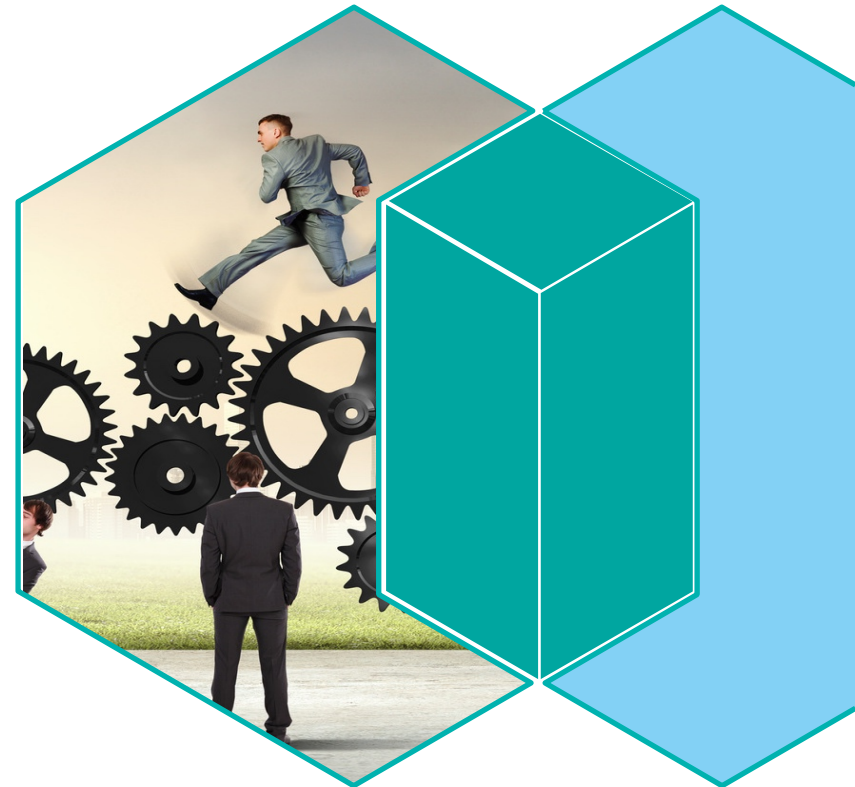# IBM Storage Solutions & Software Defined Infrastructure
Strategy, Trends, Directions

Calline Sanchez,
Vice President, IBM Enterprise Systems Storage
Twitter: @cksanche   LinkedIn:
www.linkedin.com/pub/calline-sanchez/9/599/b09/

Storage Requirements
Getting Out Of Hand?

Where is IBM Storage Investing?

IBM Storage and Software Defined Portfolio

Storage Systems

Tier 0 Acceleration

FlashSystem 900

Enterprise Storage Systems

FlashSystem V9000

FlashSystem A9000

FlashSystem A9000R

XIV

DS8880

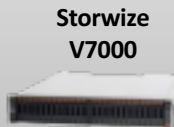### Midrange & Entry Storage Systems

Storwize V5000

Storwize V7000

Storwize V7000 Unified

Tape and Virtual Tape Systems

TS7760

ProtecTIER Deduplication

Tape Libraries

TS4500

LTO7 and enterprise tape drives

Software Defined Storage

IBM Spectrum Storage and Cleversafe

- IBM Spectrum Virtualize
- IBM Spectrum Protect
- IBM Spectrum Control
- IBM Spectrum Accelerate
- IBM Spectrum Scale
- IBM Spectrum Archive
- IBM Spectrum Conductor
- IBM Cleversafe

