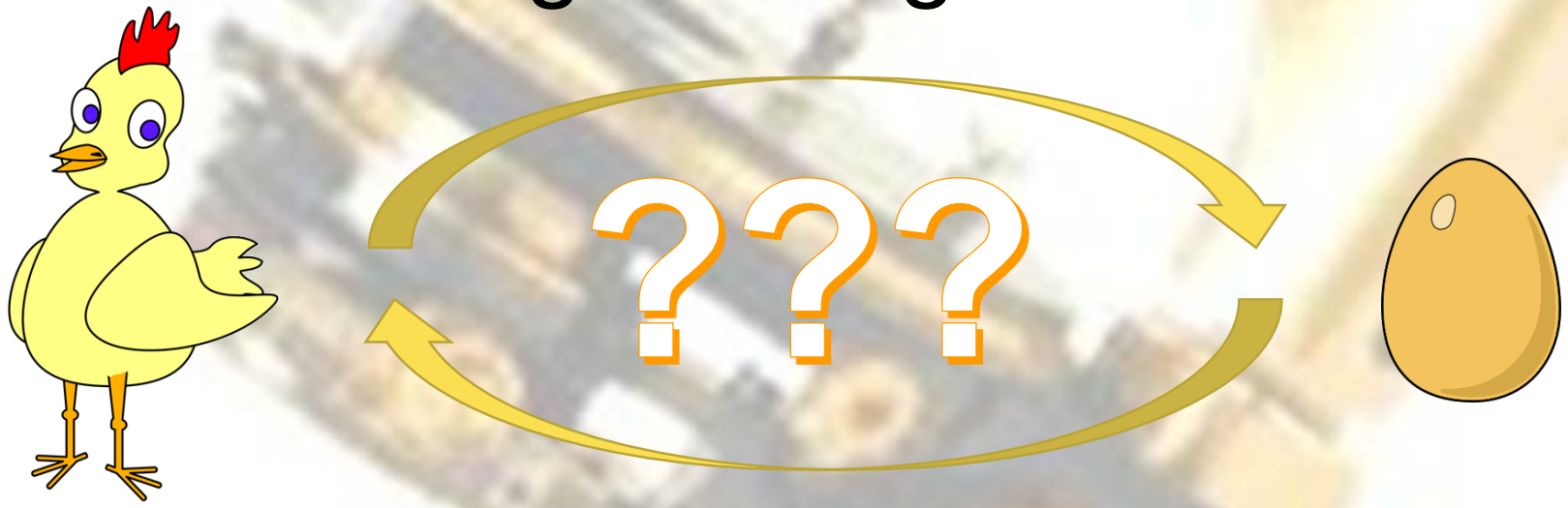
3D XPoint Must Be Priced Below DRAM

Otherwise People will Just Buy DRAM

