Cost and Performance of some Optane DIMM Options

Now that we have information on the performance of Optane DIMMs and data on recommended configurations from Intel, We are updating a Blog from last year on choices for Optane DIMMs

Today's standard configuration is **192GB DRAM with 1TB NVMe SSD**. With Optane, Intel is proposing **128GB DRAM with 1.5TB of Optane** operating in memory mode (volatile/not persistent). Cost is about the same as todays configuration. What can we expect from this configuration? In theory…

- **Read Latency is 5-7x higher for Optane, but speed (MT/S) is only 3x slower for Optane. This is the same effect we see on latency vs speed in DDR2,3,4 transitions**
- Data sets larger than 192GB would run much faster on Optane DIMMS as no swapping is required with SSD
- Datasets between 128 and 192GB would run slower because you got rid of some of the DRAM and replaced it with Optane. These now run with some of the memory running at 1/3 the speed
- The trade off is simple. cost is the same. Do you have large datasets taking up more than 192GBs of memory? Are you OK with 1/3 the performance when accessing the Optane vs DRAM?
- Reminder: In Memory mode the Optane is configured by controller as volatile memory.

A second configuration is App direct mode. In this mode we have true persistent memory. You can use it with load/store commands like memory or block level storage like SSDs. A simple example is replacing the NVMe SSD with persistent memory. Its like an SSD on the DRAM bus. Example

- Replace 512GB NVMe accelerator SSD with 512GBs of Optane persistent memory in app direct mode.
- Cost goes from $400 for NVMe to $1800 for Optane DIMMs.
- When accessing the Optane DIMM the speed is 10-50x faster depending on your metric and application.
- It is persistent so data is never lost
- Much more expensive but as an accelerator, much faster.

If you are an IT expert, a great summary of performance improvement seen from Optane DIMMs is shown here from the UCSD NVM Team. https://arxiv.org/abs/1903.05714

We have a matrix of lots of cost/performance options, including NVDIMMS available from other suppliers (Samsung, Netlist, Micron, Viking, Smart Modular, etc)