Innovator, Disruptor or Laggard, Where will your storage applications live? Next generation storage

Bev Crair, Vice President and General Manager, Storage Group
Intel
The world is changing

Information Growth
From now until 2020, the size of the digital universe will about double every two years

Security
Increase in avenues and attack surfaces

Complexity
What we do with data is changing, traditional storage infrastructure does not solve tomorrow’s problems

Cloud
Emergence of new IT solutions
Information is exploding

306 HOURS VIDEO UPLOADED TO YOUTUBE

50,200 APPS DOWNLOADED

137 MILLION E-MAILS

EVERY MINUTE EVERY DAY

Source: TechSpartan.co.uk - 2013 vs 2014 In an Internet minute
Data use pattern changes

- From collecting to analyzing data
- Valuable data now resides outside the organization
- Analyzing and optimizing unstructured data
Data growth challenges

Data needs are growing at a rate unsustainable with today's infrastructure and available professionals

Transforming storage architectures

What’s your workload Today?

- Enterprise service providers
- Server based storage
- HPC Big data

Architectural Convergence on the Cloud Storage Platform

FUTURE STORAGE ARCHITECTURE

2020 AND BEYOND

NEW PROTOCOLS OPTIMIZED FOR DATA TIERING
DATA RESIDENT COMPUTING
WORKLOAD AWARENESS PLATFORMS
WORKLOAD DATA MANAGEMENT
MACHINE LEARNING BASED
AUTONOMOUS MANAGEMENT
Next generation NVM: Intel and Micron

New class of storage and memory

3D Xpoint®

1000X FASTER THAN NAND

1000X endurance of NAND

10X denser THAN conventional memory
Why is NG NVM fundamentally different?

**Fundamental Memory Characteristics**

<table>
<thead>
<tr>
<th>Performance</th>
<th>Persistency</th>
<th>Capacity</th>
</tr>
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<tbody>
<tr>
<td>(Short Delay)</td>
<td>(Non Volatility)</td>
<td>(Cost)</td>
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</tbody>
</table>

- **NG NVM**
  - (Fast, Persistent, 10X DRAM Density)

- **DRAM**
  - (Fast, Volatile, Expensive)

- **NAND**
  - (Slow, Persistent, Cheap)

NG NVM is a Unique Balance of All Three Characteristics
Removing the storage bottleneck

NVMe is the next quantum leap

SSD NAND technology offers ~500X reduction in latency versus HDD

NVMe eliminates 20 µs of latency today

NG NVM reduces NVM latency offering ~10x reduction in latency versus NAND SSD
Intel storage architecture innovations

**Hardware**
- Processor
- Memory
- Solid State Drives
- Networking
- Quick Assist

**Software**
- Intel Storage Performance Development Kit (SPDK)
- Intel® Storage Acceleration Library (ISA-L)

**Solutions**
- CoprHd Storage Controller
- Rack Scale Architecture
- Reference Architectures

**NEWS:** Intel Storage Performance Development Kit
Open Source: NVMe User Mode Linux Driver available on
https://01.org/storage-performance
Where will your application live?

Silo’ed Storage

Zones of Virtualization

Private Cloud

Public Cloud

Scale-Up / Purpose Built Storage

Scale-Out / Software Defined Storage
CALL to ACTION

- Accelerate development for NVMe and PCIe
- Embrace Open Source software to accelerate new technology development
- Leverage next generation NVM technology for converged infrastructure
- Intel and You: A Bright Future Together!