

INTEL OPTANE TECHNOLOGY

by

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PRESENTATION CONTENT

- 1. WHY OPTANE TECHNOLOGY ?**
- 2. WHAT IS OPTANE TECHNOLOGY ?**
- 3. READ / WRITE IN OPTANE TECHNOLOGY**
- 4. PERFORMANCE IN OPTANE TECHNOLOGY**

WHY OPTANE TECHNOLOGY

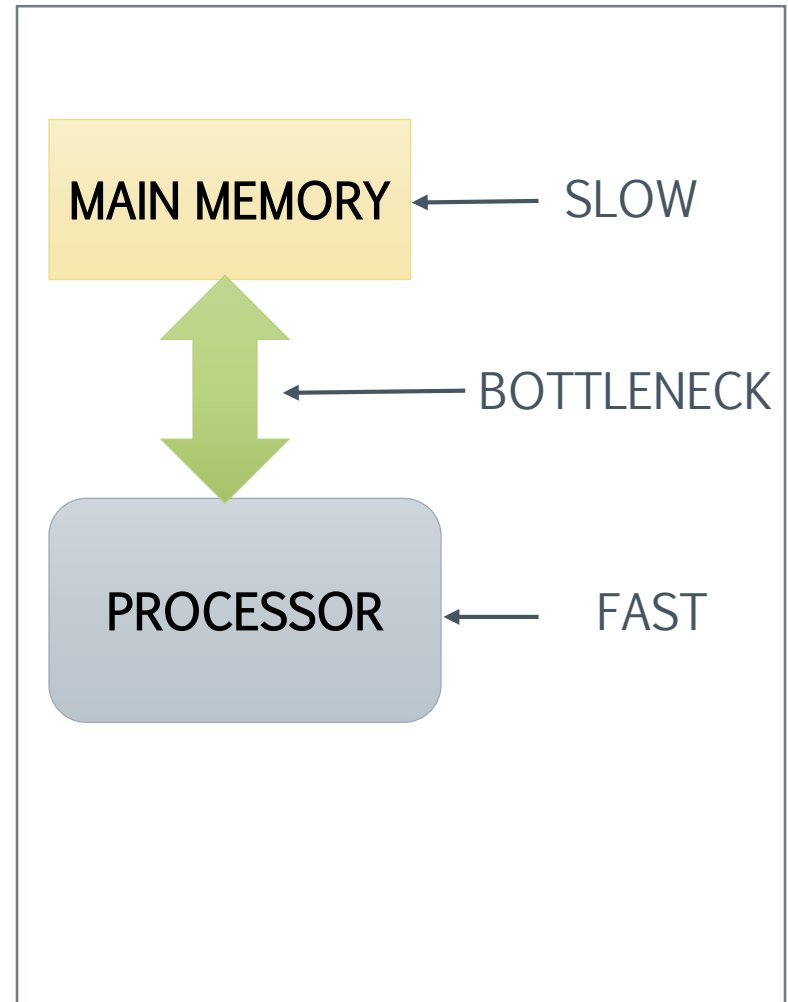
1. WHY OPTANE TECHNOLOGY ?

➤ PROBLEM

- Application became more complex
- More data to be processed
- Processor speed is high
- Memory speed is slow
- Performance is decreased

➤ SOLUTION

- Need memory
 - FAST
 - DENSE
 - NON- VOLTILE



1. WHY OPTANE TECHNOLOGY ?

➤ COMPARISSION

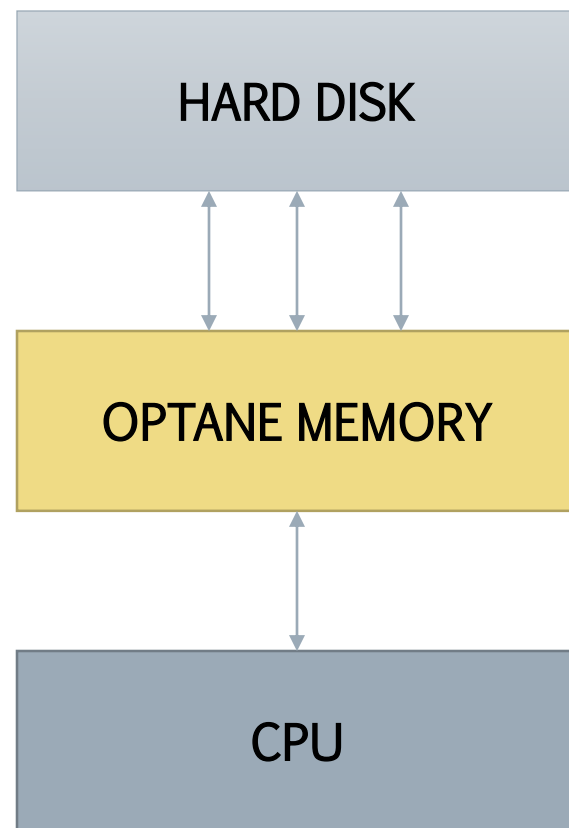
TECHNIQUES	FAST	DENSE	NON-VOLTILE
DRAM	VERY	LITTLE	NO
NAND	NO	YES	YES
OPTANE	YES	YES	YES

