Twin Scale Out (TSO™) Appliance
Scale Out NAS Storage

StoneFly TSO™ "Twin Scale Out" NAS Storage Appliances deliver unprecedented performance, redundancy and scalability. **TSO** series of appliances were designed for customer's requiring a powerful storage solution that can scale out storage capacity while scaling up performance. Mirrored twin **Scale Out NAS** nodes scale up to 36 drives and 288 TeraBytes of storage per chassis, up to 512 drives per twin nodes, and easily scale out to multiple nodes on demand.

The **Scale Out NAS** feature of the TSO allows you to "scale out" as your business grows by adding nodes without losing performance. With the TSO you can expand one or more volumes across multiple nodes using **no metadata** and a **single namespace**. Usable bandwidth increases as new nodes are added. Best of all, you can manage multiple nodes with just a single user interface. Each time the TSO is scaled out, it adds more capacity, more throughput, and more concurrency. Installation, management and scaling is simple to achieve at any size.

StoneFly TSO Scale Out NAS appliances allow you to add server nodes on the fly as well as add CPU horsepower and storage capacity from additional TSO nodes. This linear scalability provides predictable performance and allows users to pay as you grow. TSO simplifies the storage of media and is the ideal platform for consolidation onto a shared resource implementing higher utilization. Capacity can be quickly provisioned, shared, and managed with fewer resources. StoneFly TSO is efficient to operate since it leverages all of its resources, maximizes utilization, and integrates SATA, nearline SAS, enterprise SAS, and SSD drive tiering within the storage nodes.
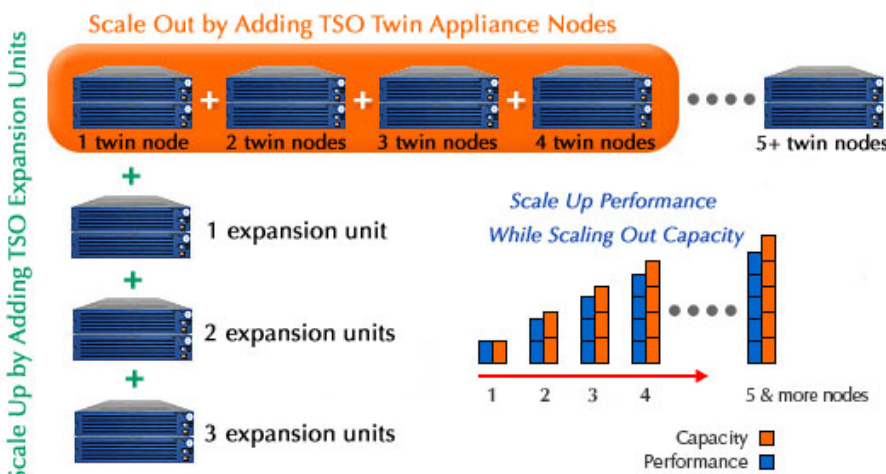
TSO is often used for ultra-fast primary storage for markets that require vast quantities of high-concurrent sequential bandwidth or fast parallel throughput for very large files used in high performance computing in media and entertainment. TSO appliances are perfect for managing large quantities of unstructured data (file-based documents, presentations, pictures, music, videos), high IO-intensive media production applications, content creation, transformation, visual effects, post-production transcode, streaming media and archive data.

What is "Scale Out NAS"?

Scale Out NAS is a distributed file system that can scale to several petabytes all while handling thousands of clients. It functions as a distributed data overlay, polling together storage building blocks over TCP/IP, aggregating disk resources and managing data in a single global namespace. The unified platform handles blocks, files, objects and big data. **Scale Out NAS** solves:

> ➢ Enterprise-wide file sharing with a single access point across data storage locations.
> ➢ Nearline storage for infrequently accessed data that needs to be online.
> ➢ Rich media (audio & video) content distribution with petabyte-scale storage & high-read performance requirements.
> ➢ High-performance storage for bandwidth-intensive applications like weather prediction and oil and gas exploration.
> ➢ Centralized storage-as-a-service to enterprise applications.
> ➢ Backup target and archive for on-site or off-site data protection.

Scale Up and Scale Out with StoneFly TSO
NAS - Single Name Space Volume (NFS, CIFS)

Twin Scale Out NAS Storage

> ➢ *"Scale Out"* as your business grows
> ➢ Add nodes without losing performance
> ➢ Expand one volume across multiple nodes
>> → No **Metadata**
>> → Single **Namespace**
> ➢ Bandwidth increases as nodes added
> ➢ Multiple boxes, single user interface
> ➢ Twin nodes mirrored for data redundancy
> ➢ Scale Up nodes with affordable expansion units
> ➢ Web–based intuitive graphical user interface
> ➢ No downtime volume or storage expansion
> ➢ Support for NAS protocols CIFS/SMB and NFS
> ➢ Tiered–storage (SATA, SAS, SSD)
> ➢ Linear scalability = Predictable performance
> ➢ Handles blocks, files, objects and big data
> ➢ Distributed file system

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TSO Appliance Series Key Features

