

# Elastic Storage **System** (ESS) Update Spectrum Scale User Group - Germany

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# ESS in a Nut Schell



24TB to 13PB/rack



- IBM Integrated Solution for Spectrum Scale
  - Spectrum Scale for ESS
    - The latest Scale Release (Target within 1 Month)
    - ESS Unique Software RAID
      - Erasure Code, Checksum, Disk Hospital, . . .
  - Integrated Red Hat Enterprise Linux
  - Proven IBM Hardware: Servers, Storage (NVMe, SSD, HDD, NVDIMM)
    - Optional: Rackless systems, Switches, etc)
  - Comprehensive IBM Test & Integration
  - Award-Winning IBM Support



IBM  
**Spectrum  
Scale**



**The Fastest Performance and Implementation of Spectrum Scale**  
*#1 & #2 SuperComputer*

# Differentiator: Spectrum Scale RAID for ESS



**Erase Code software** provides enterprise storage performance using standard and inexpensive disk drives

## **Faster rebuild times**

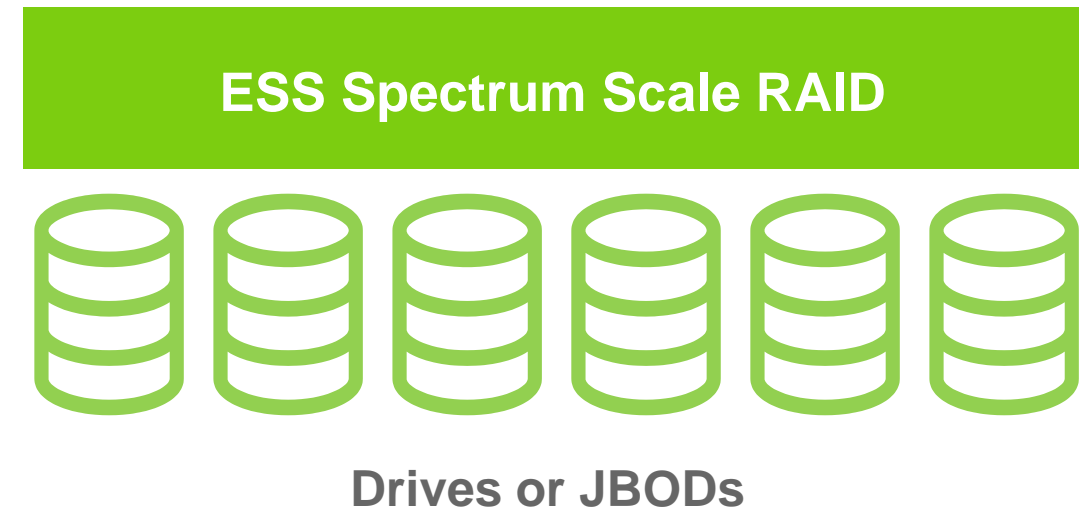
- More disks are involved during rebuild
- Approximately 3.5x faster vs. RAID-5