IBM Spectrum Storage

Software Defined Computing

IBM Spectrum Computing

- IBM Spectrum Symphony
- IBM Spectrum LSF
- IBM Spectrum Conductor

IBM Spectrum Computing

Integrated Infrastructure Solutions

VersaStack

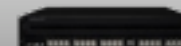PurePower

IBM Elastic Storage Server

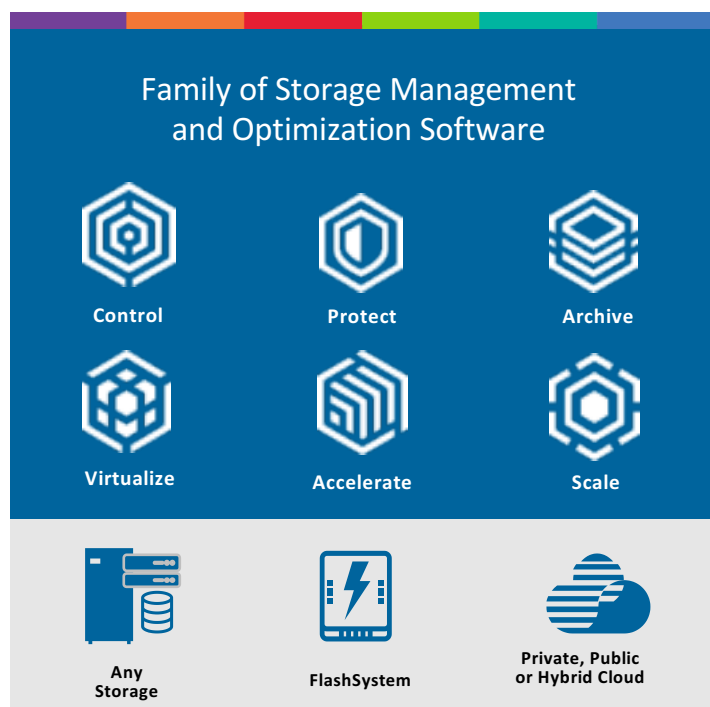## Storage Networking

MDS 9148S

SAN768B-2 & SAN384B-2

SAN42B-R

MDS 9718, 9710 & 9706

IBM Spectrum Storage Family
Proven Technology, Open Standards, Modular Adoption

#1
Software Defined Storage

Family of Storage Management and Optimization Software

Control

Protect

Archive

Virtualize

Accelerate

Scale

Any Storage

FlashSystem

Private, Public or Hybrid Cloud

IBM Spectrum Suite: single license

IBM Spectrum Control	Analytics-driven hybrid cloud data management to reduce costs by up to 73%
IBM Spectrum Protect	Optimized hybrid cloud data protection to reduce backup costs by up to 53 percent
IBM Spectrum Archive	Fast data retention that reduces TCO for active archive data by up to 90%
IBM Spectrum Virtualize	Virtualization of mixed block environments stores up to 5x more data
IBM Spectrum Accelerate	Enterprise block storage for hybrid cloud deployed in minutes instead of months
IBM Spectrum Scale	High-performance, highly scalable hybrid cloud storage for unstructured data driving cognitive applications

IBM All-Flash Family
Flash for all primary storage workloads

1B Invested in Flash Storage

New April '16
FlashSystem A9000

Cloud service providers
- Full time data reduction
- Workloads: Cloud, VDI, VMware

New April '16
FlashSystem A9000R

Large deployments
- Full time data reduction
- Workloads: Mixed and cloud

Enhanced August '16
FlashSystem V9000

Virtualizing the DC
- Enterprise class heterogeneous data services and selectable data reduction

New August '16
Storwize V7000F

Mid-Range
- Enterprise class heterogeneous data services and selectable data reduction

New August '16
Storwize V5030F

Entry / Mid-Range
- Enterprise class heterogeneous data services and selectable data reduction

