Tegile Intelligent Flash Arrays
One Flash Platform. Any Workload.

Think And not Or.
Think And not Or.

Tegile IntelliFlash Storage Arrays

IntelliCare™
Cloud Analytics & Support

IntelliStack™
Converged Infrastructure Solutions

IntelliCare™
Flash 5 Guarantee

Tegile Agility™
Utility-Based Pricing
Setting the Stage – Why Flash?
What is the Digital Transformation?

“The investment in a movement, technology and business model to more effectively support digital customers, their applications and how those behaviors will change compared to traditional approaches.”
Tegile Enables The Datacenter Digital Transformation

IT Infrastructure
- Workload Consolidation
- Cloud Scale
- Cost Reduction

Applications
- Accelerating Legacy
  e.g. Relational Databases
- Enabling Next-Gen
  e.g. Unstructured Databases, Analytics

Business
- Process Automation
- Reduce Complexity
- Increase Efficiency
- Drive New Models
Setting the Stage:
4 Year Storage TCO Tells the Story

Projection 2015-2020 of Capacity Disk & Scale-out Capacity NAND Flash

Source: © Wikibon 2015, 4-Year Cost/TB Magnetic Disk & SSD, including Packaging, Power, Maintenance, Space, Data Reduction & Data Sharing
Datacenter Storage Today…

- Disk Systems
  - Legacy Systems
- Disk/Flash Hybrid Systems
  - Capacity Workloads
    - Majority of workloads
- All Flash Systems
  - Performance Workloads
    - One off point projects like VDI, critical DB
Flash is Evolving Along Two Vectors

Flash Technology Evolution

High Density Flash (Lower $/GB)

High Performance Flash (Higher $/GB)
Flash media is evolving rapidly

- SLC Flash
- MLC Flash
- eMLC Flash
- PCIe/NVMe
- TLC Flash
- 3D XPoint
Customer Want to Move to Flash

- Disk Systems
- Disk/Flash Hybrids
- One-Off Workloads On All-Flash Systems
- Consolidate Workloads On All-Flash Systems

Customers are here
Messaging & Value Proposition
Data Silos Add Cost & Complexity

- Backup Copies
- Communication & Collaboration
- Business processing Analytics Virtualization
- Financial transactions E-commerce applications OLTP
Other Vendors Only Solve Part of the Problem

- Backup Copies
- Communication & Collaboration
- Business processing Analytics Virtualization
- Financial transactions E-commerce applications OLTP

- Low-Cost Media
- Legacy Arrays (Block or File)
- Hybrid Arrays (Block Only)
- All-Flash Arrays (Block Only)
Meet the Needs of Your Entire Business

- Backup Copies
- Communication & Collaboration
- Business processing
  Analytics
  Virtualization
- Financial transactions
  E-commerce applications
  OLTP
One Flash Platform. Any Workload.

Same Operating System | Same Feature Set | Same User Experience
Why Is Tegile So Popular?

Enables Workload Consolidation in the Datacenter
- *Achieve consistent, low latency*
  - For individual applications – performance or capacity biased
  - For application consolidation at scale

Achieves the Best OPEX Savings
- Rackspace, Power, Cooling
- Best $/GB as compared to traditional legacy disk-based storage
  - *IntelliFlash HD is a game-changer --> NAND Flash Density Advantage*

Prepares Customers to Transition to the Flash Datacenter
- *Tegile is leading the transition*
  - Single Platform that grows with needs
  - Future-Proof
Product Positioning
Tegile Use Cases

Server Virtualization

Desktop Virtualization

Databases
Tegile Flash Array Architecture

**HYBRID**
- Multi-Layer Architecture
  - Flash & Disk
  - Flash for Performance
  - Disk for Capacity
- High IOPs
- Lower $/GB

**ALL FLASH**
- Single Layer of Flash
- High IOPs
- Consistent Low Latency
- Higher $/GB

**MULTI-TIERED FLASH**
- Multi-Tiered Architecture
  - Fast & Dense Flash
  - Fast Flash for Performance
  - Dense Flash for Capacity
- High IOPs
- Better Latency than Hybrid
- Lower $/GB
Tegile’s Portfolio Platform

Hybrid
- T3100
- T3200
- T3300
- T3400

Flash + Hybrid
- T3530
- T3630
- T3730

All-Flash
- T3500
- T3600
- T3700
- T3800

Highly Dense Flash
- T10KHD-100
- T10KHD-200
- T10KHD-300

One Flash Platform for ANY Workload
Entry All-Flash

 <$50K Street Price

T3500 All-Flash Array
• 18TB+ Effective Capacity @ 5:1 (6TB Raw)
• Runs on the IntelliFlash™ Operating Platform
• Customers looking to enter the all-flash platform

ESF-5 All-Flash Enclosure
• 18TB+ of Effective Capacity @ 5:1 (6TB Raw)
• Add up to six to any AFA
IntelliFlash HD

- Ideal for 95TB+ of usable capacity
- Runs the IntelliFlash™ Operating Platform
- Designed For:
  - Throughput-Driven Performance
  - Workload Consolidation @ Scale
  - Data Repository for Real-Time Analytics