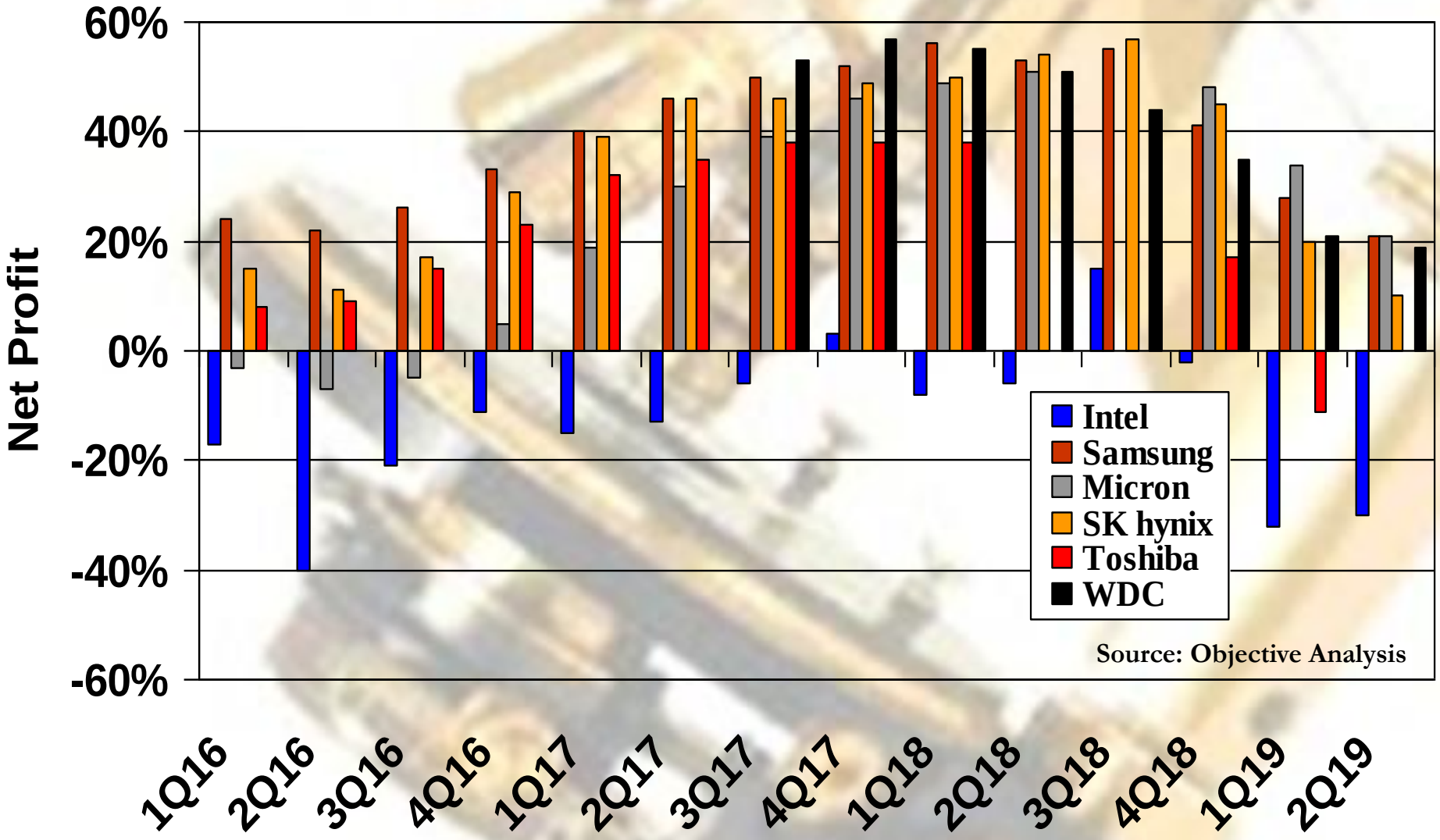


2015 Slide: A Chicken & Egg Problem

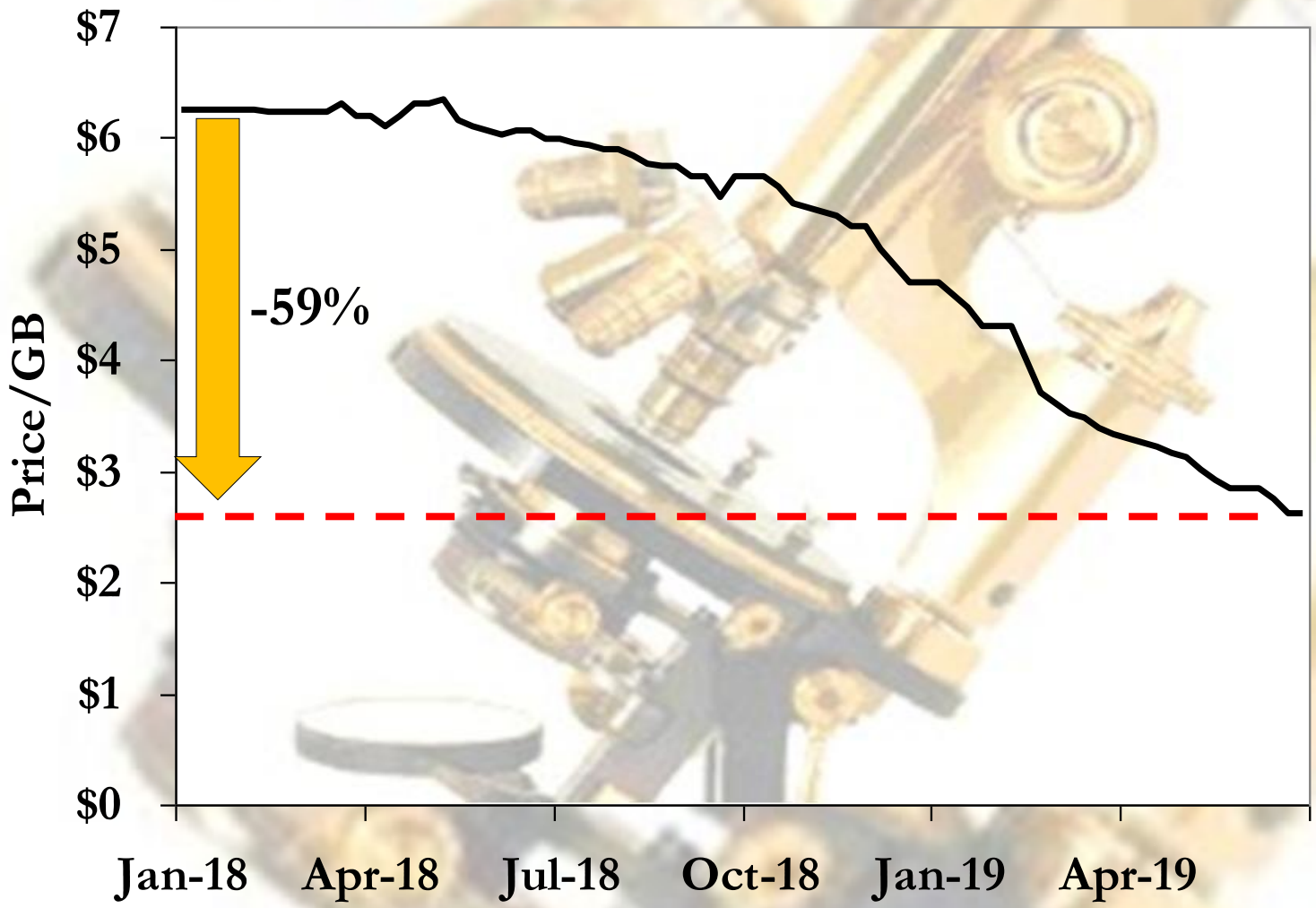
- 3D XPoint will be sell in volume once it's priced lower than DRAM
- 3D XPoint prices will fall below DRAM once the volume is high enough