New April '16
DS8888

High End Server
- Mainframe
- High End Power

Enterprise Class
- Reliability
- Accessibility
- Availability

New July '16
DeepFlash 150

All-Flash for Big Data
- High capacity
- High density

FlashSystem 900
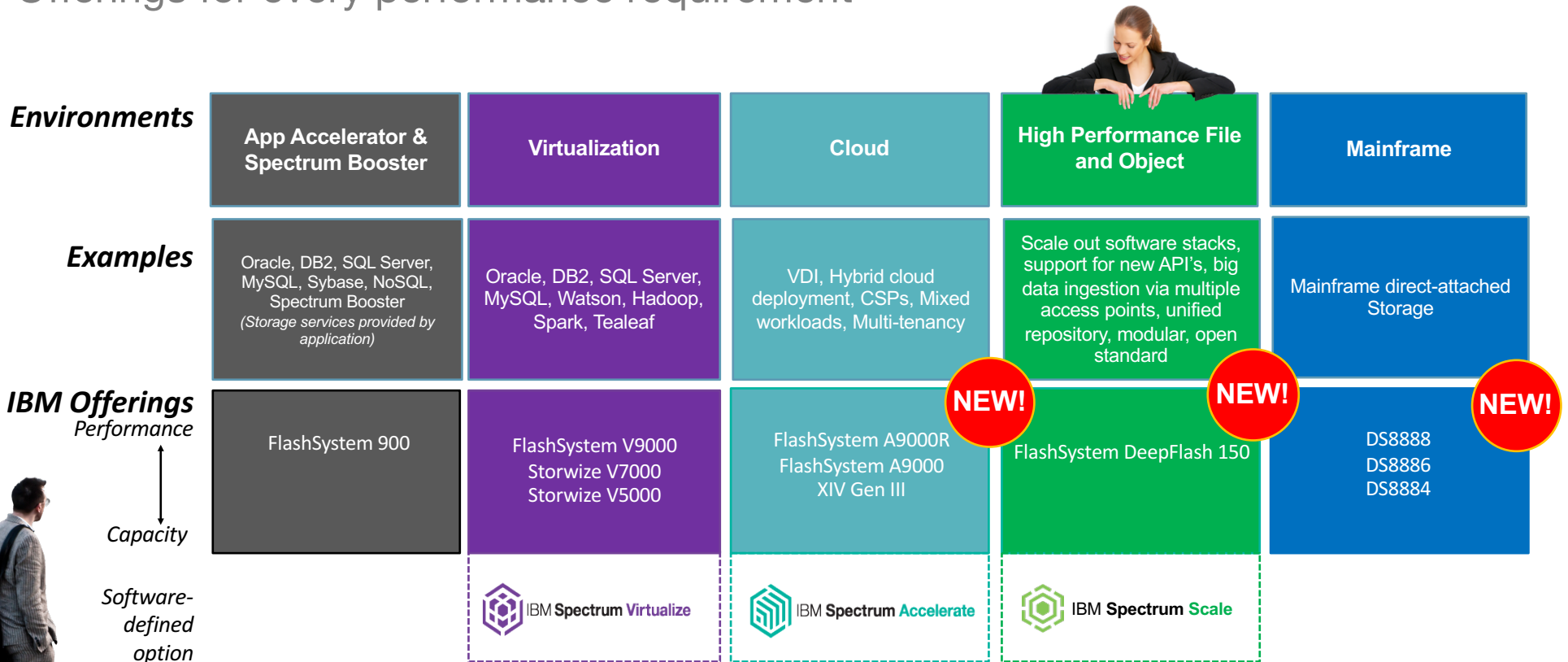All flash array for application acceleration
- Extreme performance
- Targeting database acceleration & Spectrum Storage booster

VersaStack™ Solution
by Cisco and IBM

The Right Flash for the Right Workload and Environment
Offerings for every performance requirement

Environments	App Accelerator & Spectrum Booster	Virtualization	Cloud	High Performance File and Object	Mainframe
Examples	Oracle, DB2, SQL Server, MySQL, Sybase, NoSQL, Spectrum Booster *(Storage services provided by application)*	Oracle, DB2, SQL Server, MySQL, Watson, Hadoop, Spark, Tealeaf	VDI, Hybrid cloud deployment, CSPs, Mixed workloads, Multi-tenancy	Scale out software stacks, support for new API's, big data ingestion via multiple access points, unified repository, modular, open standard	Mainframe direct-attached Storage
IBM Offerings Performance ↕ Capacity	FlashSystem 900	FlashSystem V9000 Storwize V7000 Storwize V5000	**NEW!** FlashSystem A9000R FlashSystem A9000 XIV Gen III	**NEW!** FlashSystem DeepFlash 150	**NEW!** DS8888 DS8886 DS8884
Software-defined option		IBM **Spectrum Virtualize**	IBM **Spectrum Accelerate**	IBM **Spectrum Scale**	

Tape: Protecting Your Assets.

