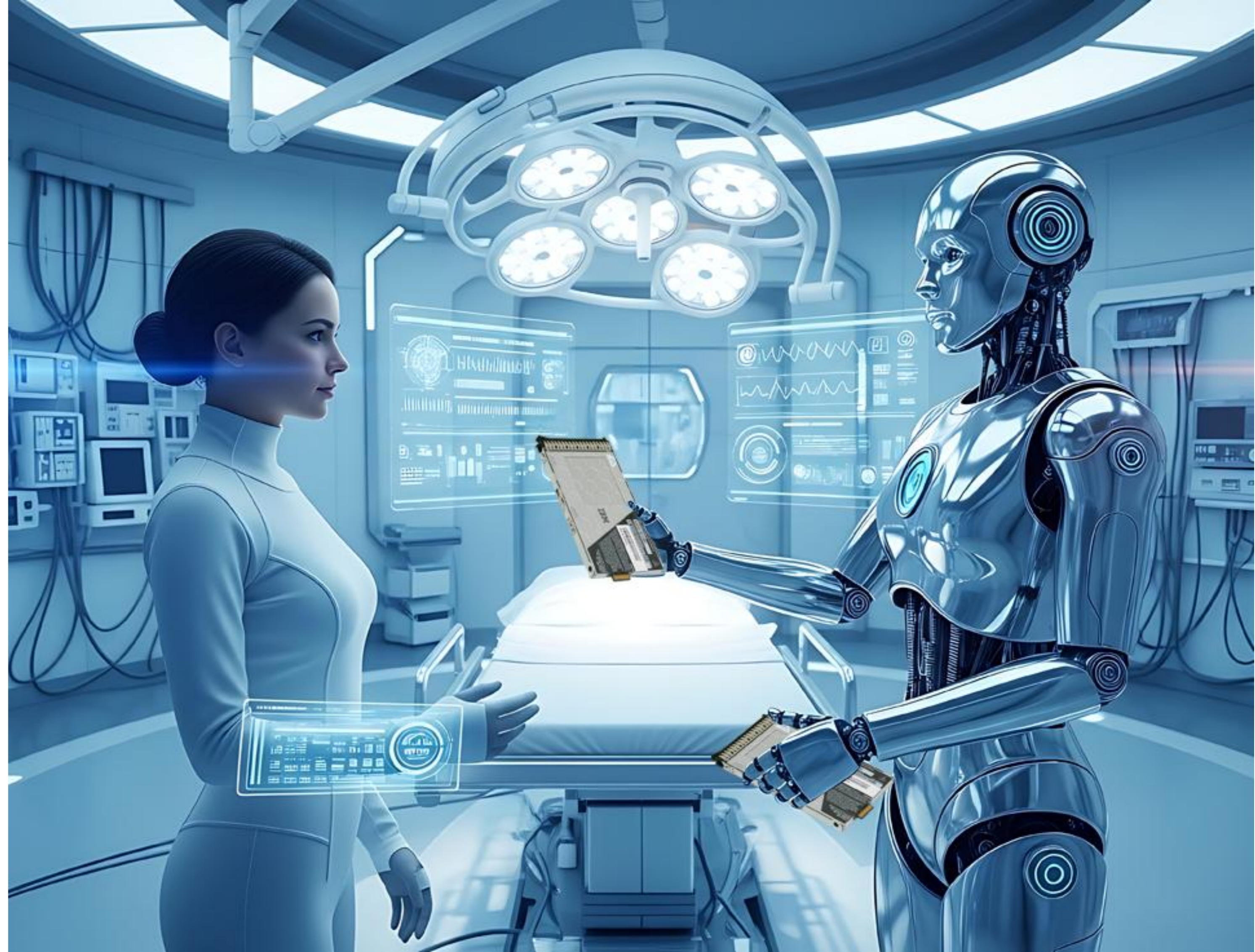


FlashSystem 7600  
redefining what is  
possible w/ storage



# FlashSystem 7600 has a new look front and back



Two 2T-E3 slots for potential future use-cases

Thirty-two 1T-E3 slots for 5<sup>th</sup> Gen FlashCore Modules, or for industry-standard commodity NVMe E3 SSDs