Result: Huge Intel Losses



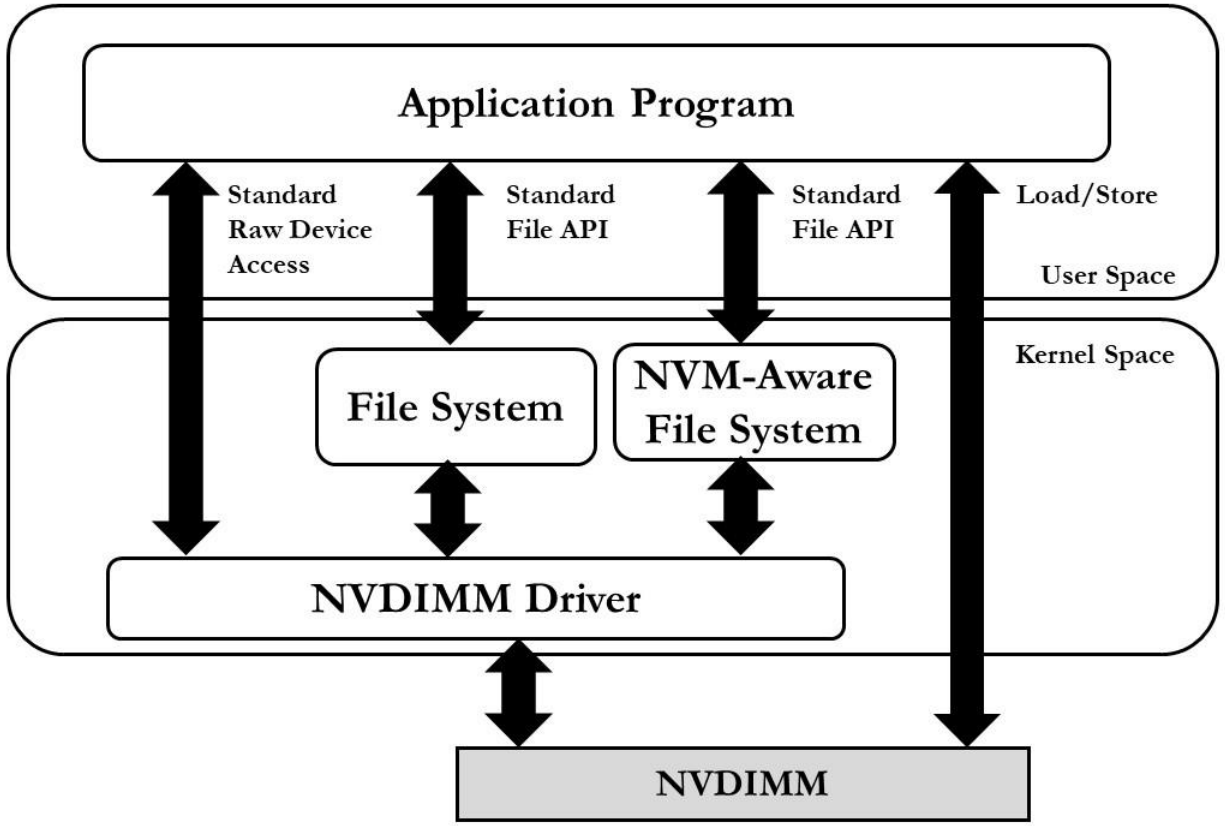
But DRAM Prices are Collapsing!



2015 Slide: A New Memory Layer Needs A Lot Of Support

- Will require a new bus
  - DDR doesn't support variable access times
- Will require new O/S support
  - Cache management?
  - Memory management?
- Persistence will require application support
  - SNIA and others working on this
  - Some instruction support now in Intel specs