IBM Tape Solutions: Comprehensive Portfolio

Entry · Mid-Range · Enterprise

Tape virtualization

TS7620 Appliance · TS7650G Gateway · TS7760 VTL

Replication · Grid Cloud

SDS

Spectrum Archive
Single Drive

Enterprise Edition

Library Edition

Tape automation

TS2900 · TS3100 · TS3200 · TS3310 · TS4500 High Density

Tape Drives

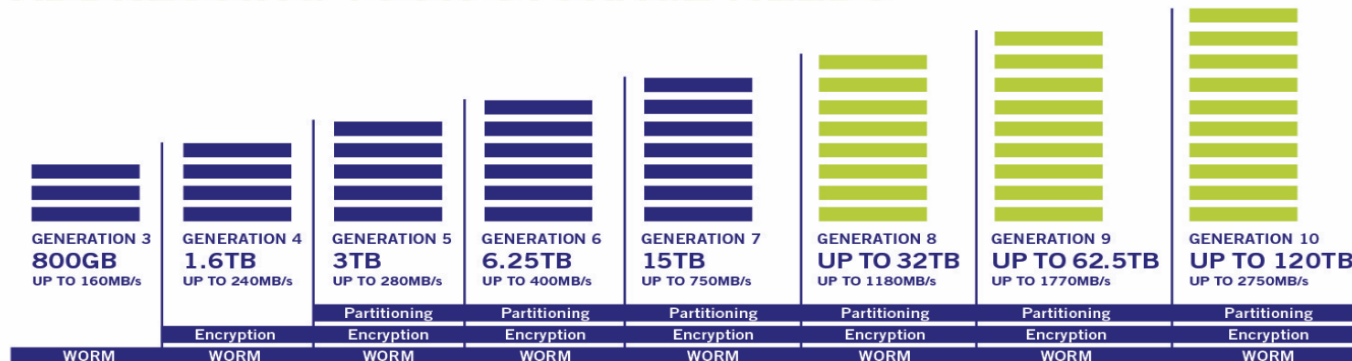LTO 7 HH · LTO 7 FH · LTO Media · TS1150 · 3592 Media