Two 2T-E3 slots for potential future use-cases

# Scale faster, perform better, store and protect everything.

## Efficiency

- FPGA hardware paths (no firmware)
- Zero impact inline hardware compression

## Protection

- Highest in class ECC encoding
- Zero impact inline hardware quantum safe encryption
- Zero impact inline anomaly detection

## Performance

- Pseudo-SLC read cache
- Read/Write heat segregation
- Smart data placement - hinting architecture
- PCIe Gen4
  - 3.5GB/s
  - 175K IOPs

## Endurance

- Health and heat binning - asymmetric wear levelling
- Lowest in class write amplification
- Variable voltage levels - lifespan
- Highest in class endurance
- ***IBM has had zero FCM's wear out in the field!***



Hardware Ransomware Threat Detection



Hardware Encryption

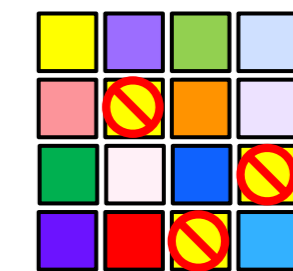
TCG

FIPS

QSE



Hardware Compression



Hardware Deduplication

Zero configuration. Zero performance penalty. All features. All capabilities. Fully built in.

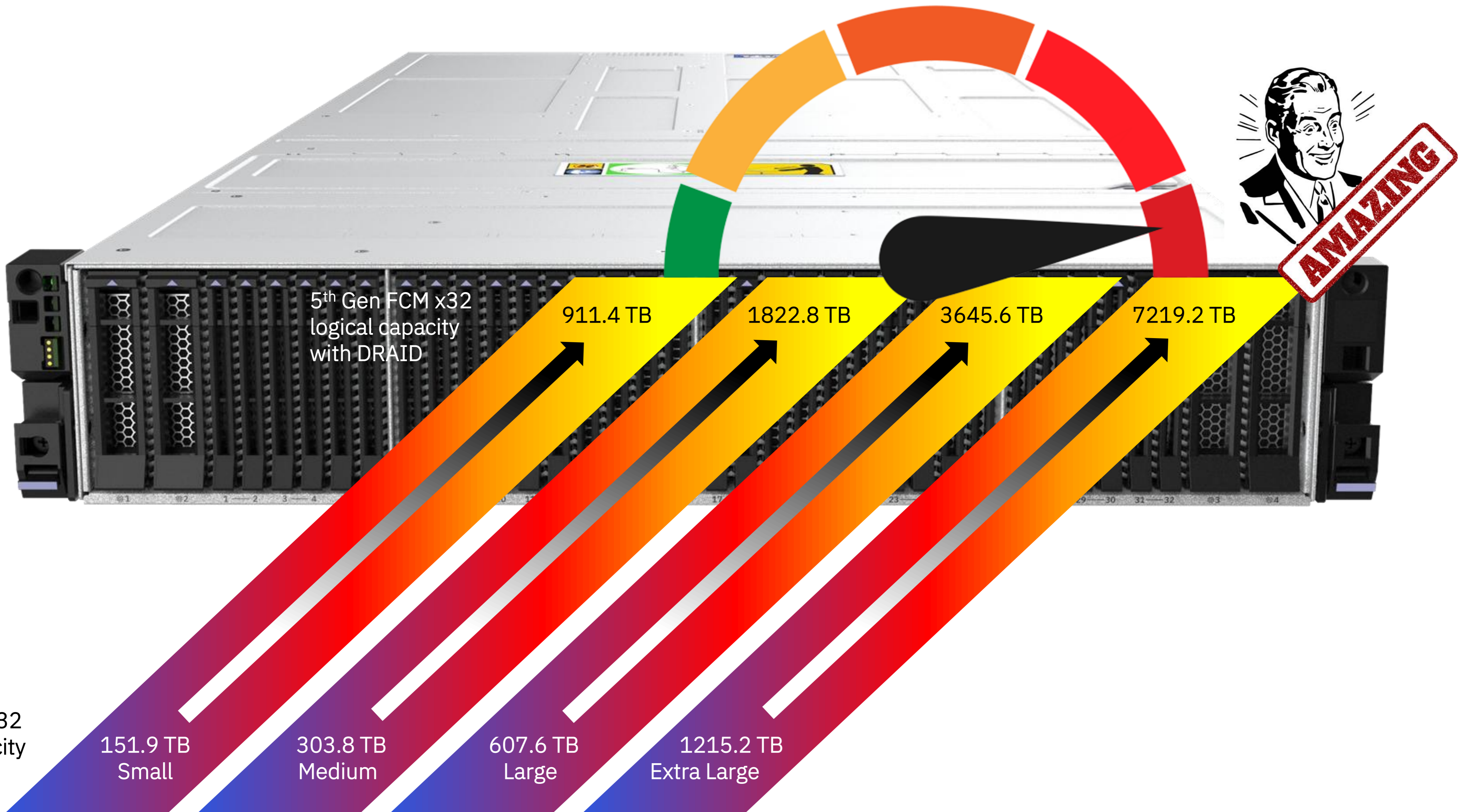
# 5<sup>th</sup> generation FlashCore Modules