## **Minimal impact of rebuild on system performance**

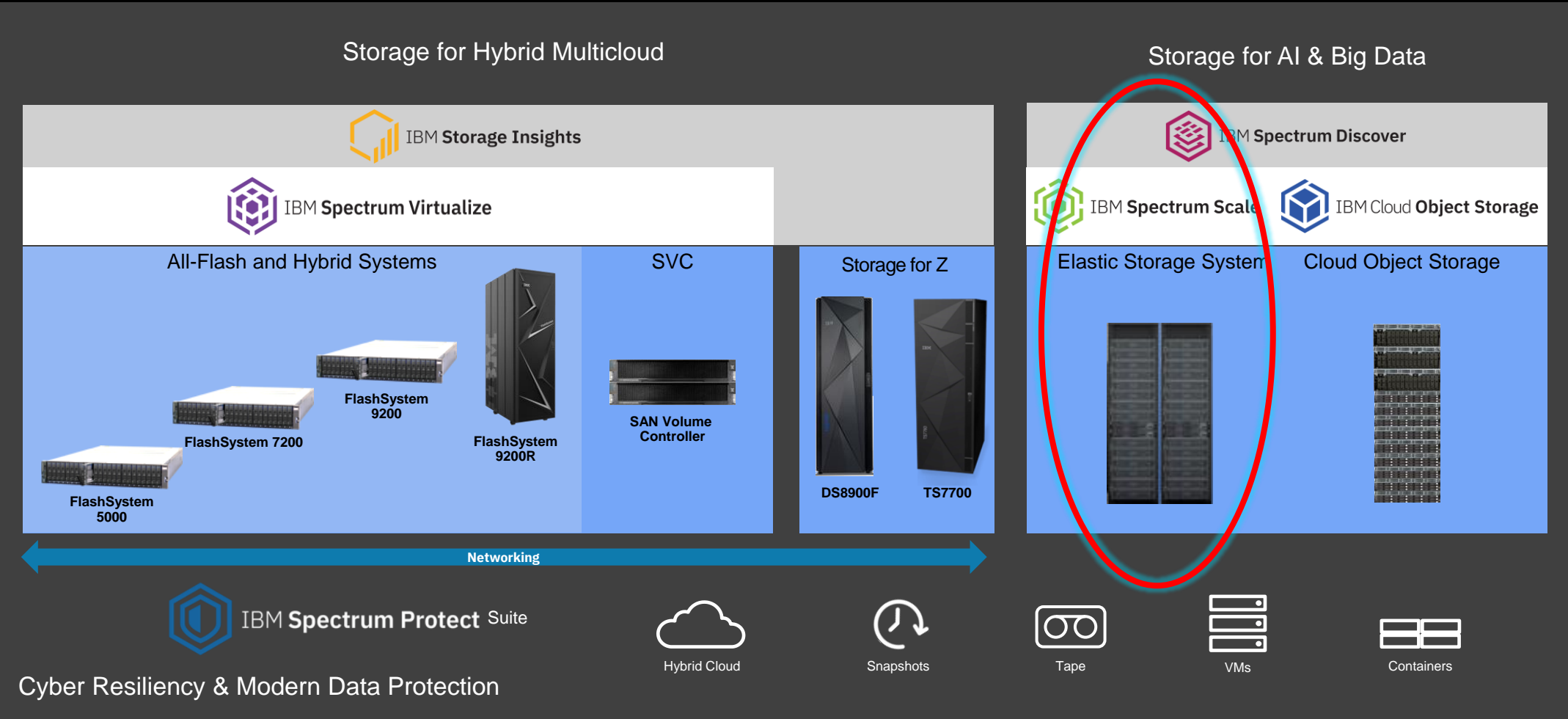
- Rebuild is done by many disks
- Rebuilds can be deferred with enough protection

## **Better fault tolerance**

- End to end checksum reduces / eliminates file system checks
- Stable, consistent high performance at all times
- Disk Hospital
- Expanded Call Home