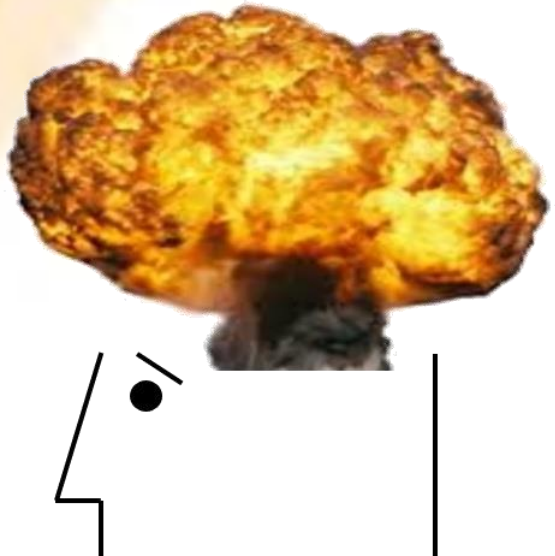
SNIA NVM Programming Model



https://www.SNIA.org/forums/sssi/nvmp

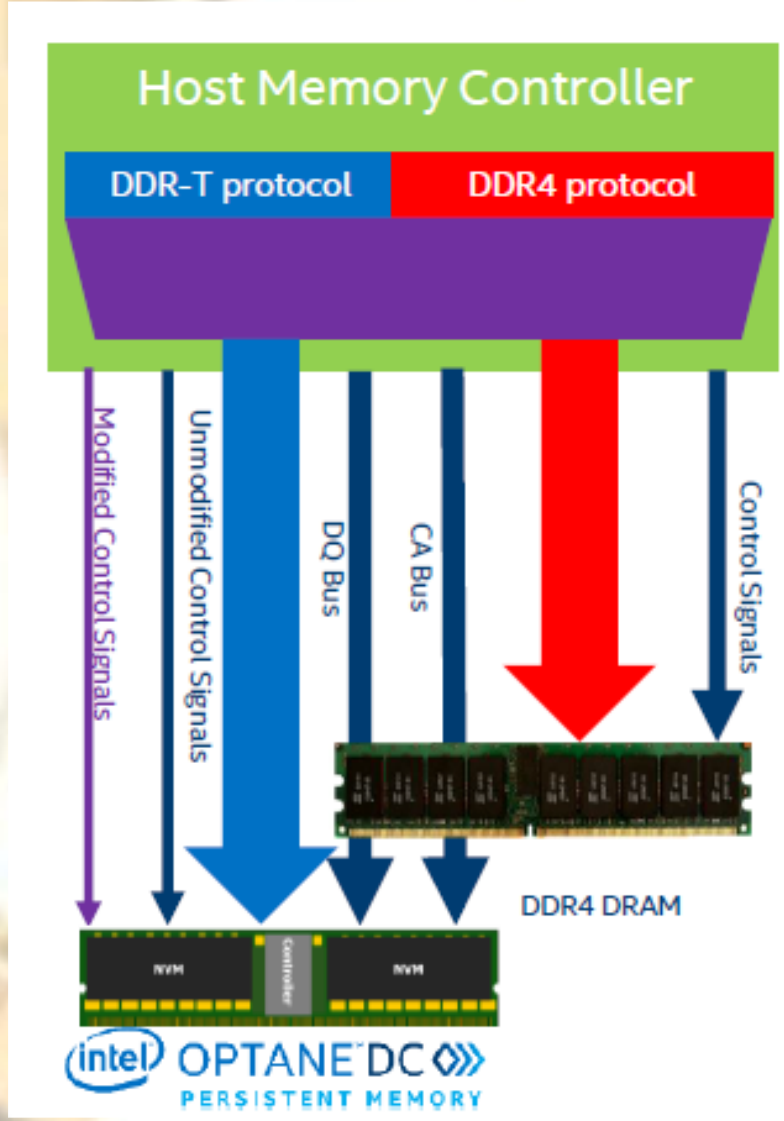
Two Access Modes

- Memory Mode
  - Optane DIMM looks like a huge DRAM
  - DRAM caches Optane DIMM
    - The DRAM is invisible to the application program
- App Direct Mode
  - Persistent
  - Uses SNIA NVM Programming Model