<table>
<thead>
<tr>
<th>Model</th>
<th>Usable Capacity</th>
<th>Effective Capacity (5:1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T10KHD-100</td>
<td>95TB</td>
<td>475TB</td>
</tr>
<tr>
<td>T10KHD-200</td>
<td>190TB</td>
<td>949TB</td>
</tr>
<tr>
<td>T10KHD-300</td>
<td>285TB</td>
<td>1.4PB</td>
</tr>
</tbody>
</table>

Model Usable Capacity Effective Capacity (5:1)
IntelliFlash HD Models

One Upgrade SKU:
- 8 x 2TB SSDs
- 20 x 8TB Flash Modules

T10K-HD-100:
- 8 x 2TB SSDs
- 22 x 8TB Flash Modules

T10K-HD-200:
- 16 x 2TB SSDs
- 42 x 8TB Flash Modules

T10K-HD-300:
- 24 x 2TB SSDs
- 62 x 8TB Flash Modules

< $1/GB Street Price
Hyper-Consolidate to the Flash Datacenter

- 10TB Effective
- 50K IOPS
- 1M+ IOPS
- 1PB+ Effective
Future Proof Your Architecture

As flash evolves...

<table>
<thead>
<tr>
<th>Hybrid</th>
<th>All-Flash</th>
<th>Multi-Tiered Flash</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Performance Layer</strong></td>
<td>Fast SSD</td>
<td>Fast SSD</td>
<td>Fast SSD</td>
</tr>
<tr>
<td><strong>Capacity Layer</strong></td>
<td>Dense HDD</td>
<td>-</td>
<td>Dense SSD</td>
</tr>
</tbody>
</table>

…Tegile IntelliFlash will continue to leverage new media
Tegile Architecture: Differentiation
Tegile Boosts Performance: Metadata Acceleration

**Traditional Storage**
- Metadata interspersed with data
- I/O performance gated by metadata access
- Performance penalty for deduplication on HDD

**Tegile Storage**
- Metadata abstracted from data
- Aggregated metadata placed on dedicated devices
- Optimal I/O paths
- Inline data reduction without performance impact
- Accelerated storage operations

Accelerate all data operations and services
Active/Active Hardware Design

- Multiple Paths to Hosts
- Active/Active Controllers
- Enterprise-Grade SSDs
- All-Flash & Hybrid Pools

- No single point of failure
- Non-disruptive software upgrades
- Five 9s availability… Guaranteed.
Native Multi-Protocol (SAN & NAS)

**Block-Based**
- Fibre Channel
- iSCSI
  - iSCSI – 1GbE & 10GbE
  - FC - 4Gb/8Gb/16Gb

**File-Based**
- NFS
- CIFS / SMB 3.0
  - Auto-home directories for CIFS
  - AD integration

- Access all protocols concurrently
- Inline Compression & Dedupe for all protocols
- Multi-path support for all protocols
Data Reduction Technologies

- Acts as performance multiplier
- Only unique blocks stored in cache
- Maximizes the amount of data kept in flash
- Increases cache hit ratio
Save on Rack Space, Power & Cooling

3 x 42U Traditional Storage

3 x 2U Tegile Arrays
Easy Storage Administration

- Simplify configuring, managing, and monitoring your Tegile arrays
- Dashboard lets you quickly and easily monitor space usage, performance, cache hits, CPU hits, and network throughput
- Wizards guide you through your common storage tasks
- Advanced settings available for those who wish to fine tune their storage
Simplified Provisioning & Ease-Of-Use

- Application-optimized templates simplify provisioning
- Choose the type of workload and IntelliFlash will preselect the optimum configuration properties for LUN/Share
- Templates based on best practices
- Advanced configuration options also available
Affordable Disaster Recovery

- Natively replicate between all-flash and hybrid arrays
- Save money by buying a more affordable secondary array
Real-Life Customer Examples
10TB Database: Flash Impact

Virtualized ERP Database

Average I/O Wait Time
- Before Tegile: ~6 seconds
- After Tegile: ~1 second
100TB Analytics: Flash Impact

Market Close Analytics

- Before Tegile: 22 Hours
- After Tegile: 4 Hours
Development Platform-as-a-Service (dPaaS) Before Flash

CloudForge by CollabNet

PostgreSQL

MongoDB

285RU
40K IOPS
On Disk

2 x NetApp FAS6000

WAN

SnapMirror Replication

Secondary Location for DR

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Storage Topology – After Flash

- **CloudForge by CollabNet**
- **PostgreSQL**
- **MongoDB**

**Tegile Hybrid & All-Flash Arrays**

**285RU / 40K IOPS**
- On Disk

**135RU**
- On Flash

**200K IOPS**

Secondary Location for DR
How Is Tegile Different?

Hybrid, All-Flash & Multi-Tiered Flash
Dial up performance AND capacity to accommodate your future needs

Multi-Protocol Support
Native support for block AND file protocols (iSCSI, FC, NFS, CIFS/SMB 3.0)

Superior Data Reduction
Inline compression AND deduplication

Simple Administration
Intuitive web UI, app integration AND cloud analytics

Enterprise Resiliency
Fully redundant hardware AND active/active controllers

Affordable Disaster Recovery
Replicate between all-flash AND hybrid configurations
Thank You