- Increased raw capacity
- Increased logical capacity
- Increased performance
- Increased computational offload
- Increased security
- Increased data reduction



Capacity Points in TB	Small	Medium	Large	XL	2XL
Form Factor	1T	1T	1T	1T	1T
Raw Capacity	6.6TB	13.2TB	26.4TB	52.8TB	105.6TB
Useable Capacity (1:1)	5.6TB	11.2TB	22.4TB	44.8TB	89.6TB
Max Data Reduction	6:1	6:1	6:1	6:1	4.88:1 <sup>1</sup>
Logical "effective" Capacity	33.6TB	67.2TB	134.4TB	268.8TB	438.0TB <sup>1</sup>
Platform Support	7600	7600	7600	7600	9600 <sup>2</sup>

# 7600 offers stunning density and performance



# FlashSystem 7600 density gains over FlashSystem7300

FlashSystem 7300 facts:

Rack Space : 2RU

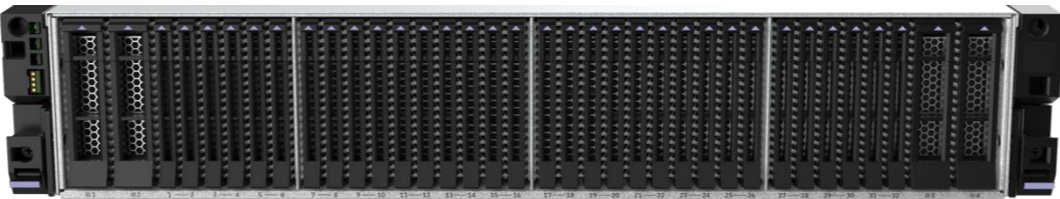


Max capacity :  
Physical usable : **772TB**  
Effective : **2.32PB**

Per Rack Unit :  
**386 TB** physical  
**1.16 PB** effective

FlashSystem 7600 facts:

