Forward Looking Statements

This presentation contains certain forward-looking statements.

Any statement that refers to expectations, projections or other characterizations of future events or circumstances is a forward-looking statement, including those relating to market growth for flash and SSD, industry trends including the increased adoption of and demand for flash and SSD in various devices, enterprise applications and data centers, future memory technology, technology transitions and future products, including 3D NAND and its performance, cost and timing of commercial availability. This presentation also contains information from third parties, which reflect their projections as of the date of issuance of those statements.

Actual results may differ materially from those expressed in these forward-looking statements due to factors detailed under the caption "Risk Factors" and elsewhere in the documents we file from time to time with the SEC, including our annual and quarterly reports.

We undertake no obligation to update these forward-looking statements, which speak only as of the date hereof or the date of issuance by a third party, as the case may be.

SanDisk

The World is Ready for Big Data Flash

Gary Lyng

Snr Director Marketing & Strategy, Data Center Solutions
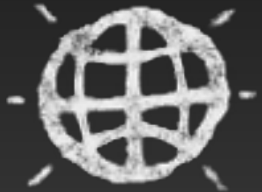
Flash Memory Summit 2015 – session 301-A

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Business Trends

Beyond Data

MOBILE · CLOUD · BIG DATA · SOCIAL

BILLIONS
of people

MILLIONS
of Apps

40,000 Exabytes Digital Universe in 2020

Customer Experience & Impact

Simplicity

Information
on-Demand

Scale
Beyond

Consistent
QoS

Technology Trends

Consolidate-Expand-Consolidate

Scaling Beyond

MAINFRAME

VIRTUALIZATION

HYPER-CONVERGED INFRASTRUCTURE

WEB SCALE

GEO-DISTRIBUTED SCALE-OUT

BILLIONS OF DEVICES

CLIENT/SERVER

DISAGGREGATED STORAGE & COMPUTE

CLOUD SERVICES

BILLIONS OF OBJECTS

KEEP INFORMATION FOREVER

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Enable a New Generation of
Services & Applications
for an Experience
Never before thought possible!

Flash Changes Everything and
the Ripple Effects are Wide-Ranging

On Our Lives
Solve impactful challenges quicker

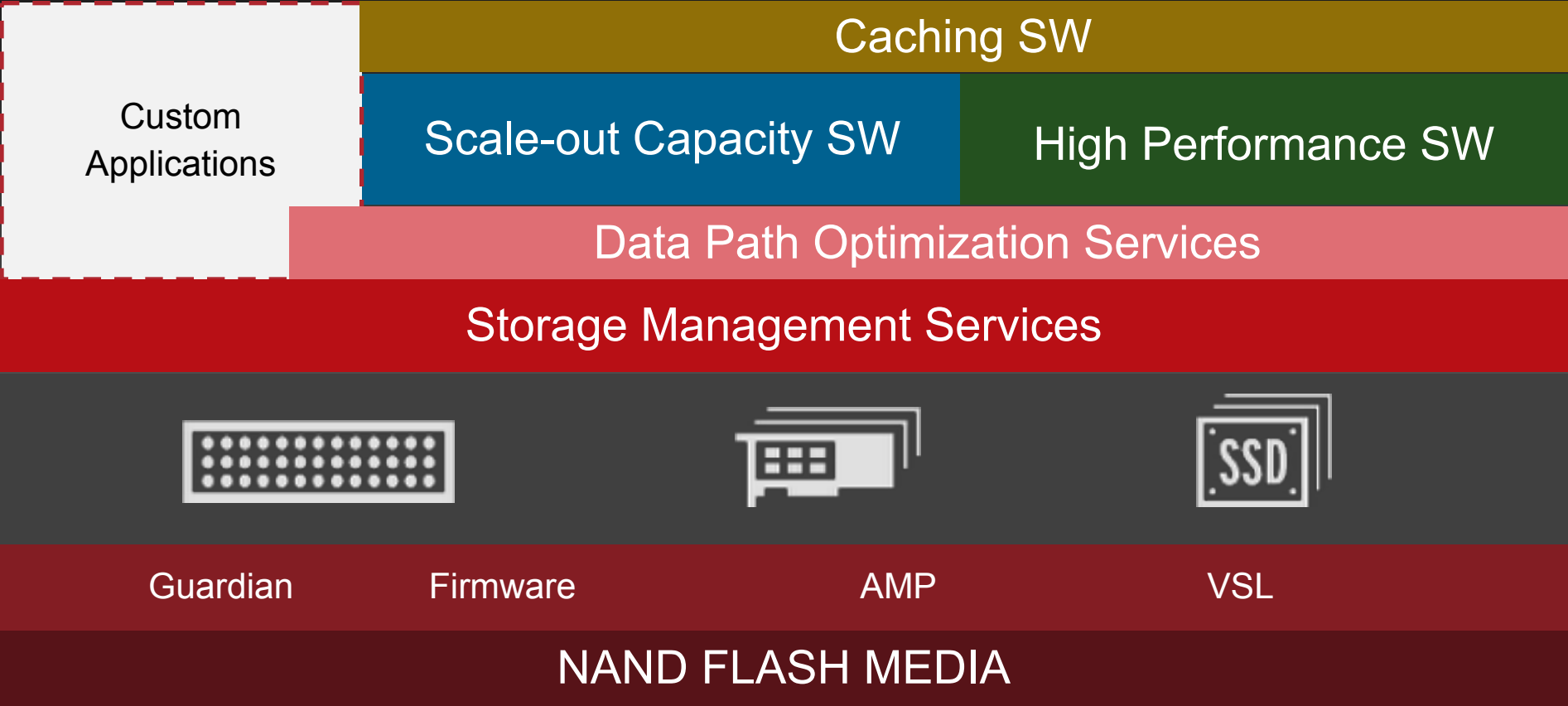# Flash Changes Everything and the Ripple Effects are Wide-Ranging