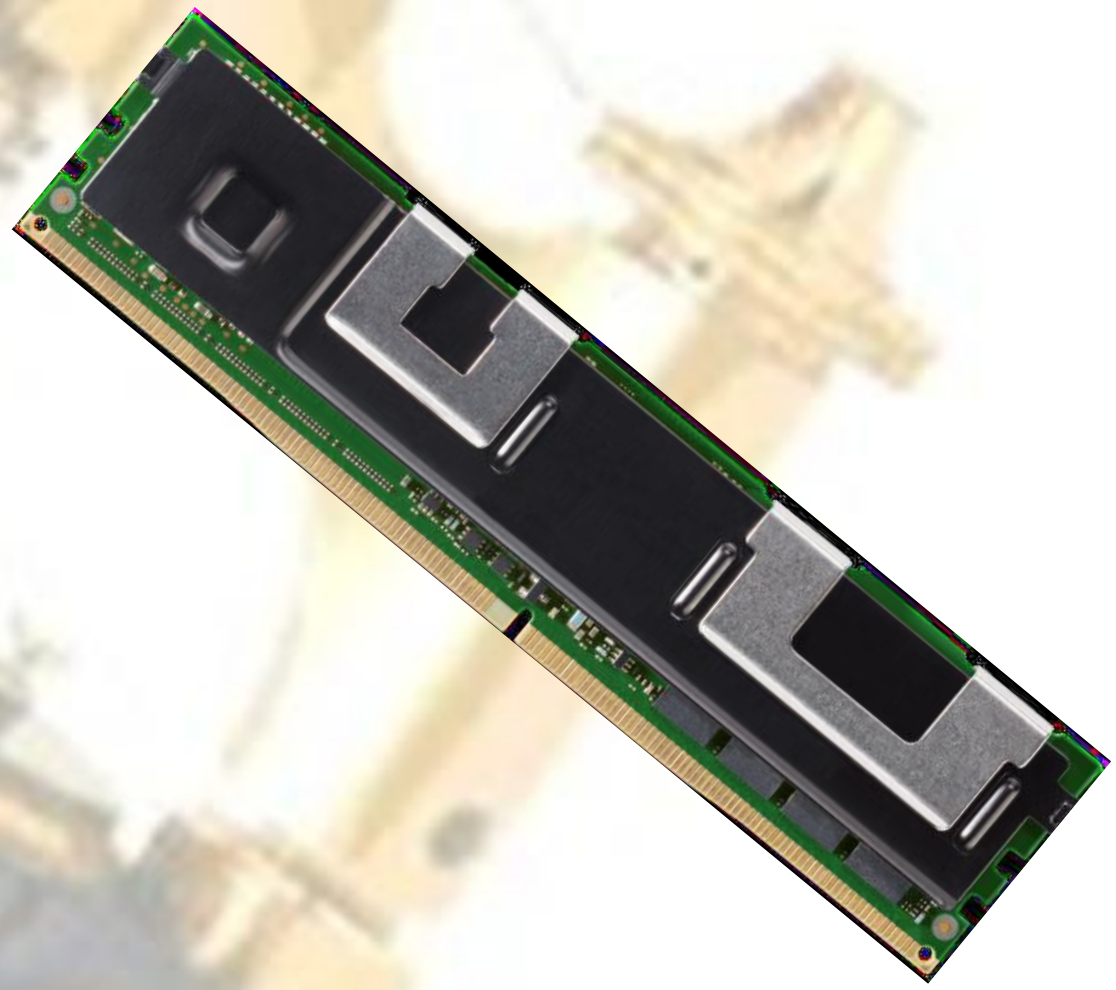
Intel DDR-T Protocol

- "T" = Transactional
  - Supports out-of-order transactions
- Nearly-standard DDR4
  - Same Address Bus
  - Same Data Bus
  - Some Control Signals Modified