Rack Space : 2RU



Max capacity :  
Physical usable : **1.22PB**  
Effective : **7.29PB**

Per Rack Unit :  
**611 TB** physical  
**3.6 PB** effective

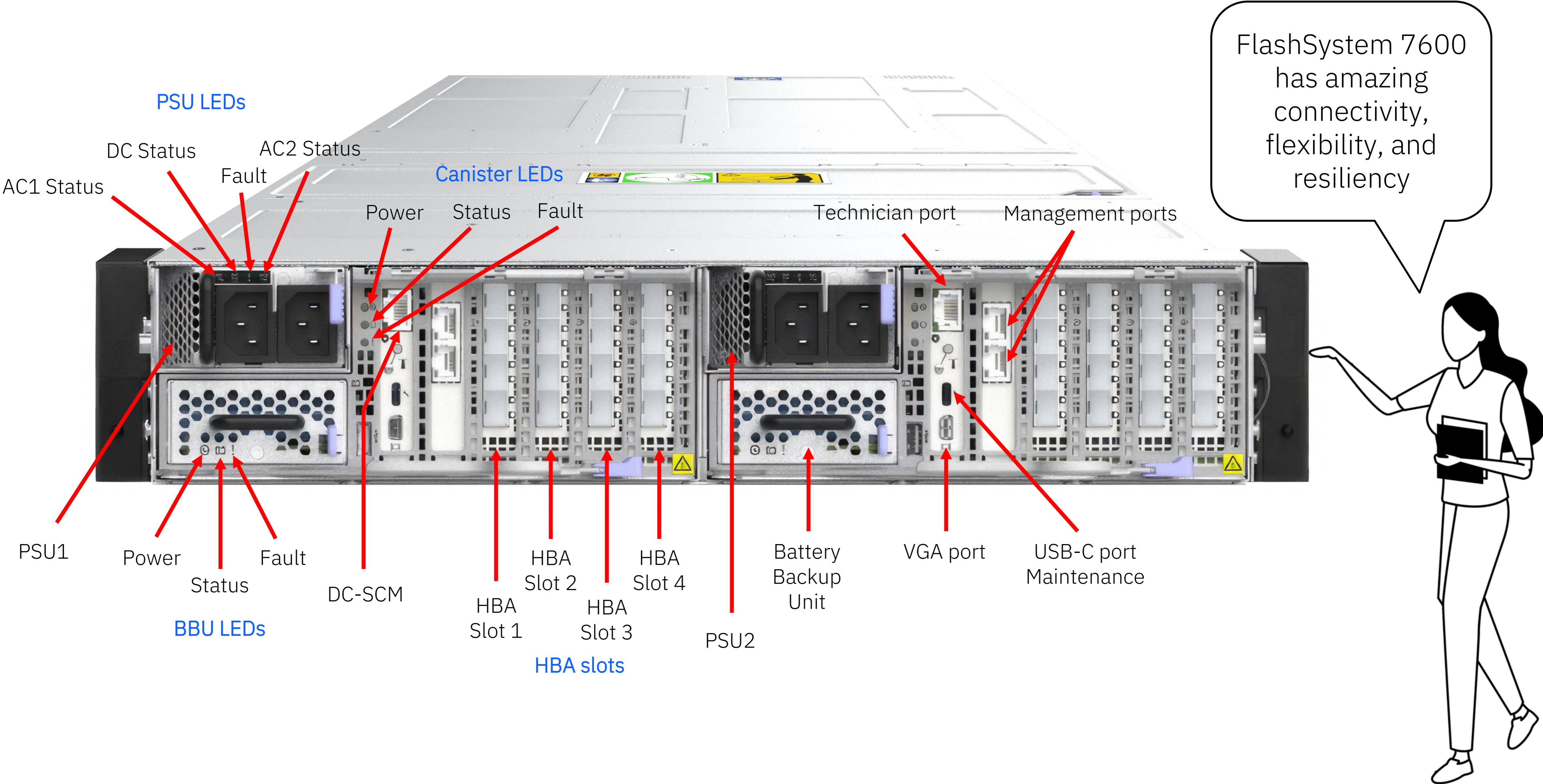
Comparison:

