Cristiano Beretta
Realizzare un ambiente cloud ibrido in modo semplice con le funzioni di hyperconverged storage
**IBM Spectrum Storage Family**

*Securely ‘unboxing’ storage to revolutionize data economics*

<table>
<thead>
<tr>
<th>IBM Spectrum Control</th>
<th>Analytics-driven data management to reduce costs by up to 50 percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Spectrum Protect</td>
<td>Optimized data protection to reduce backup costs by up to 53 percent</td>
</tr>
<tr>
<td>IBM Spectrum Archive</td>
<td>Fast data retention that reduces TCO for active archive data by up to 90%</td>
</tr>
<tr>
<td>IBM Spectrum Virtualize</td>
<td>Virtualization of mixed environments stores up to 5x more data</td>
</tr>
<tr>
<td>IBM Spectrum Accelerate</td>
<td>Enterprise storage for cloud deployed in minutes instead of months</td>
</tr>
<tr>
<td>IBM Spectrum Scale</td>
<td>High-performance, highly scalable storage for unstructured data</td>
</tr>
</tbody>
</table>

**Family of Storage Management and Optimization Software**

- Control
- Protect
- Archive
- Virtualize
- Accelerate
- Scale

**Any Storage**

**FlashSystem**

**Private, Public or Hybrid Cloud**

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IBM Spectrum Accelerate is ...

- XIV Software
  - IBM provided

3 to 15 x86 nodes
  - Client provided

IBM Spectrum Accelerate system
  - High-end storage

+ 3 to 15 x86 nodes
  - Client provided

= IBM Spectrum Accelerate system
  - High-end storage
To understand what is Spectrum Accelerate, you must understand what is XIV

- Consistent performance
- No tuning, no hotspots
- Deployed in minutes instead of days
- Out of box integration with VMware, Hyper-V and OpenStack
- Scales out to hundreds of PBs of under one management

Same Core Software

Enterprise functions including 3 way mirroring

Field proven better than five 9’s availability

Secure with Multi-tenancy and Encryption*

Real-time compression* guarantees data reduction without application impact

* Real-time Compression and encryption are not yet available on Spectrum Accelerate. It’s on the roadmap for 2016.
XIV value proposition: Starts with a grid architecture

It starts with a superior architecture design:
- Large Processing Power (modules)
- Grid Architecture
- Innovative and Powerful Caching

= Consistent performance
- No tuning, no hot spots
- Minimal impact upon disk fail (<1%) or module fail (<7%)

Traditional Storage:
- Clustered controllers
- RAID protections
- Long RAID rebuilds
- LUN/Disk layout needed
- Performance tuning
- Disk hotspots
- Islands of storage
Winning evolution - 2011 to today

IBM XIV technology

- XIV Gen3
  - #1 ESRP for Microsoft 2010
  - 3Q 2011
  - 4Q 2011
  - 3TB HDDs
  - Mobile Dashboard for iPad, SPc-2/E: #1 in price-performance
- SSD Caching
  - Cross-gen mirrors
  - Mobile Dashboard for iPhone
  - 1Q 2012
  - 4Q 2012
- Encryption
  - Hyper- Scale Consistency, RESTful, OpenStack
  - Havana, VMware space reclamation, Top ESRP, 800GB
  - 1Q 2013
  - 2Q 2013
- IBM Hyper-Scale Mobility, OpenStack
  - 4TB HDDs
  - Windows 2012 UNMAP, Mobile Dashboard for Android, Windows 2012 space reclamation, SPC-1
  - 2Q 2013
  - 1Q 2014
- IBM XIV Cloud Storage for Service Providers
  - Cloud storage. Just right.
  - 1Q 2014
  - 3Q 2014
- IBM Spectrum Accelerate
  - 6 TB drives;
  - Day Zero VVOL
  - 4Q 2013
  - 2Q 2014
  - 1Q 2015

What’s New:
- Real-time Compression;
- Microsoft Azure Site Recovery
- 1Q 2015
- 2Q 2015

2015: The Year of Low TCO
XIV and VMware Integration

**vCenter Management of IBM Storage**
- Provisioning, mapping and monitoring IBM storage in vSphere

**vStorage APIs for Array Integration (VAAI)**
- Host server offload capability

**vStorage APIs for Storage Awareness (VASA)**
- IBM Storage Overview
- Profile driven storage direction

**SRM Integration**
- Replication simplification with XIV

**vCloud Suite**
- Includes VMware vRealize Orchestrator (vRO), VMware vRealize Operations Manager (vROPS), and VMware vRealize Automation (vRA)

**vStorage APIs for Data Protection (VADP)**
- Tivoli Flash Copy Manager and Tivoli Storage Manager for Virtual Environments