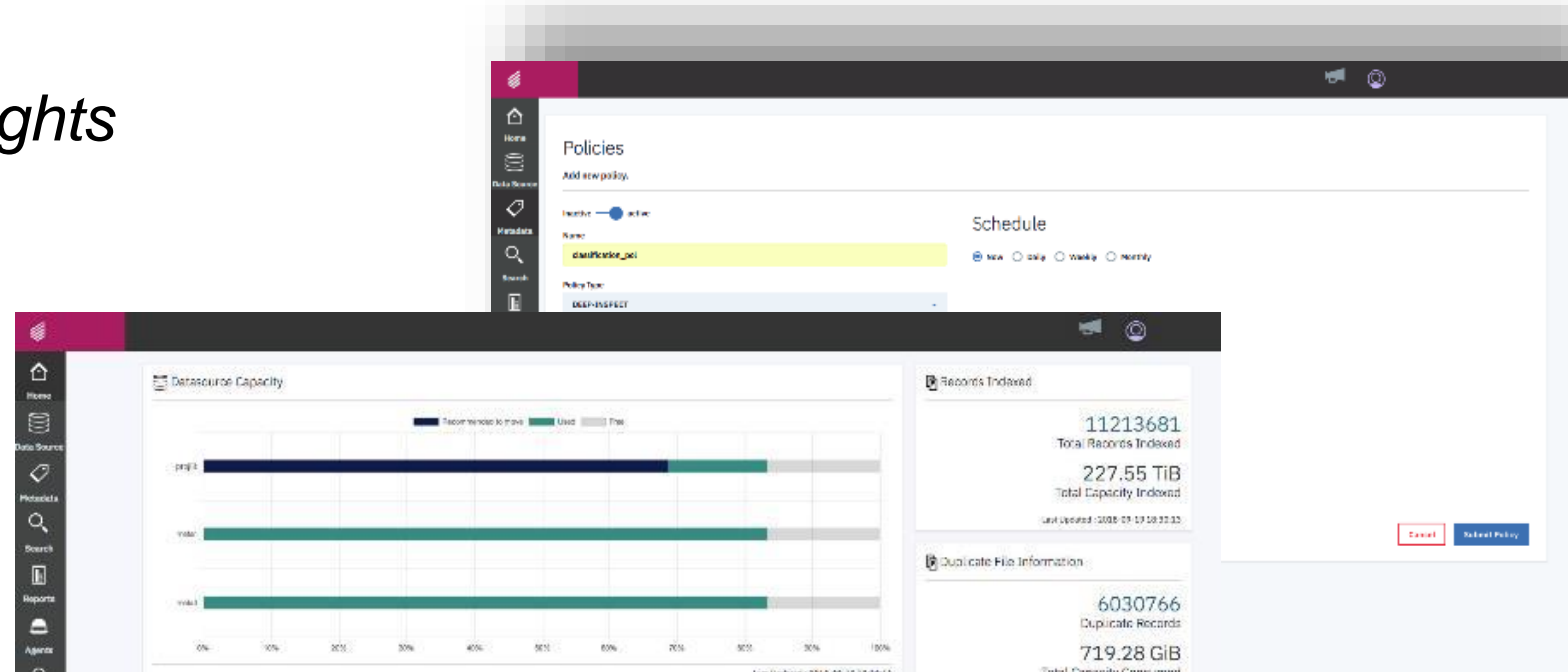
# Simplified Storage Portfolio – More ESS Focus





# Spectrum Discover: Metadata management for an AI

*Unified metadata and data insights  
for file and object storage  
on-premises and in the cloud*



## Discover

Automatically ingest and index system metadata from heterogeneous file and object storage systems on-prem and in the cloud

## Classify

Automatically identify and classify data, including sensitive and personally identifiable information

## Label

Enrich data with system and custom metadata tags that increase the value of that data

## Find

Find data quickly and easily by searching catalogs of system and custom metadata

# The Smarter and *Faster* Storage approach



## The IBM ESS Family

Field proven, highly efficient and super reliable

- Over **1350** ESS purchased
- Over **300** ESS customers
- Over **4,000** Spectrum Scale clients
- Over **150%** Growth in 4Q19 YtY
- The leading Storage Solution for AI/ML and Analytics
- #1 and #2 Fastest Super Computer in the world
- Used by major Financial, Life Sciences, ADAS and Research & Government institutes across the world

# #1

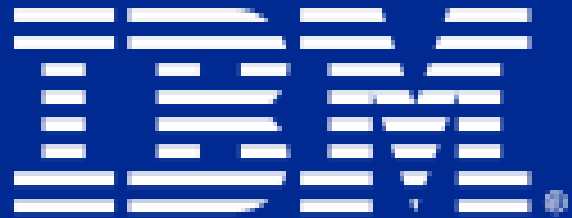
IBM is the world leader in  
Software Defined Storage Environments.