WHAT IS OPTANE TECHNOLOGY ?

2.WHAT IS OPTANE TECHNOLOGY ?

➤ OVERVIEW

- **Founded in 2017**
 - **Used primarily as cache drives for a traditional hard drive**
- Ex-intel OPTANE memory keeps parts of the OS on the drive to speed up performance**
- **Coming in 16GB and 32GB modules**
 - **OPTANE memory is packaged in an M.2 SSD that users can add into desktop systems**



2.WHAT IS OPTANE TECHNOLOGY ?

➤TECHNOLOGIES

1. 3D XPOINT MEMORY MEDIA

- Define architecture

2. INTEL MEMORY AND STORAGE CONTROLLERS

- Define read / write

3. INTEL INTERCONNECT IP

- Define interfaces

4. INTEL SOFTWARE

- Defined by software driver

**3D XPOINT™
MEMORY MEDIA**



**Intel Memory and
Storage Controllers**



Intel Interconnect IP



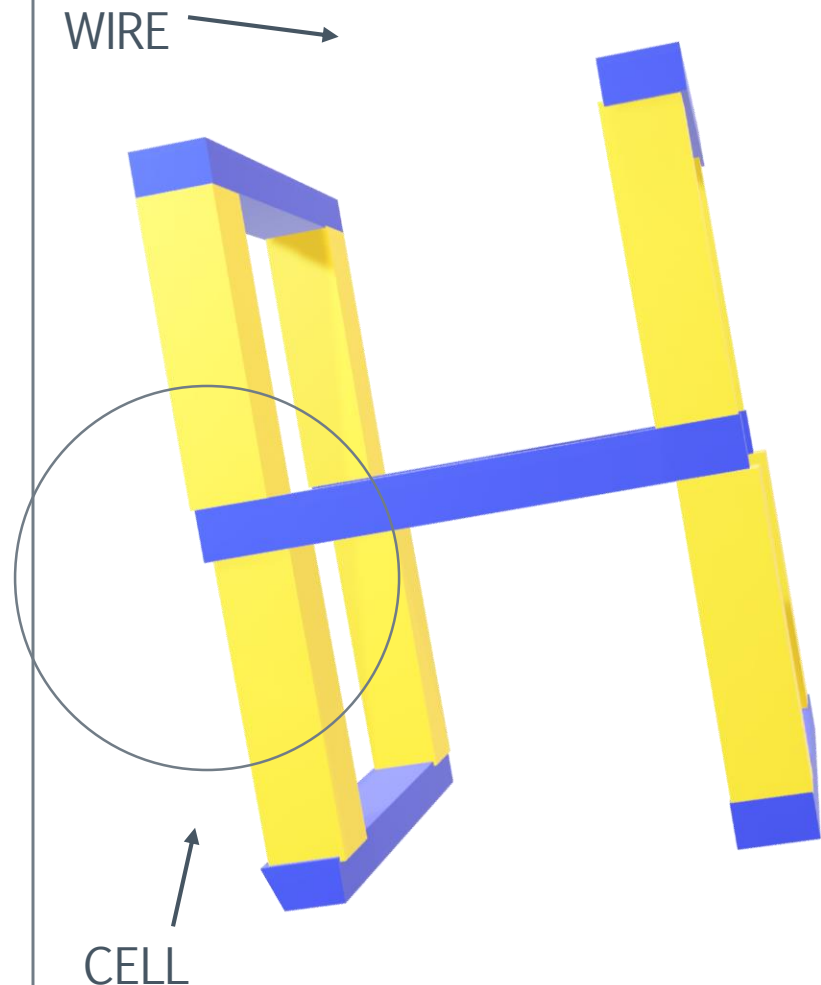
Intel software

2.WHAT IS OPTANE TECHNOLOGY ?

