PAC Storage Scale Out NAS Performance

PAC STORAGE

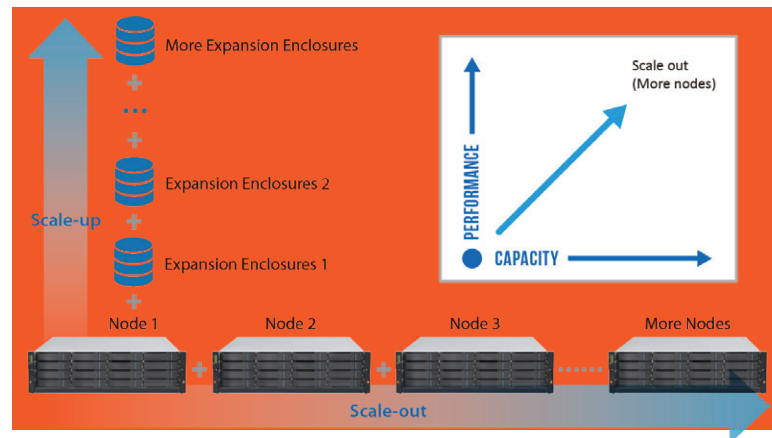| 100+ GBps	144	100+
Read/Write speed	Nodes	PB

Configuration

PAC Storage Scale Out NAS scales starting from 3 nodes up to 144 nodes. By adding nodes increases both performance and capacity. For additional capacity, you can add expansion chassis to each node. All components in a cluster work together to create a unified pool of highly efficient storage.

Hardware

The PAC Scale Out NAS can be configured with 2U-25 Bay, 4U-24 Bay and 4U-60 Bay chassis.

The 60 Bay can be configured as 2 nodes per chassis with each of the 30 drives split into a node. Each node will utilize 1 of the 2 controllers in the chassis. This high density configuration can run 120 drives in 8U rack space.
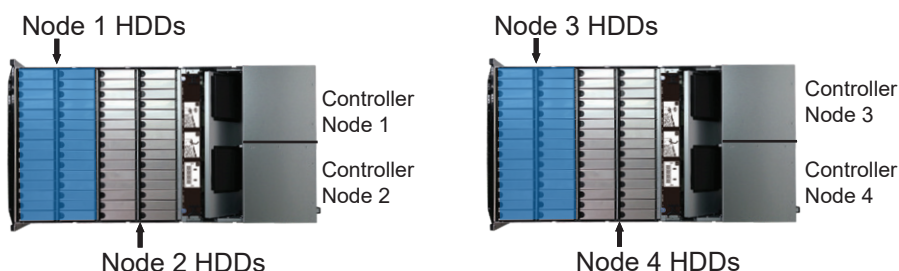
25 Bays

24 Bays

60 Bays

Node 1 HDDs

Node 3 HDDs

Controller Node 1

Controller Node 2

Controller Node 3

Controller Node 4

Node 2 HDDs

Node 4 HDDs

Example of 4 Node Cluster with 2x 60 Bay units

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PAC Storage's unique system architecture is embedded with a layer of RAID protection. Opposed to traditional scale-out NAS where the faulted node requires full reconstruction, the PAC Storage Scale Out NAS architecture does not require the cluster to reconstruct for a faulty disk drive as it local RAID will rebuild, so rebuilds are faster and system performance is not affected.
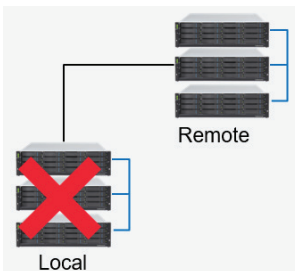
RAID Protection prevents data loss from a disk failure. No performance impact when rebuilding and no data loss if drives at multiple nodes fail.
Disk protection: RAID5, RAID6
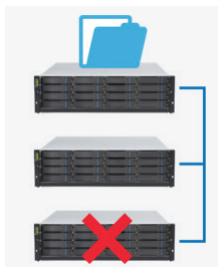
Node Protection for data redundancy across multiple nodes to prevent data loss from a node failure.

Node protection: Erasure code (2+1 or 4+1 or 4+2 or 8+1 or 8+2) or Replica (x2 or x3)

Cluster Protection Supports data remote replication to backup data in another site.

Cluster Protection: Rsync

Self Encrypted Drive (SED) Keep the extreme confidential files encrypted. prevent critical data from being hacked, deleted, rewritten or even read.

WORM (Write Once Read Many) For following the regulation, protect transaction record/ confidential files be deleted/modified by accent for several years.

Web-based Centralized Management. Easy GUI to simplify installation and maintenance. Users can manage the entire cluster with a single pain of glass.