*Extreme  
Performance & Scalability*



# IBM Storage

Enabling enterprise data management for the future



**Red Hat**

# Linux is the foundation for open. Red Hat is the leader.

54%

of public cloud  
apps run on Linux

#1

most used platform for  
development today

79%

of container  
hosts are Linux

71%

paid market share is Red Hat Enterprise Linux

#2

contributor to Kubernetes open source





# The New ESS Architecture

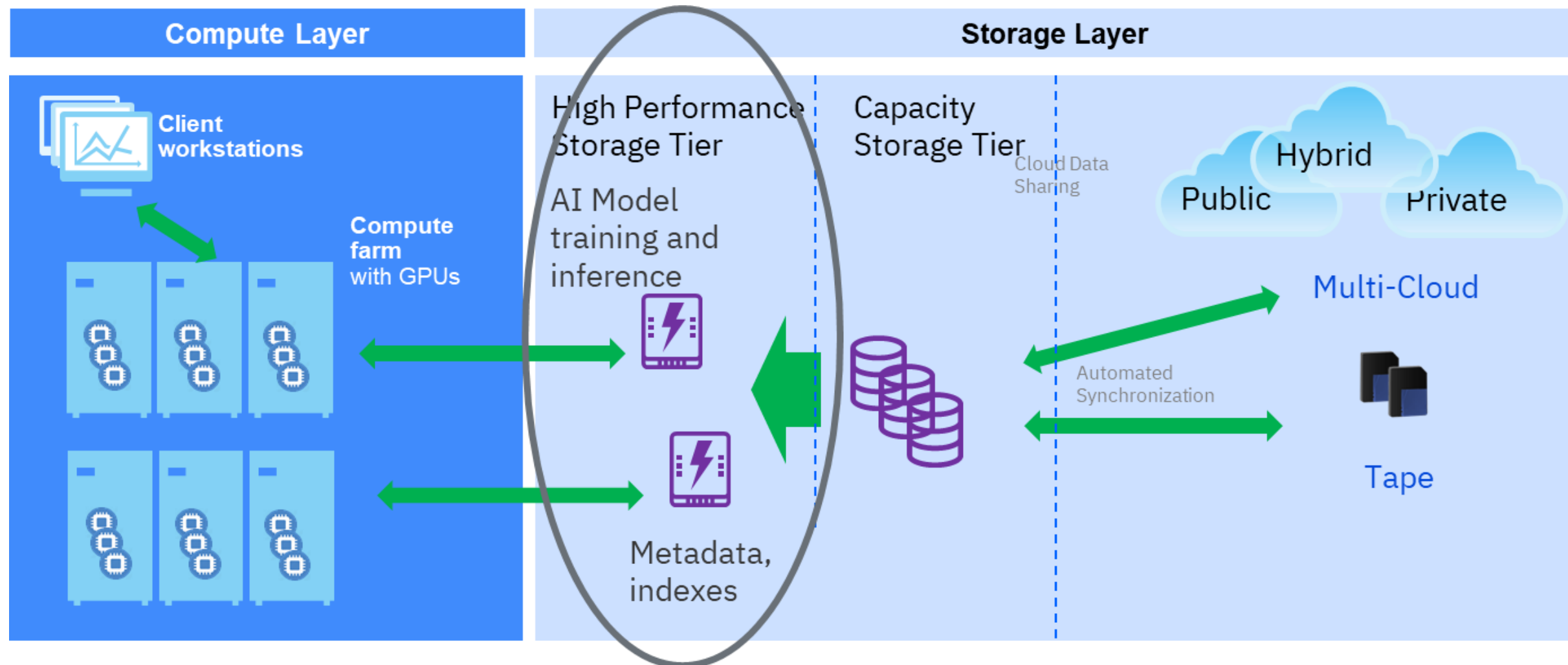
## Leverage the new integration with Red Hat

- Embedded Red Hat Enterprise Linux
  - Integrated and Streamlined
  - Everything we need and nothing we don't
- Integrate OpenShift technologies
  - Redefine ESS Deployment and Upgrade leveraging Containers (RHEL, Spectrum Scale, Scale RAID, IBM integration code)
  - Leverage Ansible playbook bundles (APBs) to create a standard mechanism for automating complex deployments.