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➤ ARCHITECTURE (3D XPOINT)

- **Wires arranged in either rows or columns**
- **The intersection of each row and column is the cell**
- **Cell which is the actual storage element**
- **Cells are material that can change its resistance to different values**



2.WHAT IS OPTANE TECHNOLOGY ?

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➤SPECIFICATION

1. Write is easy and fast

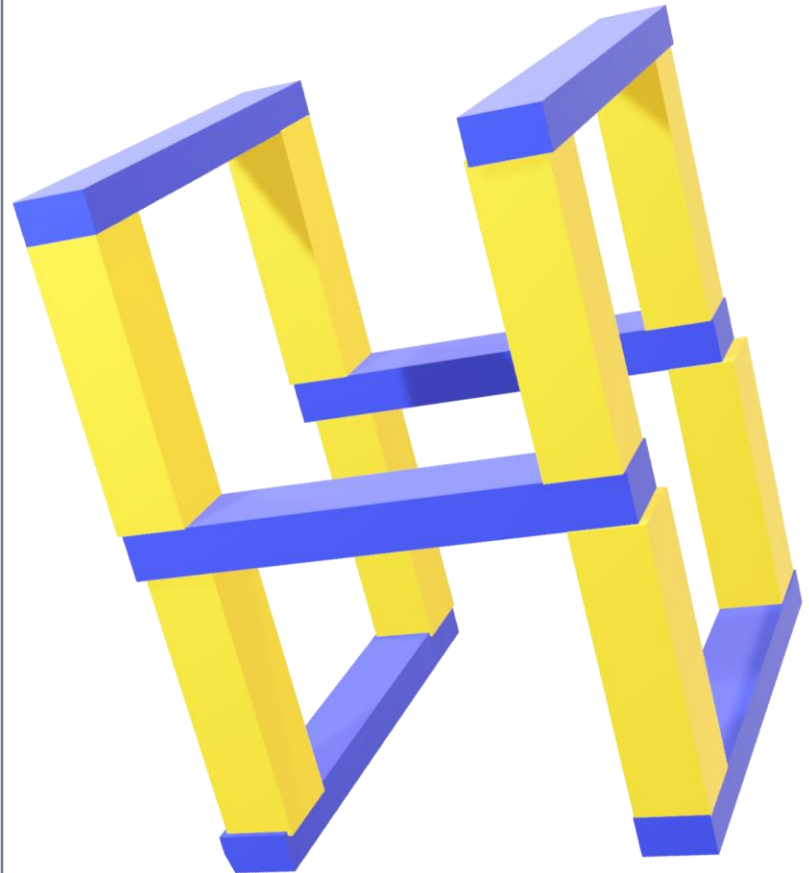
-The value stored in each data cell can be written easily without needing any erasure step.