On Innovation
Big Data & complex tasks more feasible, enabling new possibilities

On the Data Center Bottom Line
ITC, TCO, delivering on SLAs, growing the business

SanDisk Solution Building Blocks & Flash Intelligence

Custom Applications	Caching SW	
	Scale-out Capacity SW	High Performance SW
	Data Path Optimization Services	

Storage Management Services

| Guardian | Firmware | AMP | VSL |

NAND FLASH MEDIA

SanDisk®

Workloads Demanding Flash Solutions

Databases

Virtualization

Big Data

Content Repositories

Big Data Analytics

Media Services

Workloads Demanding Flash Solutions

Challenges & Considerations for Scaling Storage

Traditional Approaches Fail

- Over design software for HDD failure
- Forced massive redundancy
- Poor performance
- New steps not addressing

Performance with Capacity

- Forced trade-offs and high complexity
- Billions of users, objects and immediate gratification required
- **Your cold data is my hot data**

Big Data NDO Scale-out

- File systems break at massive scale
- Object Storage optimal efficiency
- Multi-protocol access to a common storage substrate: Block, Object and File interfaces

Big Data

Content Repositories

Big Data Analytics

Media Services

SanDisk®

Massive Capacity Deployments Choices

A JBOF System – SanDisk InfiniFlash

- Designed for simplicity at scale
- 64TB to 512TB in 3U SAS system, up to 1M IOPS
- Management at system level (API, CLI)
- Hot swappable components, fully HA design
- Fully supported: system to component
- Big Data Flash Solution Integration with
  - InfiniFlash-OS : Unified File, Object, Block
  - ION SW: High Performance Block

JBOF

- Bunch of SSDs in a 3rd party chassis for shared storage or Deploy in Servers
- Standard 2.5" SSD form factor
- Data center grade drive choices
  - 4TB SAS SSD (Optimus MAX)
  - 2TB SATA (CloudSpeed Ultra Gen. II)
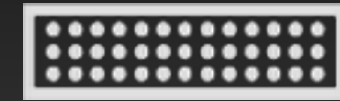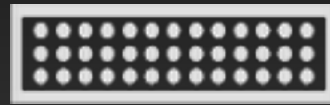- Support per drive

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Petabyte to Exabyte Solution Building Blocks

SCALE-UP

SCALE-OUT

ENTRY LEVEL FLASH UPGRADE

For <u>any</u> application in virtualized (VMware) Windows, Linux

~3X performance gains through caching

SW: FlashSoft

PREMIUM UPGRADE FROM 'ENTRY'

Oracle, SQL server, SAP, Exchange, SharePoint and other scale up

~10x performance gains relative to HDD

SW: ION, Tegile, Nexenta, Windows Storage Spaces

PEFORMANCE NOT SEEN BEFORE

NoSQL databases, Hadoop

~5x performance gains relative to HDD

SW - GPFS, CEPH or Redhat Gluster, Openstack

Hadoop with InfiniFlash Optimized Object Store

Hadoop Technology at an Inflection Point
- Hadoop 2.x enhancements
- Rapid network bandwidth improvements
- Now affordable Flash Acceleration & Capacity