*Simplified Deployment & Upgrade*

# High Performance for AI Training & Inference



# ESS 3000 Overview - *Now Shipping*

## Core Design

- Self-Contained Storage Building Block
  - Dual active-active server running Spectrum Scale
  - 12 or 24 2.5-inch NVMe flash drives:  
(1.92 TB, 3.84 TB, 7.68 TB or 15.36 TB\*)
  - Est: 40 GB/s sequential BW in a 2U enclosure
  - 280TB User capacity (8+2P)
  - 4 to 12 ports: IB EDR, 100GbE or mix
  - 384GB or 768GB memory per internal server
- Simple Install and Upgrade
  - Containerized Install/Upgrade
  - Embedded Red Hat OS
- Leverages proven Flash System technology
  - NVMe standard flash drives & IBM Flash Core FCM-2 (future)
  - Processing, NVMe Storage, RAS capability & dense packaging

\*Raw capacity



### Delivers:

#### **Fast NVMe Storage**

High Performance Storage Tier (HPT)

#### **Fully Utilize Compute GPUs**

#### **Simple Installable Solution**

IBM SSR delivery  
Optional Lab Services

#### **Fast Time-to-Value**

hours vs. days/weeks

# ESS 3000: Ideal Customers

- **AI & big data analytics Workloads** in Commercial or Federal accounts
- Clients who want to **Accelerate Scale Out business applications** with NVMe and IBM Flash technologies
- AI workloads requiring a High Performance Tier of storage to ensuring **full GPU resource utilization**
- Extend an **existing Spectrum Scale environment** with a rich set of capabilities and performance in existing clusters



# Stronger Together: Enterprise AI

IBM Storage and SDI



- #1 in GPUs, #1 in AI Compute Servers
- AI Solution orientation
- Mindshare with ML/DL developers and data scientists



- #1 in SDS, #1 in Tape, #1 in Analytics, #2 in Storage
- SDS and Fastest DGX I/O performance
- Mindshare with IT decision makers

## NVIDIA and IBM Together

IBM SDS (SW Defined Storage) Solution Complements NVIDIA DGX  
Global partner network in IBM Storage to match to Deep Learning partners  
Acceleration of AI Adoption in the market  
Broadest portfolio of data management solutions to complement DGX  
Deep Learning partner and NVIDIA support



# IBM Spectrum Storage for AI with NVIDIA DGX

- **Converged solution**

- From 1/3 rack to largest supercomputers
- IBM ESS 3000 + NVIDIA DGX + Mellanox

- **IBM leads in AI Infrastructure**

- #1 in performance
- Multiple extensible SDS solutions to accelerate your data pipeline