**IBM Spectrum Control Base Edition**
- Central Storage Control Plane for Cloud

**vSphere Virtual Volumes (VVOLs)**
- XIV Storage abstraction delivers easy automated provisioning with tenant domains, policy-compliant service, snapshot and cloning offloading, and instant space reclamation
Compare the paradigms
XIV Support for SAN Replication with Microsoft ASR and System Center
IBM Spectrum® Accelerate

- Dynamically group nodes into an XIV system
- Data is spread across all nodes and all HDDs in the grid – using the XIV Gen3 proven data path
- Each 1MB piece of data is mirrored on two different nodes
- SSD and RAM used as cache in the same manner as XIV Gen3
- First release – between 3 to 15 nodes
VM resources configuration range

**Software requirements**
VMware ESX v5.5 Update 2 or later, is required on every node.

<table>
<thead>
<tr>
<th>Hardware feature</th>
<th>Minimal configuration</th>
<th>Balanced configuration</th>
<th>Optimal configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of ESXi host machines</td>
<td>3</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>Number of physical CPU cores per ESXi host machine</td>
<td>+2 for the ESXi server; 6 physical cores in total</td>
<td>+2 for the ESXi server; 6 physical cores in total</td>
<td>+2 for the ESXi server; 8 physical cores in total</td>
</tr>
<tr>
<td>RAM per ESXi host machine</td>
<td>24 GB</td>
<td>48 GB</td>
<td>96 GB</td>
</tr>
<tr>
<td></td>
<td>(+16 GB for the ESXi server; 40 GB in total)</td>
<td>(+16 GB for the ESXi server; 64 GB in total)</td>
<td>(+32 GB for the ESXi server; 128 GB in total)</td>
</tr>
<tr>
<td>Number of hard disk drives (HDDs) per ESXi host machine</td>
<td>6</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>HDD capacity</td>
<td>1 TB</td>
<td>4 TB</td>
<td>4 TB</td>
</tr>
<tr>
<td>Number of solid-state drives (SSDs) per ESXi host machine</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>SSD capacity</td>
<td>500 GB</td>
<td>800 GB</td>
<td>800 GB</td>
</tr>
<tr>
<td>Number of 10-Gigabit Ethernet ports for the interconnect network</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

The following table specifies hardware configurations that must be dedicated solely for the IBM Spectrum Accelerate virtual machine. Additional hardware resources must be allocated for the ESXi server functionality and other virtual machines that run in parallel.
Spectrum Accelerate differentiators

- Established, proven and mature grid architecture synergistic with virtualization
  - Field proven with more than 100,000 deployments
- Consistent performance
- Low touch hyperscale management on/off prem, ease of use
- Function, scale, and enterprise-class capabilities
  - QoS granularity – hosts, tenants, pools
  - Multi-tenant segregation of duty – not just QoS
  - Native remote replication– synchronous, asynchronous
- Proven flash caching maturity
- Industry leading Vmware integration
- Latest OpenStack; advanced REST
IBM Spectrum Accelerate scales and enables growth with your workload and business demands.
XIV is Ideal for Cloud: Deploy, provision, [forget,] scale

- No tiering or manual administration
- No hotspots, by design
- High density & high performance
- Grow applications and volumes linearly
- Scale up & out with no application disruption
- Up to 12 TB of flash cache
Built with IBM Spectrum Accelerate

Enterprise-class SDS spanning data center and cloud
- Same mature proven software
- One set of advanced functions
- One management experience

Spectrum Accelerate on XIV
Spectrum Accelerate on public cloud
Spectrum Accelerate on commodity-choice hardware
Spectrum Accelerate on Cloud
(Service on SoftLayer)
IBM Spectrum Accelerate: What’s New in 3Q 2015
New flexibility cuts a faster path to cloud storage for enterprise

- **Spectrum Accelerate as a cloud service on IBM SoftLayer.**
  IBM Spectrum Accelerate™ on Cloud offers enterprise cloud storage capabilities without hardware purchase or upkeep.
  **Benefit:** Deploy enterprise-class software defined storage in the cloud, including disaster recovery without a DR site and mirroring managed in one pane

- **Converges compute and storage on the same server.**
  Run Spectrum Accelerate and other application VMs on the same server.
  **Benefit:** Minimizing CaPex! Save costs with fewer servers and building hyper-converged solutions based on proven XIV technology.

- **License Spectrum Accelerate for your new XIV systems.**
  **Benefit:** Simplify software procurement and enjoy flexible transfer of unused capacity to Spectrum Accelerate deployments on or off premises—cutting costs as you evolve your infrastructure.
Spectrum Accelerate on Cloud: Who Needs It?