PAC STORAGE

FLEXIBLE MANAGEMENT POOLS

Can meet multiple needs: Put hot data in SSD pools and cold data in low-cost HDD pools
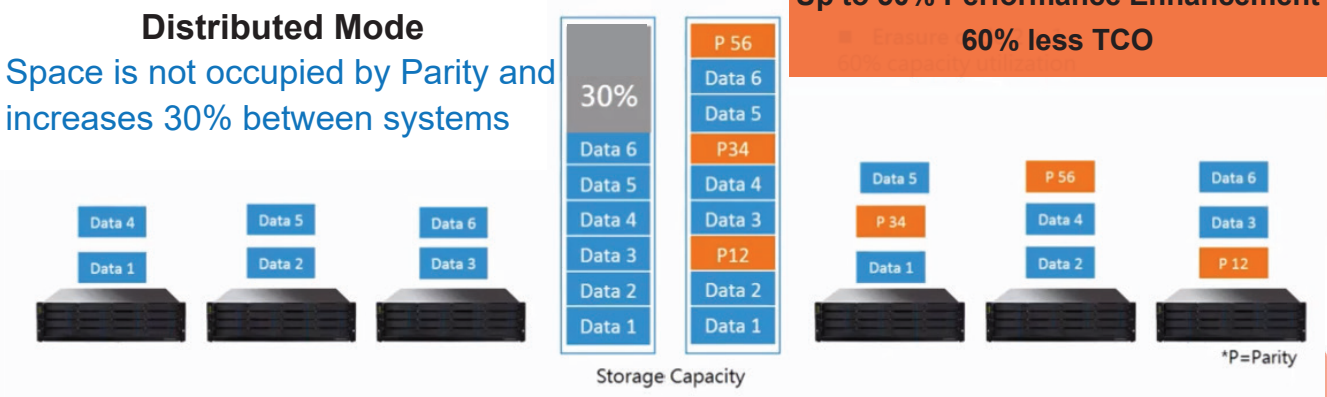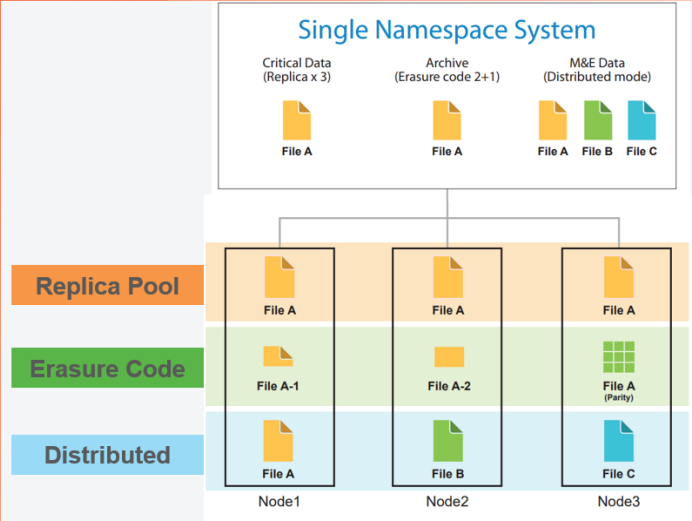
← HDD Pool | **SSD Pool →**

Data pools:

Replica: Data is replicated between nodes

Erasure code: Data is striped between nodes with parity protection

Distributed mode: *Proprietary Feature*-Data is distributed between nodes with local RAID protection. A file is evenly distributed in each node without creating data copies. This increases capacity utilization by 30-50% compared to Erasure code and Replica.
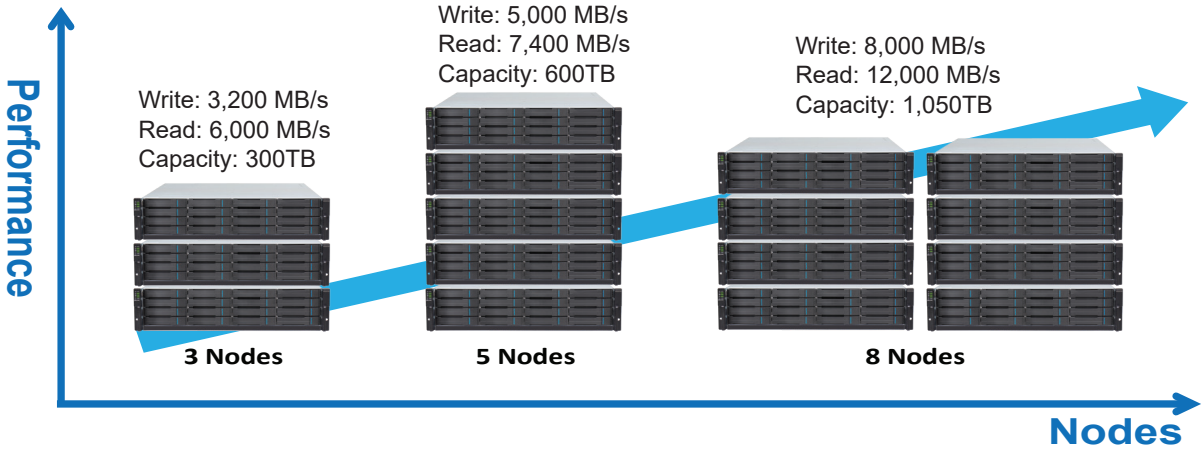
Different types of pools consolidated in a single namespace cluster.