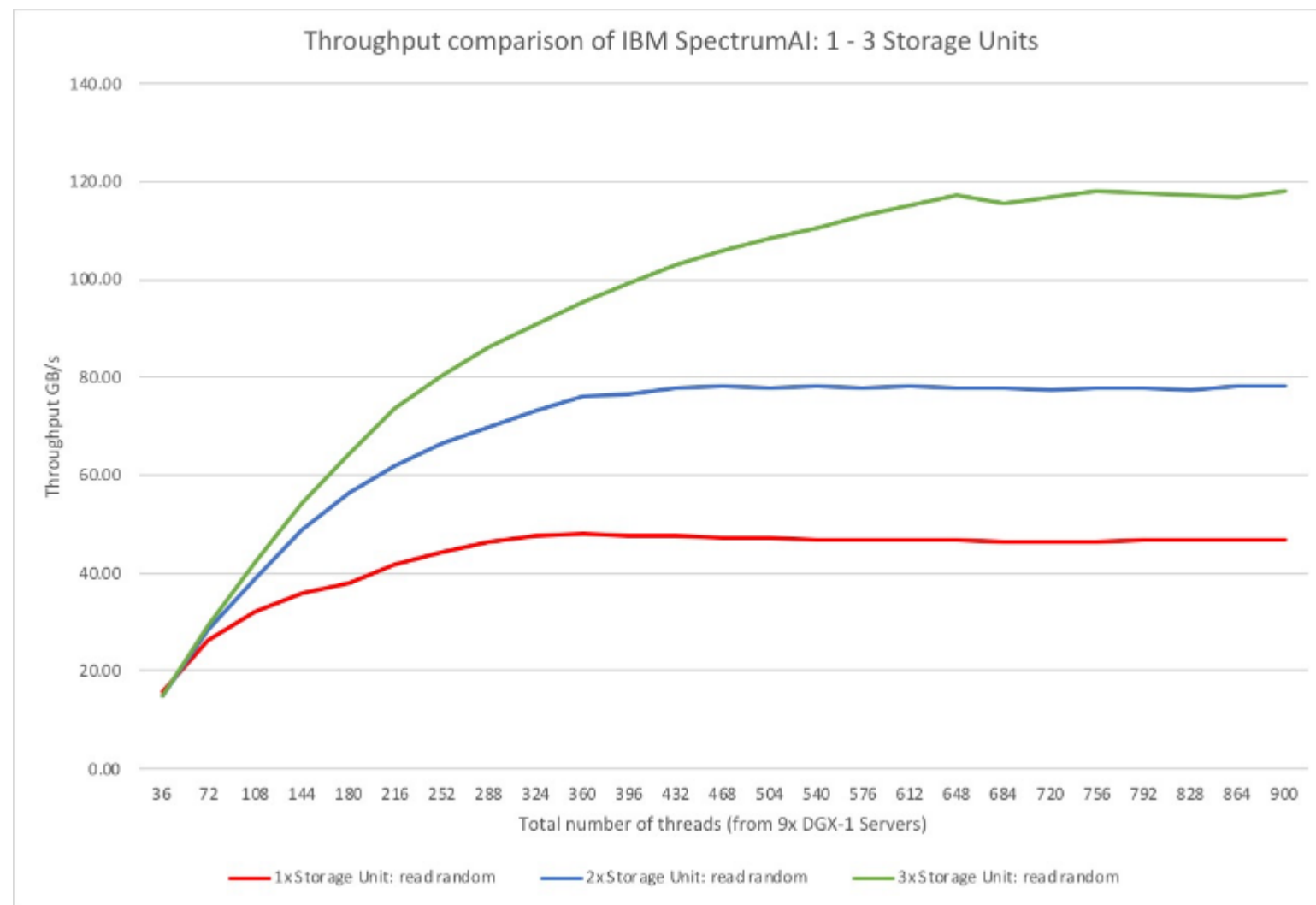


# ESS 3000 for AI with NVIDIA DGX

*Near Linear Scaling by adding 40GB/s per 2U appliance*

*No need for downtime or reconfiguration*

*Best in class throughput potential*