Compute Farm

- MapReduce with high performance Object Store with S3
- High Throughput, High IOPs, High density at lower cost
- No compromise in Time-to-Insight
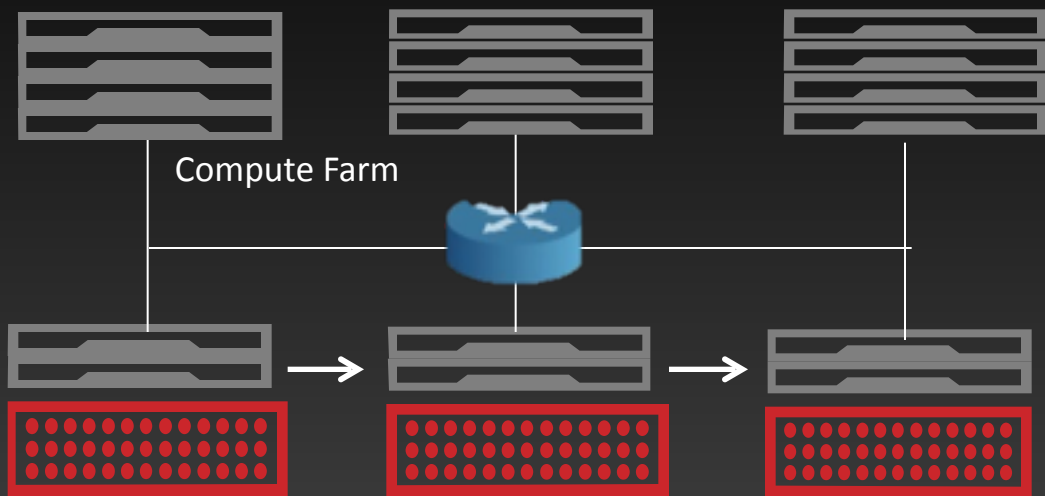
Architecture
- Disaggregated Compute and Storage leading to flexible deployments and optimal use of resources
- High throughput Object Store provides data protection with Erasure Coding with high storage efficiency

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Dramatic TCO Impact for Hadoop Deployment

Reliability – 10x Higher
- 10x higher reliability than a typical HDD*
- AFR < 0.15%*
- Improving up time & useable capacity

6x Density, Enable IT Consolidation
- 70% less Racks
- 50% less Servers
- Up to 1PB / 3RU – 6x the density of typical HDD array

Maintenance Cost Reduction
- 100PB – failure rate per week, 15-35 HDD
- Fast rebuild times reduce exposure to failures
- Less data redundancy & hot spares needed
- Fewer repair calls & less FRU stock held

Power & Cooling – 66% Less
- Half the power & cooling of a typical HDD array
- Low power - 750W active, 400-500W average
- Power scales with activity, don't pay for what isn't being used

*   Annual Failure Rate as compared to HDDs. InfiniFlash AFR based on internal testing. Results available upon request.
**   As compared to 4TB HDDs.

Big Data Media Services - Video Surveillance

IT Consolidation & Cost Control/Avoidance
- Move to IP & HD increasing storage needs
- Longer retention
- Regulatory & Threats driving more demand

Customer Growth
- Physical Security, The 'TLA's
- Compliance officer, Risk officer
- Government, City Surveillance & Transportation are the highest spend in storage amongst verticals

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•Video Management Software (VMS)

SanDisk Scales Flash from Idea to Reality

Application Partners

Market Leader
PCIe Accelerator
4TB SAS SSD

Distribution Partners Integrating & Solution Delivery

Massive Capacity & Scale-out
InfiniFlash
512TB

Integrated with
Key Server & Storage Vendors

Innovation Leadership
• 5000+ Patent portfolio

THOMSON REUTERS
TOP100
GLOBAL INNOVATORS

Vertically Integrated
•Sole focus on Flash technology
•Fab – Memory Cell Design
•Full Product Manufacturing
•~40% of world's flash produce by SanDisk/ Toshiba partnership

Innovation with ISVs & Open Source

Solution Building Blocks for the Data Center...

➤ Application Intelligence & Performance

➤ Breakthrough Economics @ Scale

➤ Immediate Access to Information

for an Experience Never Before Thought Possible!

SanDisk®