Abstract:

It appears that NVDIMMs, introduced in 2009, are finally reaching a point of mass adoption. This device is not only used as fail-safe storage for both storage arrays (SAN) and hyperscale data centers, but is helping to accelerate software development for future computing systems that will use storage class memory (SCM) and persistent memory (PM). This report investigates NVDIMM technology, its use, and its future, while explaining how and why it is just now gaining market traction.

Starting with an outline of the technology, and explaining how and why it is used, this study thoroughly explores NVDIMM applications and explains the technology’s appeal in each application. The report compiles information that Objective Analysis has acquired from extensive field interviews with NVDIMM manufacturers, OEMs, the design community, and end users. It concludes with an NVDIMM unit shipment forecast by NVDIMM type.

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Executive Summary

What is an NVDIMM?
- NVDIMM history
- Some Background: The Memory/Storage Hierarchy
- Definitions of NVDIMM types: -N, -F, -P
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  - NVDIMM vs. DRAM

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- Special Operating System requirements
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- What Systems will Use It?
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  - Scaling limits: How Persistent Memory will replace DRAM
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- Using NVDIMM-N to develop SCM/PM software

The Impact of Intel’s 3D XPoint Memory and Optane DIMMs

- Optane as a Large (Volatile) Memory
- Optane for Persistence

NVDIMM Standardization

- Joint Electron Devices Engineering Council (JEDEC)
- Storage Networking Industry Association (SNIA)
- Unified Extensible Firmware Interface (UEFI)

Profiles of NVDIMM Manufacturers

- AgigA/Cypress
- Diablo Technology
- IBM Corporation
- Intel Corporation
- Micron Technology
- Netlist
- Samsung
- SanDisk/Western Digital Corporation
- SK hynix
- SMART Modular Technologies
- Viking Technology/Sanmina
- Windawn
- Xitore
- Etc.

NVDIMM Forecasts by Type

- NVDIMM-N
- NVDIMM-P
- NVDIMM-F
- NVDIMM-X
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Methodology