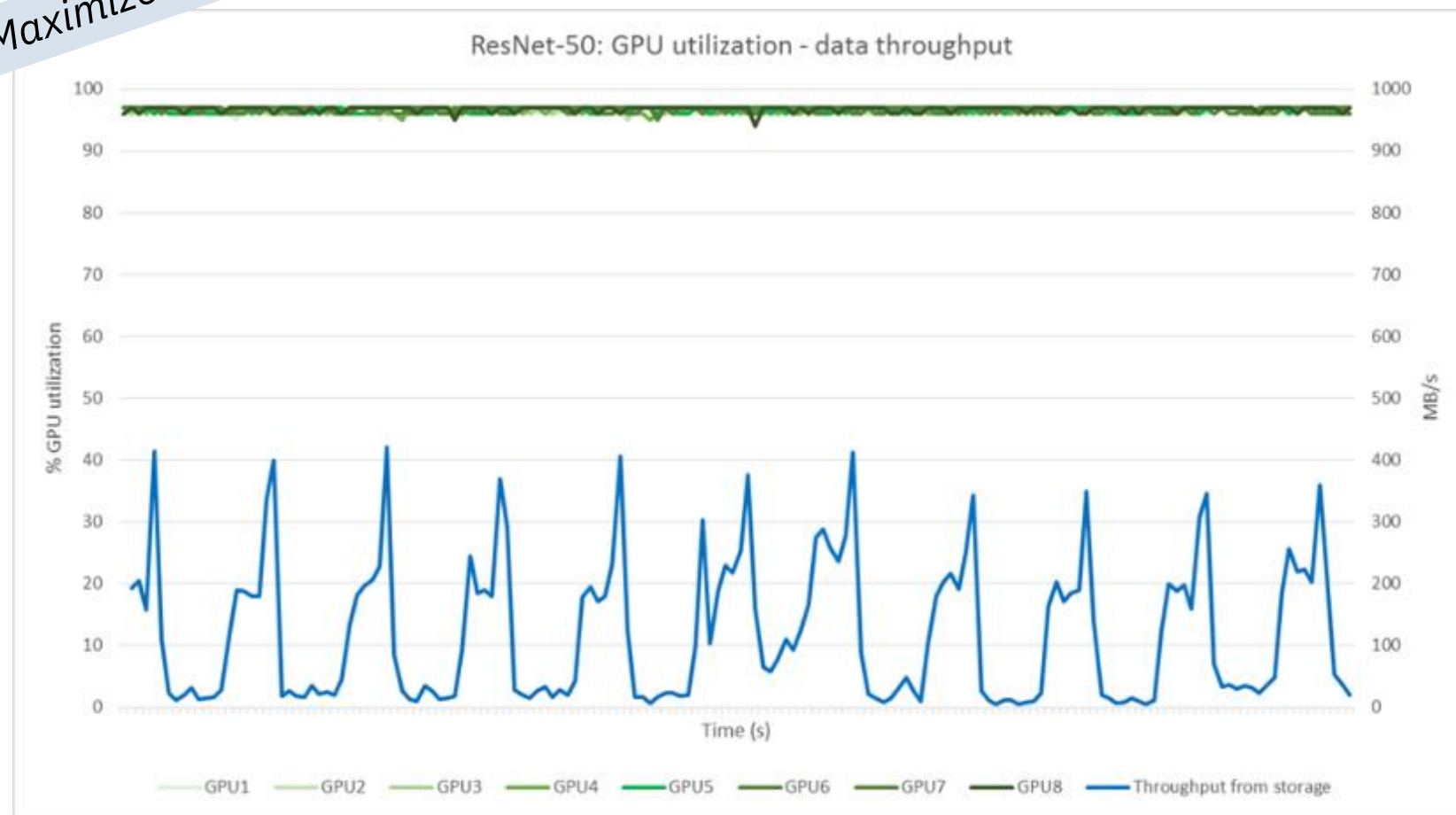


# ESS 3000 for AI with DGX

**Keeping GPUs busy  
regardless of IO  
access patterns**

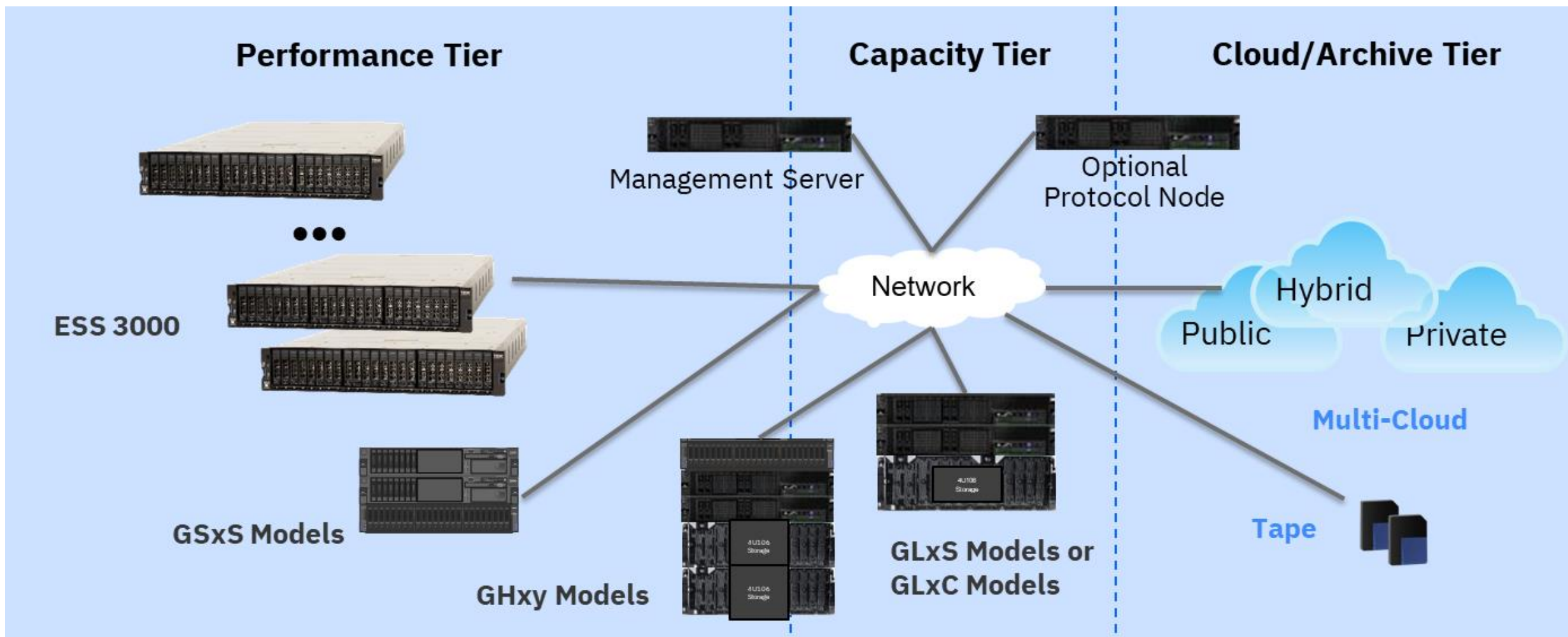
**Headroom for data  
centric workload  
growth**