StoneFly StoneFusion 8.0 Base NAS Management 64-Bit OS
o Logical Volume Creation and Patented Advanced Storage Virtualization Services
o NAS Port Teaming and Failover
o Volume-Level Access Control and Dynamic Volume Management
o Supports NAS Protocols CIFS/SMB and NFS
o Compatible with OpenStack – Cinder, Swift & Glance
o Easy Active Directory Integration
o Support for SNMP Traps/UPS/Nagios/RAID Monitoring/Call Home
o System-Wide Graphical Performance and Utilization Reporting
o Automated Online Volume / Storage Expansion
o Scale Out NAS using a Single Name Space to Scale Capacity and Performance
o Multi-Appliance Campus Mirroring, Spanning and Central Management System
o Tiered Storage Architecture with Hardware & Software Support

TSO Series Hardware Features (per node)
o Dual Hexa-Core Storage Virtualization Engines
o 32GB Data Packet and Command Queuing Cache for SSPP®
o RAID 0, 1, 3, 5, 6, 10, 30, 50 and 60 w/ RAID Cache BBU
o 6Gb and 12Gb SAS Technology
o 8 to 36 Hot-Swappable Disk Drives per Chassis
o Choice of SATA, SAS, SSD or Tiered Storage
o Scale Up Capacity with up to 10 Expansion Units per Node
o Supports 1Gb Copper, 10Gb RJ-45/CX4 Copper, SFP+, SR/LR Optical
o One Gigabit Management Port
o Redundant 80-PLUS® Certified Hot-Swappable Power Supplies
o Dynamic Storage Expansion
o Operating Temperature: 10° to 35°C (50°F to 95°F)
o Relative Humidity: 8 to 90%, Non-Condensing

Twin Scale Out Storage Appliance Models

Model	Specifications	Model	Specifications
TSO-801X	• Eight 2.5″ Disk Drives per Chassis • 6Gb SAS 10k RPM: Up to 14.4TB • 12Gb SAS 15k RPM: Up to 4.8TB • 6Gb SSD: Up to 6.4TB per Node • No External Expansion • 2 x 1U 19″ Rackmount Chassis • Dimensions: 3.4″ x 17.2″ x 26.6″	**TSO-2401X**	• Twenty-Four 2.5″ Disk Drives per Chassis • 6Gb SAS 10k RPM: Up to 43.2TB • 12Gb SAS 15k RPM: Up to 14.4TB • 6Gb SSD: Up to 19.2TB per Node • Supports up to 512 Drives per Twin Nodes • 2 x 2U 19″ Rackmount Chassis • Dimensions: 7″ x 17.2″ x 24.8″
TSO-801 TSO-1201	• Eight/Twelve 3.5″ Disk Drives per Chassis • 6Gb SATA/SAS 7200RPM: Up to 96TB • 6Gb SAS 10k RPM: Up to 21.6TB • 6Gb SAS 15k RPM: Up to 7.2TB • 6Gb SSD: Up to 9.6TB per Node • No External Expansion (TSO-800) • Supports up to 512 Drives/Twin (12-Bay) • 2 x 2U 19″ Rackmount Chassis • Dimensions: 7″ x 17.2″ x 25.5″	**TSO-1601**	• Sixteen 3.5″ Disk Drives per Chassis • 6Gb SATA/SAS 7200RPM: Up to 128TB • 6Gb SAS 10k RPM: Up to 28.8TB • 6Gb SAS 15k RPM: Up to 9.6TB • 6Gb SSD: Up to 12.8TB per Node • Supports up to 512 Drives per Twin Nodes • 2 x 3U 19″ Rackmount Chassis • Dimensions: 10.5″ x 17.2″ x 25.5″
TSO-2401	• Twenty-Four 3.5″ Disk Drives per Chassis • 6Gb SATA/SAS 7200RPM: Up to 192TB • 6Gb SAS 10k RPM: Up to 43.2TB • 6Gb SAS 15k RPM: Up to 14.4TB • 6Gb SSD: Up to 19.2TB per Node • Supports up to 512 Drives per Twin Nodes • 2 x 4U 19″ Rackmount Chassis • Dimensions: 14″ x 17.2″ x 26″	**TSO-3601**	• Thirty-Six 3.5″ Disk Drives per Chassis • 6Gb SATA/SAS 7200RPM: Up to 288TB • 6GB SAS 10k RPM: Up to 64.8TB • 6Gb SAS 15k RPM: Up to 21.6TB • 6Gb SSD: Up to 28.8TB per Node • Supports up to 512 Drives per Twin Nodes • 2 x 4U 19″ Rackmount Chassis • Dimensions: 14″ x 17.2″ x 27.5″

TSO Scale Up Expansion Units

TSO-2401XE	**TSO-1201E**	**TSO-1601E**	**TSO-2401E**
Twenty-Four 2.5" per Chassis 2 x 2U Rackmount Chassis	Twelve 3.5″ per Chassis 2 x 2U Rackmount Chassis	Sixteen 3.5″ per Chassis 2 x 3U Rackmount Chassis	Twenty-Four 3.5″ per Chassis 2 x 4U Rackmount Chassis

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