2.High dense

-There are stackable layers

3. Non-volatile

-No transistor so 1 or 0 bit will indicates by using cells resistance level



READ / WRITE IN OPTANE TECHNOLOGY

3.READ /WRITE IN OPTANE TECHNOLOGY

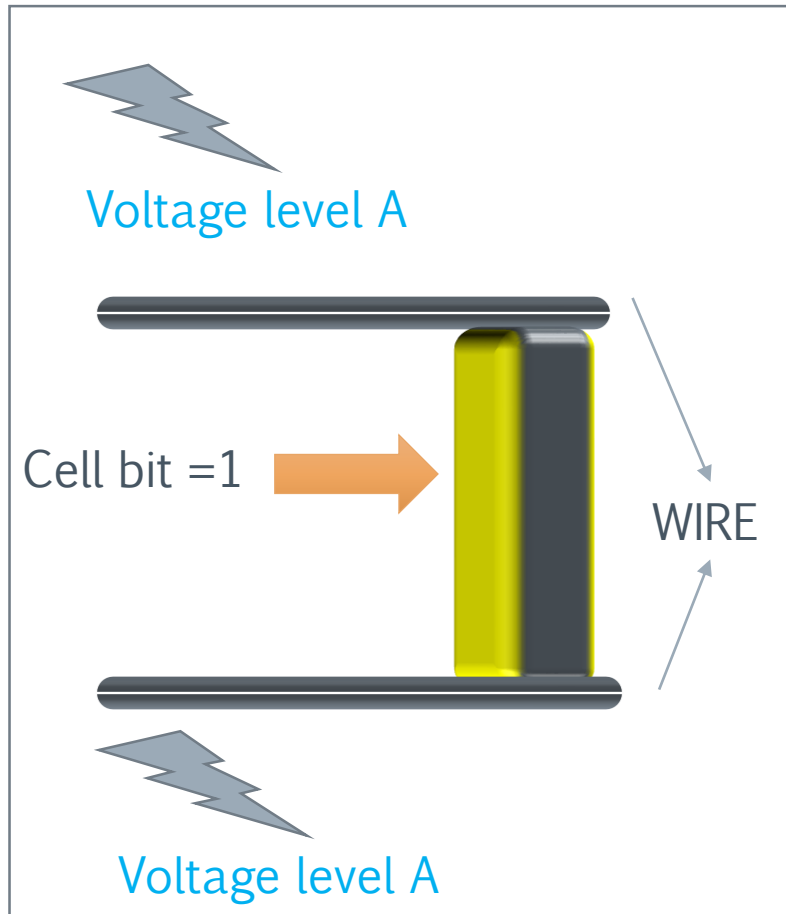
➤METHODOLGY

- Read and write operations occur by varying the amount of voltage sent to each cell using wires that will change resistance level.
- modifies the cell's resistance level can be done through a physical property change in the cell material.
- Each cell represent either a 1 or a 0 depend on resistance level of the cell
- There are 3 voltage level
 1. Level A for 1 bit write
 2. Level B for 0 bit write
 3. Level C for bit read