- SoftLayer customers needing advanced features
- XIV customers needing DR

Enterprise-grade capabilities for **SoftLayer** users

Remote mirroring on/off prem in one pane

**Mitigating risk with affordable DR**
IBM Spectrum Accelerate:
XIV Software de-coupled from appliance

Deploy new workloads in 10 minutes or less

Installed in 30 minutes; same look and feel as XIV Storage Systems

More than 100,000 servers in the world today use the same core storage software

New Way of Deploying Storage Infrastructure

- Field proven enterprise storage software
- Single Management Experience across XIV and Spectrum Accelerate
- Repurpose infrastructure at will

IBM Spectrum Accelerate running on customer-choice HW

IBM Spectrum Accelerate running on Softlayer

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IBM Spectrum Accelerate – DR Examples
IBM Spectrum Accelerate integration with an OpenStack Cloud

**Integrate in minutes!**

1. Install IBM Storage Driver for OpenStack on IBM Cloud Manager with OpenStack Controller node
2. Spectrum Accelerate system can now be used by an OpenStack Cloud such as IBM Cloud Manager with OpenStack

**Integration**

- Use IBM® Storage Driver for OpenStack
- Allows installation of Cinder driver (block storage)
- Enables use of storage resources with OpenStack
Managing Spectrum Accelerate

- Managed with existing XIV interfaces
- **GUI** and Hyper-Scale Manager
- **Scriptable** XCLI
- **Mobile** apps + push notifications

- Enabling customer orchestration software via **RESTful** API & **OpenStack**
- Provisioning
- Monitoring
Bridge to Hybrid Cloud

- Backup to and recover from the cloud
- Replicate to the cloud (intermediate DR) instead of host based replication
- Easily adapt to changing customer demands
  Create ad-hoc test environments
- Enable Cloud Service Providers to provide advanced XIV storage features
Spectrum Accelerate: Key Stakeholder Benefits

**Enterprise CIO:** can dynamically scale storage for new CAMSS applications without significant up-front investments and at a reduced 50% operational cost

- **Reduce capital expenses** by utilizing existing infrastructure for storage rather than investing in scale-up storage solutions designed for peak performance
- **Reduce operational expenses** by enabling self-service storage

**Storage Administrator:** can guarantee enterprise-level SLAs for CAMSS workloads storage-provisioned automatically in a self-serviced manner

- **Realize continuous high enterprise-level performance and reduce service time** by allowing for hardware replacement without requiring external technician involvement

**Cloud Administrator:** can self-deploy a complete elastic storage solution on demand in less than a day - as easily as deploying virtual servers

- **Easily order and deploy a storage solution online**
- **Accommodate the most appropriate storage capacity size in the most cost-affordable manner** by easily adding a new node to the grid when needed and even re-purpose storage without being restricted by rack physical constraints
Backup Slide
## Typical Spectrum Accelerate Use Cases

<table>
<thead>
<tr>
<th>Who?</th>
<th>What?</th>
<th>Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large enterprises in Financial services, Telco, Health care, MSP/CSP</td>
<td>Build-it-yourself Cloud Solution to host internal applications or for external clients</td>
<td>Want the economics and agility of Amazon or Google cloud, but not able to put data on public cloud due to security, reliability and regulations</td>
</tr>
<tr>
<td>Medium to large companies</td>
<td>Development and test environment / ad-hoc projects</td>
<td>HW procurement cycle takes too long especially for the rate applications are being developed. Looking to save cost, but still wants reliable storage.</td>
</tr>
<tr>
<td>Small to large businesses</td>
<td>Easy to manage infrastructure for Virtual Machines</td>
<td>VM administrators motivated wanted to control infrastructure, simplify deployment &amp; management</td>
</tr>
<tr>
<td>Large companies with lots of branch offices</td>
<td>Remote office deployment</td>
<td>Easy to centrally manage, replicate date between branch office and HQ</td>
</tr>
<tr>
<td>Everyone</td>
<td>Replacement for traditional Storage solution*</td>
<td>SDS can replace their traditional Storage System as a way to reduce cost, example: don’t have to pay storage software with every new box</td>
</tr>
</tbody>
</table>

* SDS can disrupt the competitive incumbent; however it is not a straight forward replacement for traditional SAN Storage
IBM Spectrum Accelerate on Cloud
Two flavors for different needs

- 50 TB usable base, 20 TB usable increments (TiB equivalent)
  - Base: New grid of 4 nodes, VLANs and VPN connectivity if needed
  - Increments: Adds 1 node to the existing grid

- Performance and capacity oriented configurations
  - Capacity for archive type applications
  - Performance for real time processing

Capacity oriented:
- Dual CPU 6 cores
- 32 GB RAM
- 11 x 4TB SATA drives
- 10GbE dual private links

Performance oriented:
- Dual CPU 8 cores
- 64 GB RAM
- 11 x 4TB SATA drives
- 800GB SSD
- 10GbE dual private links