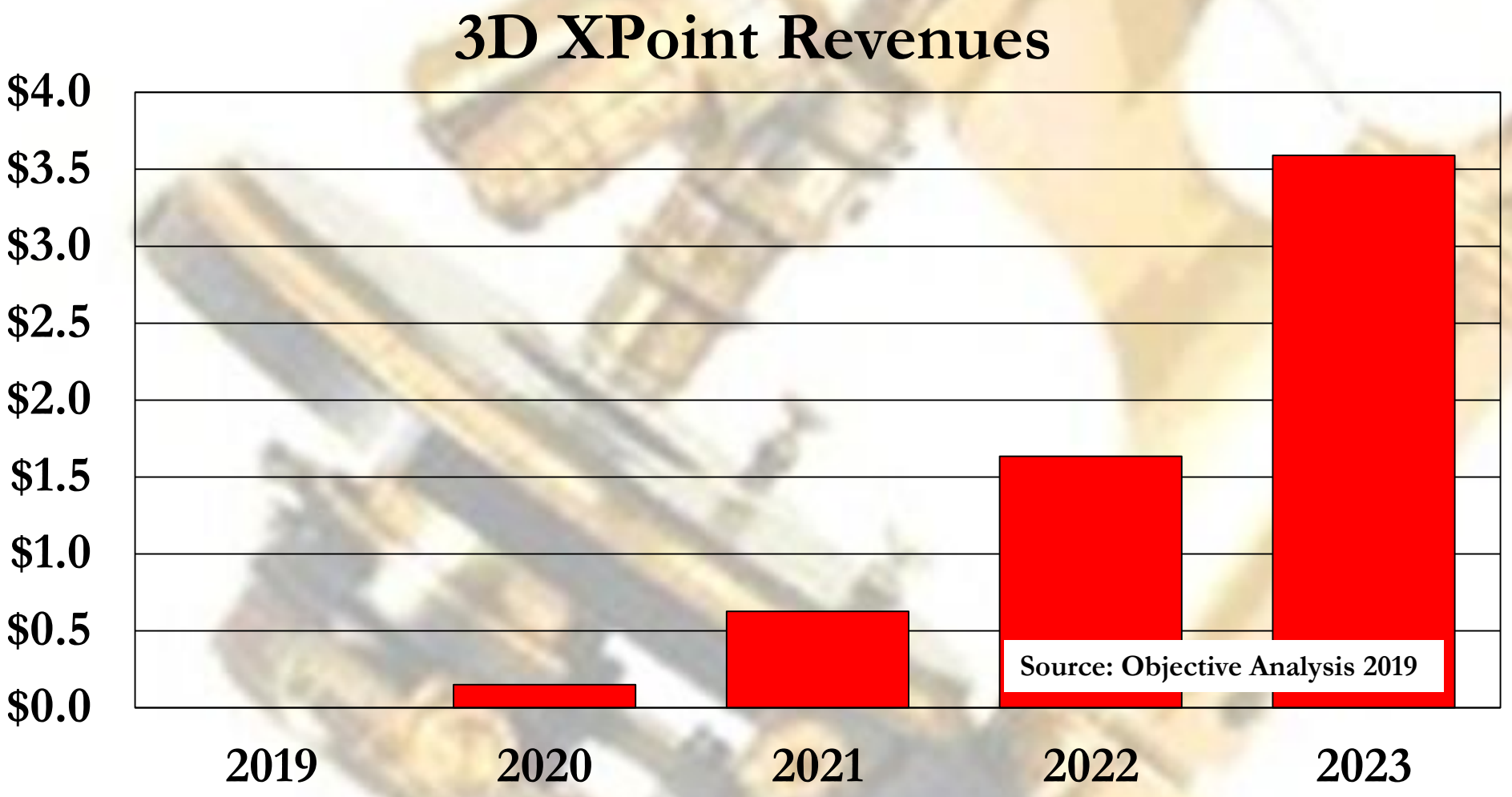


Application Support

- Memory Mode
  - Redis
  - Spark SQL OAP Cache
- App Direct Mode
  - SAP HANA
  - Redis



It is Going to Happen



2015 Slide: Summary

- New layer necessary… eventually!
  - 3D XPoint shows promise
- Lots of support will be required
  - Hardware, software, standards
- Getting pricing below DRAM will be tough
  - Smaller die size isn't the only factor
- Don't expect big changes soon

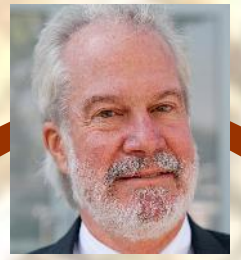
3D XPoint Report

- 2019 Update from Objective Analysis
- The Why, How, and When of 3D XPoint Memory
  - Why Intel wants it
  - How it fits into the memory hierarchy
    - Impact on DRAM
  - When will it sell in volume
- Detailed Forecasts

Now Available!

https://Objective-Analysis.com/reports/#XPoint

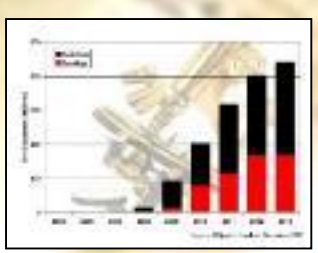
OBJECTIVE ANALYSIS

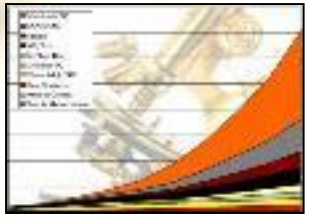


Profound Analysts

Reports & Services

Custom Consulting





Objective Analysis
Semiconductor Forecast Accuracy

Year	Forecast	Actual
2008	Zero growth at best	-3%
2009	Growth in the mid teens	-9%
2010	Should approach 30%	32%
2011	Muted revenue growth: 5%	0%
2012	Revenues drop as much as -5%	-2.7%
2013	Revenues increase nearly 10%	4.9%
2014	Revenues up 20%+	9.9%
2015	Revenues up ~10%	-0.2%
2016	Revenues up ~10%	1.1%
2017	Revenues up ~20%	22%
2018	Strong start supports 10+% growth	14%
2019	Semiconductors down -5%	TBD