IBM Systems
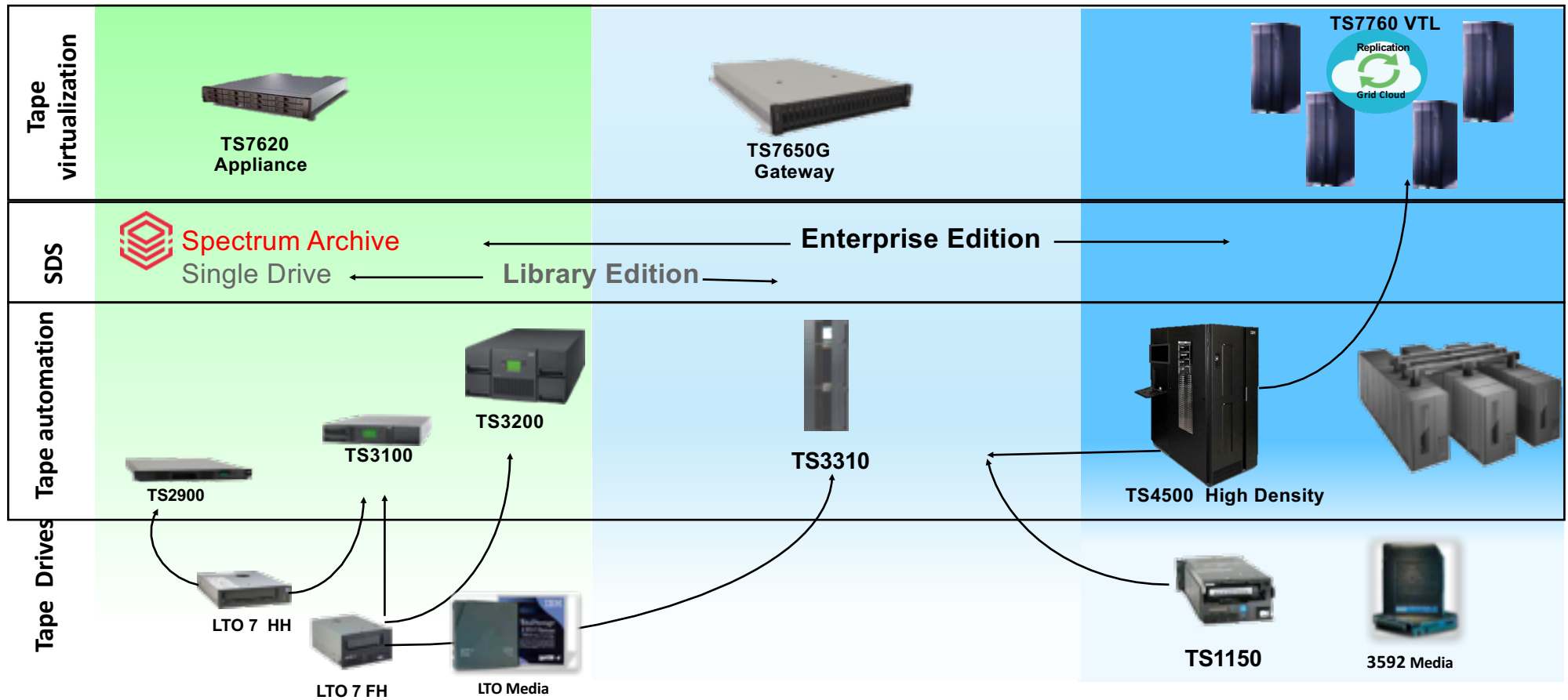
LTO Ultrium

Protect your data investments from generation to generation.

LTO ULTRIUM ROADMAP
ADDRESSING YOUR STORAGE NEEDS

GENERATION 3	GENERATION 4	GENERATION 5	GENERATION 6	GENERATION 7	GENERATION 8	GENERATION 9	GENERATION 10
800GB	**1.6TB**	**3TB**	**6.25TB**	**15TB**	**UP TO 32TB**	**UP TO 62.5TB**	**UP TO 120TB**
UP TO 160MB/s	UP TO 240MB/s	UP TO 280MB/s	UP TO 400MB/s	UP TO 750MB/s	UP TO 1180MB/s	UP TO 1770MB/s	UP TO 2750MB/s
		Partitioning	Partitioning	Partitioning	Partitioning	Partitioning	Partitioning
	Encryption	Encryption	Encryption	Encryption	Encryption	Encryption	Encryption
WORM	WORM	WORM	WORM	WORM	WORM	WORM	WORM

Note: Compressed capacities for generations 1-5 assume 2:1 compression. Compressed capacities for generations 6-10 assume 2.5:1 compression (achieved with larger compression history buffer).
Source: The LTO Program. The LTO Ultrium roadmap is subject to change without notice and represents goals and objectives only.
Linear Tape-Open, LTO, the LTO logo, Ultrium, and the Ultrium logo are registered trademarks of Hewlett Packard Enterprise, IBM and Quantum in the US and other countries.

Advantages of Tape

Energy Efficient: no power needed once data is recorded

Secure:
- Data is inaccessible when cartridge is not mounted
- Drive level encryption
- Portable

Long expected media **lifetime** (30+ years)

Reliable: Typically no data loss in case of drive failure

Affordable: 1c per GB acquisition cost at scale and 10X lower TCO then competing solutions

Tape Product Innovation

Investing and delivering innovation

- **Barium Ferrite Tape Media Collaboration with FujiFilm**

- **Timing-Based Servo and Surface Control Guiding**

- **Compact Tape Path with Flat Head Geometry Contour**
- **GMR head technology with protective overcoat**

124 Patents Issued 2014

Accelerate Product Delivery (June 28 2016 Statement of Direction)

- **15TB+ capacity enterprise drives with Ethernet interfaces**
- **Remote Direct Memory Access (RDMA) over Converged Ethernet (RoCE)**
- **Increase capacity of 3592 JD cartridges from 10 TB to 15 TB**

Investment in Tape!

Incubate Data Scientists for Innovation

Solving customers' most critical challenges

IBM Research

12 labs. 6 continents.

IBM Research helped to optimize reduction features, like deduplication and compression, for the speed of flash.

IBM Design

Storage management has never been so simple - the innovative interface has earned more than 15 patents
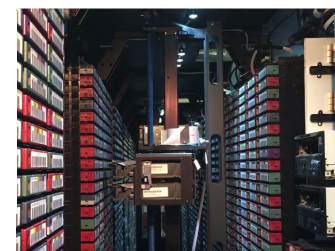
INNOVATION | **SIMPLICITY**

AVAILABILITY | **EFFICIENCY**

Supporting mission critical applications while enabling fast analytics and data lifecycle management.

Field-proven IBM Tape solutions provide low cost storage for traditional workloads and emerging use cases.

Flash Optimized DS8K

TS7760 Cluster

FOUNDATION

Thank you.

IBM

ibm.com/storage