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2014 FORMED NVDIMM SIG



15+  
MEMBER

\$550M  
TAM  
in 2020

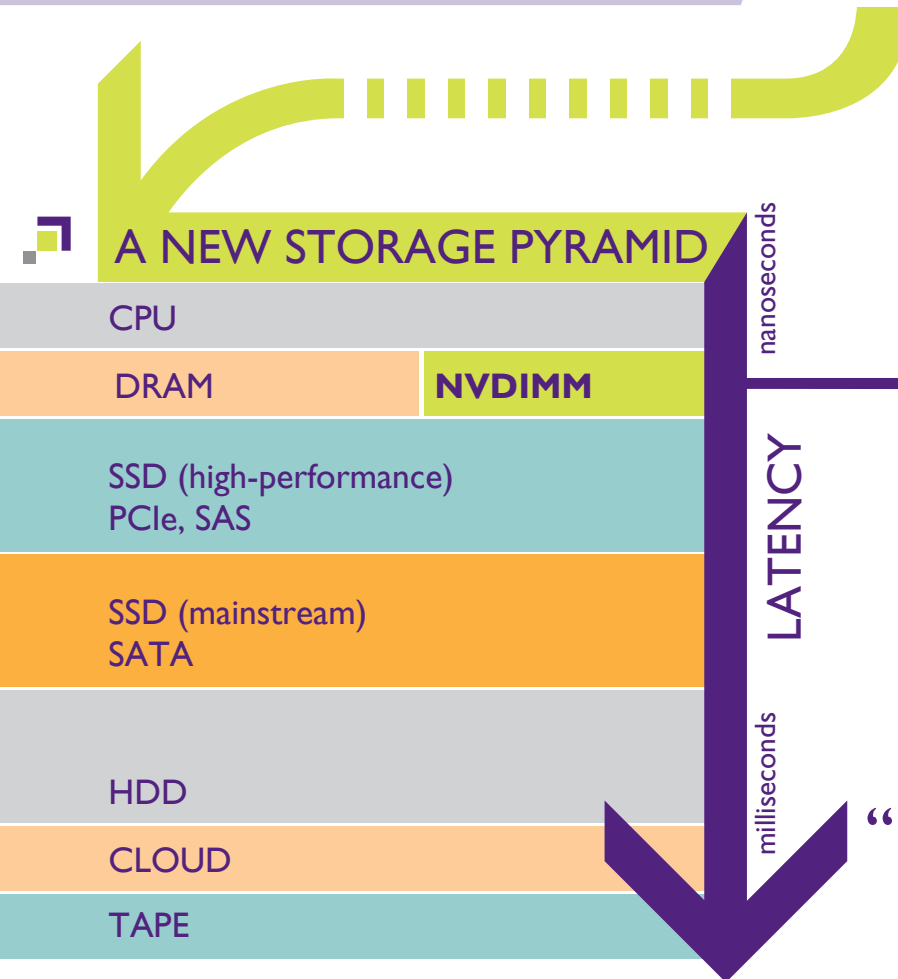
### What is NVDIMM?

A Non-Volatile Dual In-line Memory Module (NVDIMM) is a "persistent memory technology" that retains data in the event of a power loss or a system shut down.

### So its a storage device? or DRAM?

Both! NVDIMM(s) come in various volatile and non-volatile media combinations that can be block and/or byte addressable. You can use it as memory that is persistent or the fastest storage device in your application.

### A NEW STORAGE PYRAMID



#### NVDIMM - N

Memory mapped **DRAM** with no system access to flash.

Attributes:

Low-Capacity (2GB - 32GB)

Very-low Latency (10s of nanoseconds)

#### NVDIMM - F

Memory mapped **Flash** where DRAM is not system mapped.

Attributes:

High-Capacity (100GB - 1TB)

Low Latency (10s of microseconds)

#### NVDIMM - P

Memory mapped Flash and memory mapped DRAM with two access mechanisms: persistent DRAM (-N) and block-oriented drive access (-F)

Attributes:

High-Capacity (100GB - 1TB)

Low Latency (100s of nanoseconds)

“moving storage closer to the CPU”

ISV Supported {



## The What(s) & Why(s) of NVDIMM Technology

### NVDIMM-N

- **A growing number of applications:**
  - Require frequent access to large data sets
  - Are sensitive to down time
  - Have performance limitations due to I/O bottlenecks
- **NVDIMM-N provides:**
  - Low latency, high performance and near infinite endurance of DRAM
  - The persistence of NVM
- **No impact to memory bus performance**
- **Fast recovery from system power loss**
- **Software overhead can be eliminated**

### NVDIMM-F

- **Provides direct access to NVM on the low-latency, high bandwidth memory interface**
  - High-capacity, high-performance block storage
  - High-capacity, economical, byte-addressable system memory
- **Data remains within memory subsystem(shortest path to CPU)**
- **NVDIMM-F as Storage:**
  - Bypasses I/O subsystem for fastest data access
  - Eliminates contention with I/O Devices
  - Memory bus provides massive parallelism and access consistency
- **NVDIMM-F as Memory:**
  - NVM density enables more block memory per socket and per server
  - Processes larger data sets in-memory

### NVDIMM-P

- **Combination of -N and -P attributes and feature sets**
  - High-capacity, high-performance block storage
  - Low latency, high performance and near infinite endurance of DRAM
- **Memory mapped Flash AND memory mapped DRAM with two access mechanisms: persistent DRAM (-N) and block-oriented drive access (-F)**

### Use Cases for each type

It's not a one size fit all.

**In Memory Database  
Traditional Database  
Enterprise Storage  
Virtualization  
High-Performance Computing  
NVRAM Replacement  
Financial & Real-time Transaction  
Object Store  
Unstructured Data**

**Database & Big Data Analytics  
Virtualization  
Financial & Real-time Transaction  
Image-editing Systems  
Movie Rendering  
CAD Systems  
SAN appliances and Arrays  
Distributed Storage Systems  
Distributed Cache**

**In Memory Database  
Traditional Database  
Enterprise Storage  
Virtualization  
High-Performance Computing  
NVRAM Replacement  
Financial & Real-time Transaction  
Object Store  
Unstructured Data**

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