Rack Space : **Identical**

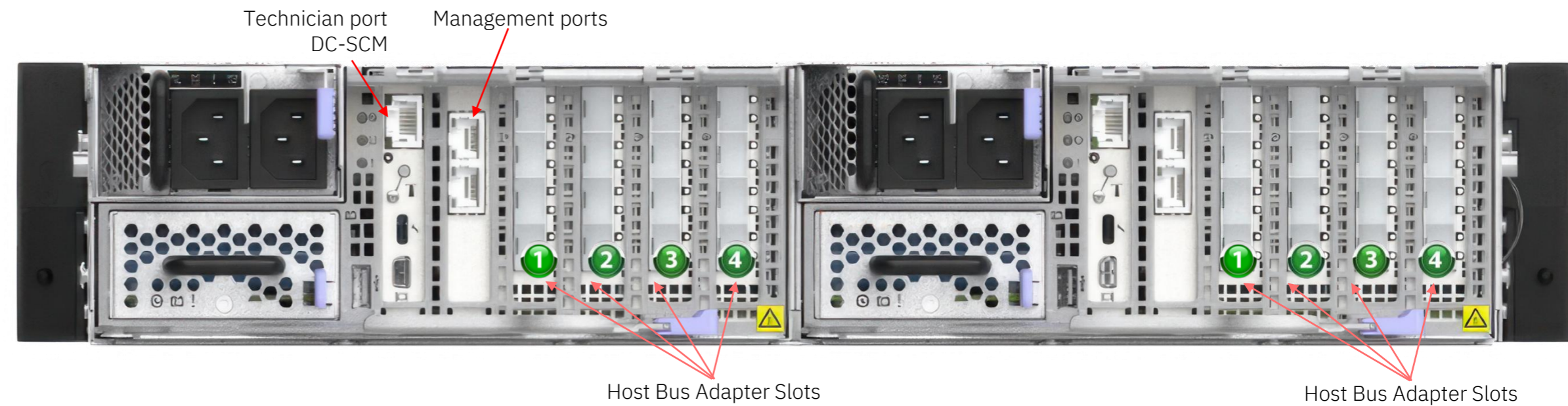
Max capacity :  
Physical usable : **58% increase**  
Effective : **214% increase**

Per Rack Unit :  
Physical usable : **58% increase**  
Effective : **214% increase**

# FlashSystem 7600 offers connectivity, and resilience



# FlashSystem 7600 adapter configs



- 4 Port 32Gb Fibre Channel
- 4 Port 64Gb Fibre Channel
- 4 Port 25Gb Ethernet
- 2 Port 100Gb Ethernet

Plug in rules – When mixed, Fibre Channel is added from left (slot 1) to right and Ethernet from right (slot 4) to left

**Slot 4 cannot be used for 64Gb Fibre Channel**

Canisters must have identical card configurations

Slot	Adapter	Speed	Max Ports Per Enclosure	Connector	Supported Protocol	Function
On-Board	DC-SCM	1Gb	2	RJ45	<ul style="list-style-type: none"> <li>• Technician Port</li> </ul>	<ul style="list-style-type: none"> <li>• Initial Configuration</li> <li>• Recovery for locked accounts/missing password</li> <li>• DA only – No switch attach</li> </ul>
On-Board	Management ports	10Gb	4	RJ45	<ul style="list-style-type: none"> <li>• Management</li> </ul>	<ul style="list-style-type: none"> <li>• Management Functions</li> </ul>
1, 2,3,4	Fibre Channel	32Gb	32	SFP+	<ul style="list-style-type: none"> <li>• SCSI</li> <li>• FC-NVMe</li> </ul>	<ul style="list-style-type: none"> <li>• Host I/O</li> <li>• Replication and HA</li> <li>• Migration</li> <li>• Virtualized Storage Attach</li> </ul>
1,2,3	Fibre Channel	64Gb	24	SFP+	<ul style="list-style-type: none"> <li>• SCSI</li> <li>• FC-NVMe</li> </ul>	<ul style="list-style-type: none"> <li>• Host I/O</li> <li>• Replication and HA</li> <li>• Migration</li> <li>• Virtualized Storage Attach</li> </ul>
1,2,3,4	Ethernet	10Gb 25Gb	32	SFP+ SFP28	<ul style="list-style-type: none"> <li>• iSCSI</li> <li>• NVMe/TCP</li> </ul>	<ul style="list-style-type: none"> <li>• Host I/O</li> <li>• IP Replication long distance with TCP/IP</li> </ul>
1,2,3,4	Ethernet	40Gb 100Gb*	16	QSFP+ QSFP28	<ul style="list-style-type: none"> <li>• iSCSI</li> <li>• NVMe/TCP</li> <li>• iWARP (rep RDMA)</li> </ul>	<ul style="list-style-type: none"> <li>• Host I/O</li> <li>• IP Replication long distance with TCP/IP</li> <li>• IP Replication short distance with RDMA</li> </ul>
TBD (one x 16)	PCIe	64Gb?	2	Optical	<ul style="list-style-type: none"> <li>• NVMe (post GA)</li> </ul>	<ul style="list-style-type: none"> <li>• NVMe I/O expansion attach</li> </ul>