Single Namespace System

Critical Data (Replica x 3) — Archive (Erasure code 2+1) — M&E Data (Distributed mode)

Replica Pool | Erasure Code | Distributed
Node1 | Node2 | Node3

Extreme 90% Capacity Utilization
Up to 50% Performance Enhancement
60% less TCO

Distributed Mode

Space is not occupied by Parity and increases 30% between systems

Storage Capacity

*P=Parity

PERFORMANCE

READ / WRITE SPEEDS continue to increase as more nodes added

Linear expansion of performance and capacity

Performance (vertical axis)

Write: 3,200 MB/s
Read: 6,000 MB/s
Capacity: 300TB

Write: 5,000 MB/s
Read: 7,400 MB/s
Capacity: 600TB

Write: 8,000 MB/s
Read: 12,000 MB/s
Capacity: 1,050TB

3 Nodes | **5 Nodes** | **8 Nodes**

Nodes (horizontal axis)

PAC STORAGE

PAC Storage performs as well or better than our competitors at a significant lower cost

Frame Test, NFS	Scale Out Mode	# Drives per Node	# Clients	Read per Node MB/s	Write per Node MB/s
PAC Storage 25 Bay x3	EC	25 SSDs	3	2008	1835
PAC Storage 25 Bay x3	EC	25 SSDs	6	3438	1698
PAC Storage 60 Bay x3	Distributed	60 HDDs	6	3548	3182
Isilon F800 x3	EC	30 SSDs	3	2222	1955
Isilon F800 x3	EC	30 SSDs	6	3966	1783
NetApp	N/A	24 SSDs	3	1711	832
NetApp	N/A	24 SSDs	6	2739	1337

These test results of the competitors are from the published at: https://www.dellemc.com/en-us/collaterals/unauth/ana-lyst-reports/products/storage/principled_technologies_isilon_competitive_benchmark_report.pdf

Performance throughput metrics from single cluster

This performance screenshot reflects throughput from a 60 Bay configured as 2 nodes running distributed mode. The host connection is 25Gb and the back-end is 10Gb.
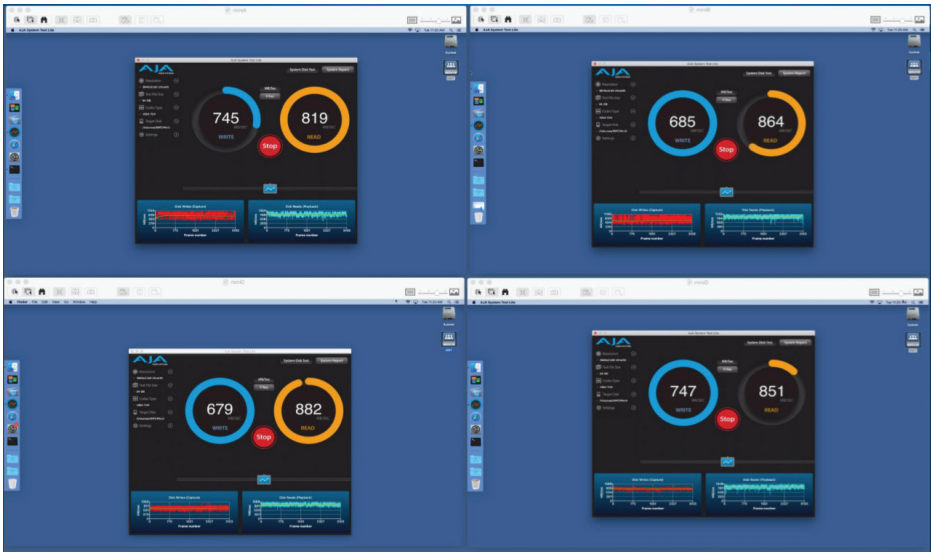
PAC Storage Scale-Out All Flash system performs up to 3,400/2,000 MB/s Read/Write speed per single node and 40Gb/s RDMA node-to-node connection to provide lightning-speed access to mission-critical workloads of such applications as HPC and M&E.