Maximize GPU Utilization



# ESS Storage System Tiers

- Start Small and Grow as Needed
- One Management Server per Scale Cluster & Optional Protocol Nodes





8



# Back-up

# Free! Introduction to IBM Elastic Storage Server and Spectrum Scale RAID



<https://www.onlinedigitallearning.com/course/view.php?id=2173> (Log on with your IBM ID)

The screenshot shows the IBM online learning interface. At the top, there are navigation links for "My Enrollments" and "My courses". Below these, the course ID "DL08003G" is displayed. The main content area is titled "Introducing the Elastic Storage Server". It includes a description of the IBM Elastic Storage Server, which is a big data storage system combining Power servers, storage enclosures, and disks along with IBM Spectrum Scale and IBM Spectrum Scale RAID technology. The course is labeled as "Basic", "30 Minutes", and "Self-paced". A "Launch" button is visible. On the left side, there is a sidebar with a "Navigation" menu containing "My Enrollments", "My courses" (with "DL08003G" selected), and "Support". Below the navigation menu, there is a "Self Completion" section stating "You have already completed this course". At the bottom of the sidebar, there is a "Course Completion Status" section.

My Enrollments > My courses >

DL08003G

Navigation

My Enrollments

My courses

DL08003G

Support

Self Completion

You have already completed this course

Course Completion Status

## Introducing the Elastic Storage Server

Basic | 30 Minutes | Self-paced

The IBM Elastic Storage Server is a big data storage system that combines Power servers, storage enclosures, and disks along with IBM Spectrum Scale and IBM Spectrum Scale RAID technology, providing analytic and technical computing storage and data services for elastic storage workloads.

Launch

# Free! - IBM Elastic Storage Server and Spectrum Scale RAID - gssutils



<https://www.onlinedigitallearning.com/course/view.php?id=3570>

(Log on with your IBM ID)

## gssutils simulation for SSR Tools sub-menu

[My Enrollments](#) / [My courses](#) / [DL08010G: SSR gssutils](#)

About



Simulation



This content is for installers or administrators for the IBM Elastic Storage Server.



You need 15 minutes or less to go through this content.



This simulation is for the **gssutils** tool that is pre-installed as part of the IBM Elastic Storage Server. The focus of this simulation is for the **SSR Tools** sub-menu to use in order to verify the installation of an ESS.

### ESS INSTALLATION AND DEPLOYMENT TOOLKIT

1. Help
2. SSR Tools >
3. Plug n Play and Hybrid >
4. Install >
5. Upgrade >
6. Validation checks >
7. View/Collect service data (snaps) >
8. Exit

```
man gssutils_panel_1
Help
```

### CHECK SYSTEM HARDWARE AND SOFTWARE

1. Help
2. Show node details
3. Check and validate various install parameters
4. Quick storage configuration check
5. Check enclosure cabling and paths to disks
6. Check disks for IO operations
7. Ping all nodes
8. Check ssh to all nodes
9. Run lsccsi from all nodes
10. Check for open serviceable events
11. Back

```
/opt/ibm/gss/tools/bin/gssnodedetails -N ens1,gss_ppc64
Shows miscellaneous node information.
```