\* denotes oversubscription

# FlashSystem 7600 Ethernet host bus adapters

BYOC rules remain the same as before - details in docs website<sup>1</sup>

Platform	Adapter	Slot	iSCSI host attach	NVMeTCP host attach	Long distance Ethernet partnership over TCP	Short distance Ethernet partnership over RDMA
FlashSystem 7600	4x25G Ethernet	1/2/3/4				
FlashSystem 9600	2x100G Ethernet	1/2/3/4				

Quad-port  
25Gbps or  
10Gbps



Dual-port  
40Gbps or  
100Gbps



### Configuration Restrictions

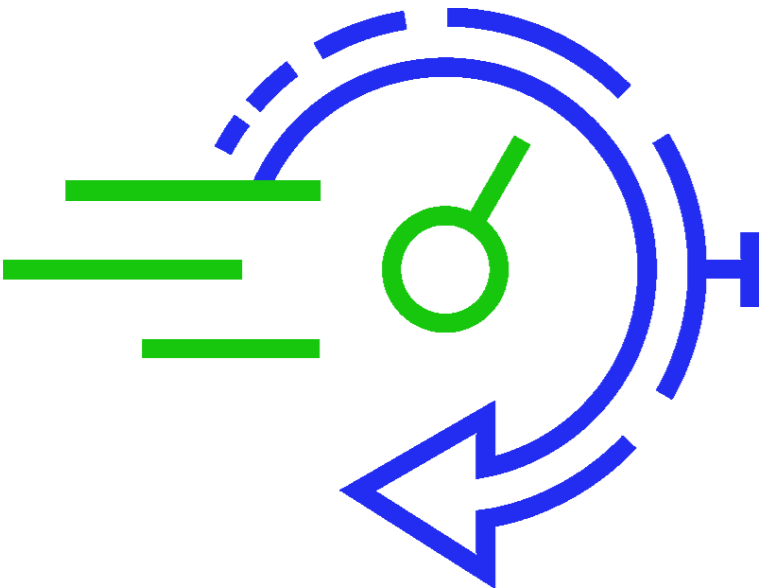
- NVMe/RDMA will not be supported on new platforms
- Long distance partnership over TCP will not support compression on new platforms
  - Intel -> AMD means hardware accelerator for compression is not available
- Asymmetric high-speed Ethernet (HSE) partnership (100G-25G) is transitional only\*

### \*Asymmetric HSE Partnership consideration risks

- Asymmetric partnership (100G-25G) is transitional only
- Bandwidth over-subscription
- Likelihood of congestion under sustained or bursty workloads
- Effective max I/O bandwidth contained by minimum port-to-port bandwidth
- Degraded I/O performance and HA loss
- Host side throttling during transition
- Flow control

# FlashSystem guarantees available on all acquisition models

## Stand-alone guarantees



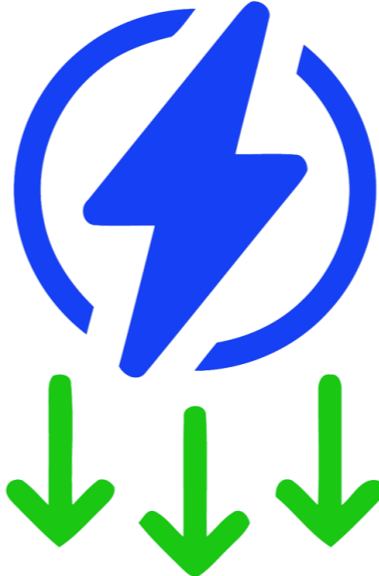
### Cyber Recovery

Immutable Safeguarded Copy snapshots can be recovered in just 60-seconds



### 100% Data Availability

Zero down time during a three-year period on a FlashSystem solution



### Sustainability

Energy efficiency as low as 0.56 W/TB (raw capacity) on select configurations.



### 5:1 Data Reduction

Guaranteed 5:1 data reduction on reducible data