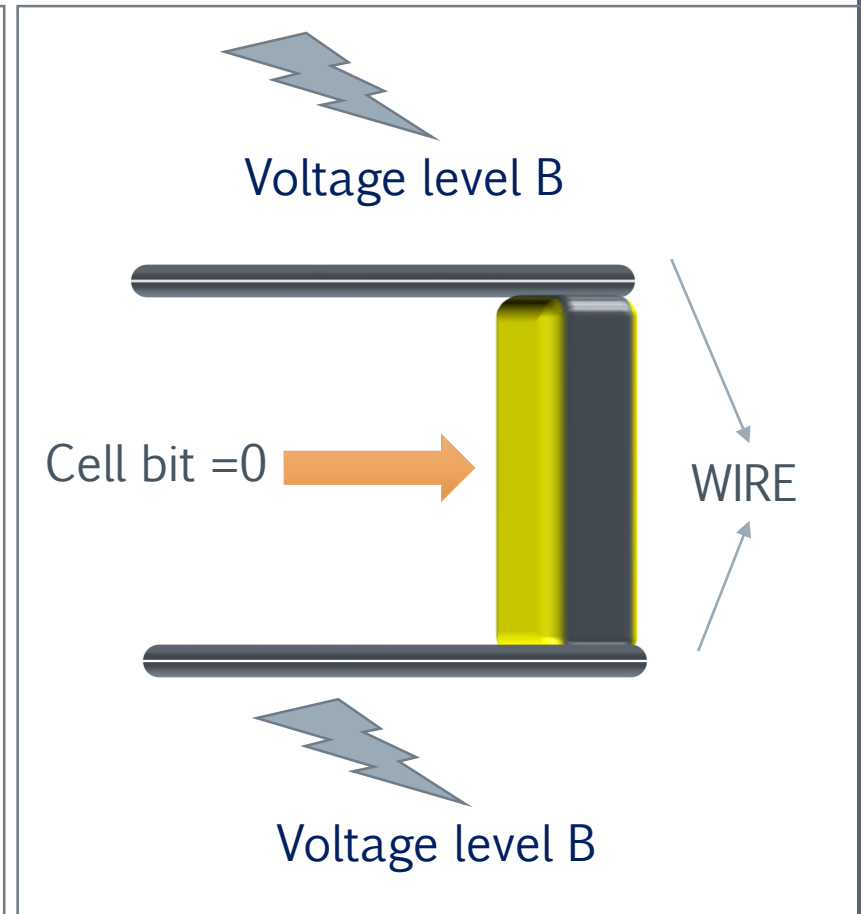
3.READ /WRITE IN OPTANE TECHNOLOGY

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WRITING 1 BIT



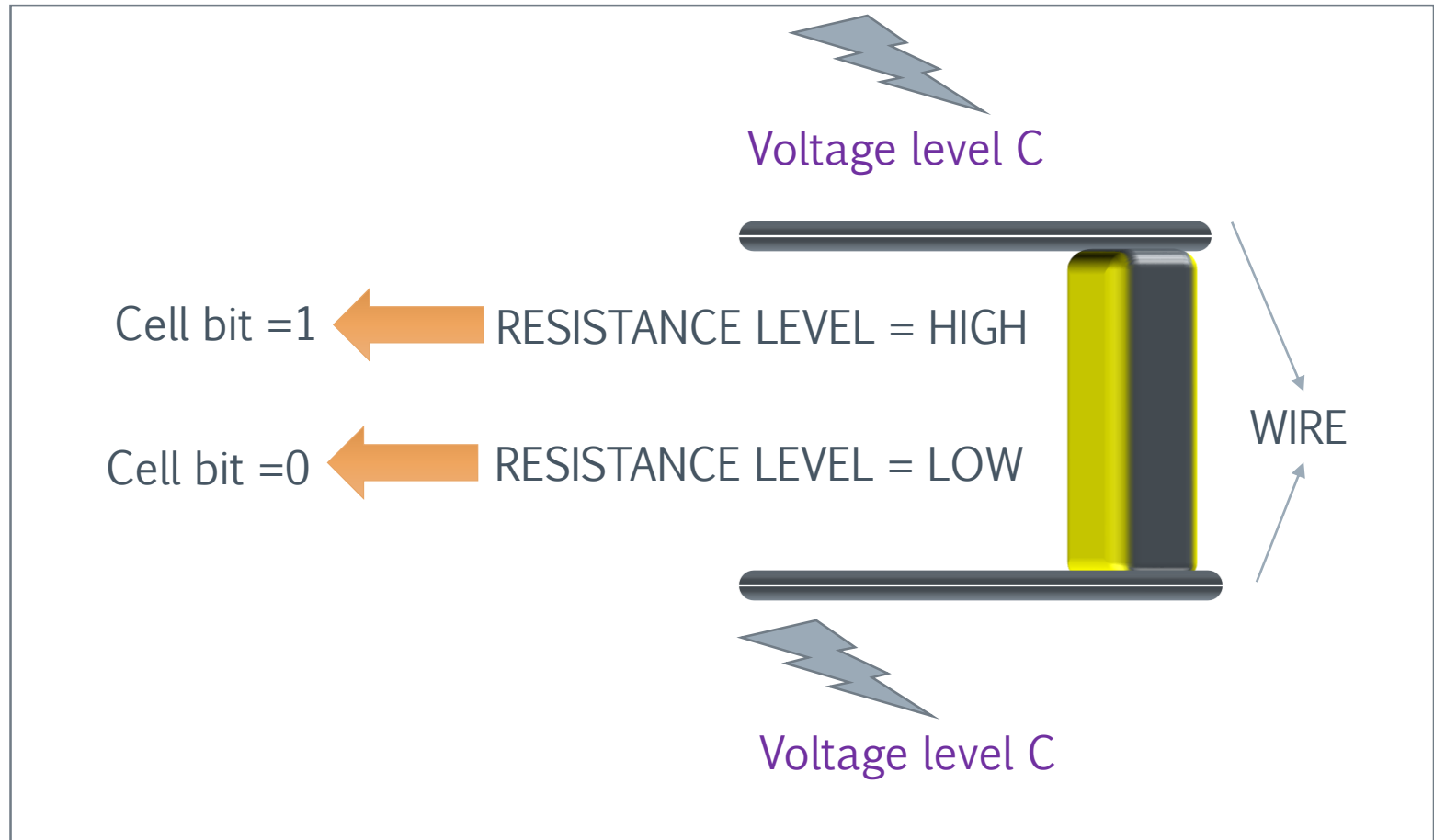
WRITING 0 BIT



3.READ /WRITE IN OPTANE TECHNOLOGY

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READING



PERFORMANCE IN OPTANE TECHNOLOGY

4.PERFORMANCE IN OPTANE TECHNOLOGY

➤ USING CRYSTALDISKMARK BENCHMARK

MBPS (HIGHER IS BETTER)	HARD DRIVE ONLY	OPTANE MEMORY AS SSD	HARD DRIVE + OPTANE MEMORY
Sequential Read	143.8	1268	1264
Sequential Write	143	292.2	292.6
4K Read	0.548	270.2	191.7
4K Write	1.592	128.5	125.9

4.PERFORMANCE IN OPTANE TECHNOLOGY

- **PROS(ADVANTAGES)**

- 1. **Exceptional performance**

- low queue depth performance
 - responsive under load
 - QOS
 - Form factor and capacities

- 2. **Can get performance of SSDs when using HDD**

- **CONS(DISADVANTAGES)**

- 1. **REQUIRMENT**

- 7th Gen Core platform
 - M.2 slot
 - windows 10 as a OS

- 1. **High cost**

- 16GB model for \$44
 - 32GB model for \$77

➤ REFERENCES

- I. WWW.INTEL.COM
- II. WWW.ARSTECHNICA.COM
- III. WWW.SEARCHSTORAGE.TECHTARGET.COM

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THANK YOU