Memory & Storage Day
Memory & Storage Day

HARVESTING THE VALUE IN OCEANS OF DATA

Rob Crooke
Senior Vice President, General Manager, Non-Volatile Solutions Memory Group (NSG)
All information provided here is subject to change without notice.

The products described in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

Intel technologies’ features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at intel.com.

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit www.intel.com/benchmarks.

Cost reduction scenarios described are intended as examples of how a given Intel-based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

Intel does not control or audit third-party data. You should review this content, consult other sources, and confirm whether referenced data are accurate.

Results have been estimated or simulated using internal Intel analysis or architecture simulation or modeling, and provided to you for informational purposes. Any differences in your system hardware, software or configuration may affect your actual performance.

© Intel Corporation. Intel, the Intel logo, and other Intel marks are trademarks of Intel Corporation or its subsidiaries. Other names and brands may be claimed as the property of others.
OUR AMBITIONS...

2013
A PC-Centric Company

2017-2021
Data-Centric

2021 & BEYOND
Intel Powers the World
DATA GROWTH DRIVES COMPUTE, STORAGE, NETWORK DEMAND

**PROCESS EVERYTHING**

- **Compute Demand**
  - 2013: 1X
  - 2018: 5X (~50% CAGR)
  - 2023: 5X

**STORE MORE**

- **Storage Demand**
  - 2013: 1X
  - 2018: 1X
  - 2023: 3X (~30% CAGR)

**MOVE FASTER**

- **Network Demand**
  - 2013: 1X
  - 2018: 1X
  - 2023: 1.5X (~25% CAGR)

Sources: Global Internet Traffic, Cisco VNI Forecasts (2016, 2017, 2018); Stored Data, IDC Data Age 2025 (2018); Compute demand, Intel analysis
INDUSTRY MEGA TRENDS

PROLIFERATION OF CLOUD COMPUTING

GROWTH OF AI & ANALYTICS

CLOUDIFICATION OF THE NETWORK & EDGE
Nodes for different workloads:

- AI Optimized
- Compute Optimized
- Storage Optimized
STORAGE NODES

- COMPUTE CACHE
- IN PACKAGE MEMORY
- DRAM
- PERSISTENT MEMORY
- PERFORMANCE STORAGE
- 3D NAND
- Intel® 3D NAND
- HDD-TAPE
CLOUDIFICATION OF THE NETWORK
ENABLING
INTERNET OF THINGS
ENABLING
INTERNET OF THINGS
TRANSFORMATION IN CLIENT COMPUTING
DRAM

PERSISTENT MEMORY

INTEL® OPTANE™ SSD

+ INTEL® 3D NAND
THE WHOLE PICTURE:
PRODUCTS THAT TRANSFORM THE ECOSYSTEM
HARVESTING VALUE:
OUR CUSTOMERS TELL THE STORY
“We call the concept Universal Storage. You no longer need to worry about where to tier your data. We make it such that you can afford to keep all your data on one system that is fast enough for your applications, but has the cost points of an archive system. Our entire business model is built on Intel® Optane SSD and Intel® QLC 3D NAND SSDs.”

Jeff Denworth
VP Products & Co-Founder
“We have been a partner with Intel from a technology perspective for a long, long time ...the technology that Intel brings to market to essentially enable us to develop the world’s best enterprise class storage products.”

Robert Decrescenzo
Director of Software Development at Dell EMC Corporation

*Other names and brands may be claimed as the property of others.*
“We have been a partner with Intel from a technology perspective for a long, long time ...the technology that Intel brings to market to essentially enable us to develop the world's best enterprise class storage products.”

Robert Decrescenzo
Director of Software Development at Dell EMC Corporation

*Other names and brands may be claimed as the property of others.
LESS LATENCY FOR A
BETTER CUSTOMER EXPERIENCE

“Cisco and Intel are at the forefront of expanding use cases for HCI through optimizing the HyperFlex All NVMe solution for Intel Optane caching and Intel 3D NAND capacity drives. This solution delivers a new class of HCI performance capable of powering more business-critical workloads and enabling increasing levels of real-time data-driven intelligence. HyperFlex All Flash and All NVMe with Intel Optane have proven to significantly improve IOPS and reduce latency in Oracle and SQL databases and have received application certifications for SAP HANA and healthcare EMR solutions. Our joint HCI solution is used to power performance intensive workloads by major hospital groups, professional sports teams, trading environments, heavy machinery manufacturers, and more all around the world.”

Kaustubh Das,
VP Product Management, Cisco Computing Systems

*Other names and brands may be claimed as the property of others.*
Verizon: Ahead of the Curve

Intel® Optane™ DC Persistent Memory with Intel® Speed Select Technology (Intel® SST) on 2nd Generation Intel® Xeon® Scalable Processors allows for adapting a server on the fly based on the need of a customer while enabling power management to a higher degree.

This allows us to change the behavior of the CPU by improving throughput by adding more cores or improving latency by increasing frequency.

This increased time to market with less variations of hardware.

*Other names and brands may be claimed as the property of others.
The Research and Development team at Hyundai needed to identify an effective desktop to deploy to support large capacity storage while solving system performance challenges. The Intel® Optane™ Memory and Intel® Rapid Storage Technology solution solved this challenge and led to a reduction of engineering assets focused on local storage, allows for greater efficiency and enhanced security.

*Other names and brands may be claimed as the property of others.
HEALTHCARE FOR A BETTER HUMAN EXPERIENCE