WARP Mechanics® WDS-8260
Ultra-Dense SSD Storage Platform

IT architects require much larger building blocks to meet modern data growth rates. To access such giant data sets, storage must also be faster in terms of IOPS and throughput. The WARP Mechanics WDS-8260 fills these needs in an efficient, cost-effective package.

With up to 60 2.5” drives per 2U enclosure, this platform is an ultra-dense solution, fitting up to 120TB in a standard 19” cabinet with high-capacity SSDs.

The platform supports both 6Gb SAS IO modules and intelligent storage controllers. Intelligent controllers include built-in dual 1Gb and 10Gb Ethernet ports and interface options for additional 1/10/40Gbps Ethernet, 6Gb SAS, or 40/56Gbps FDR InfiniBand.

The unit can be configured as a simple JBOD or intelligent WARPware system.

A JBOD allows numerous SAS drives to be shared via SAS expanders. As a JBOD, it may connect to customer-provided servers via 24Gbps (x4 6Gbps) miniSAS ports, or act as an expansion enclosure for other WARP Mechanics products.

The WDS-8260 becomes much more interesting when configured as a smart WARPware unit to provide block, file, or object storage services.

WARPware modules support advanced features such as thin provisioning, de-duplication, block-level checksums, copy-on-write, snapshots, replication, and more. Upper-level services are embedded supporting shared block storage (SAS, iSCSI), NAS (NFS, SMB/CIFS, FTP), or advanced protocols like Lustre, Ceph, and Swift.

Features & Benefits
• Up to 3PB per rack
• Up to 60x SSD modules per enclosure
• Enterprise RAS (reliability, availability, & serviceability)
• Hot-plug drives, controllers, and power / cooling FRUs

JBOD:
• >10GB/s in dual JBOD SAS controller configuration

RAID/NAS:
• Dual WARPware controllers
• Up to 24GB/s burst, 12GB/s sustained (dual controller)
• Interface options: 1/10/40 Gbps Ethernet 40/56 Gbps FDR

Example WARPraid and WARPnas Configuration

Flash Performance
• ~120TB raw capacity - pure SSD
• 4x 40Gbps or 56Gbps FDR Infiniband interfaces
WARP Mechanics® WDS-8260
Ultra-Dense Storage Platform
Technical Specifications

Ordering Part Number and Product Description
JPS-080260 • Ultra-Dense JBOD • WDS-8260

Scalability/Capacity
Up to 60 drive modules – 120 TB if using 2TB modules. Cascading of enclosures for additional capacity will commonly be limited by the SAS HBA or RAID card used. Practical configurations of 2PB in a single cabinet are possible. Selected system-level configurations have no known upper limit. (Zettabyte range.)

Throughput Performance
Theoretically, one chassis with two I/O modules supports a burst rate of 24Gbps half-duplex. Practically, bandwidth tends to be limited by the installed drive modules. Sustained bandwidth is 8 to 12Gbps per system, depending on drives, interfaces, and controller types.

Latency Performance
SAS expanders have orders of magnitude lower latency than fast HDD or even SSD modules, and are a second order derivative with respect to IOPS.

Dual I/O Controllers
Redundant active/active I/O modules. JBOD: Auto-negotiate data path speeds; in-band management; four 4x6 Gb SAS 2.0 ports (SFF-8088) per controller.

WARPraid/WARPnas: Per-controller built-in dual-port 10GDE NIC + two PCIe g3 x8 slots, which can accept SAS, FC, IB, or Ethernet cards.

Redundant Hot-Swap Components
- Two I/O controller modules
- Two advanced power and cooling modules (APC)
- Two independent AC power inlets
- Up to 60 drive modules

Rackmount Enclosure
Dimensions Without Cable Management Arms: 3.45”H x 16.56” W x 35.1” D
Dimensions With Cable Management Arms: 3.45” H x 16.56” W x 39.17” D
Weight: 100 lbs max
Weight of 60 SDDS Single Shipping Pack: 150 lbs typical

WARP Mechanics controller firmware supports SCSI Enclosure Services (SES) 3.0 for in-band management. WARPware hosts include tools for managing firmware and advanced features.

Disk Drive Modules
60 independent 6Gbps point-to-point connections to each SAS or SATA drive module with dual-port access and failover by each I/O controller to each drive. SATA drive modules include active MUX for redundant I/O. Form factor: 3.5” HDDs; 2.5” supported for SSDs via adapter. Rotational speeds: 5400 RPM, 7200 RPM, 10K RPM, and 15K RPM.

Active Failure Notifications
In-band via SES-3 with JBOD, audible alarms, and LEDs

Host/Expansion Interfaces
WARPraid/WARPnas: 1/10/40GbE, 40/56GbIB, 8/16GbFC.
JBOD: Two SAS 2.0 I/O controller modules per chassis, each with four 4x6Gbps SAS 2.0 SFF-8088 connections. (24Gbps per interface.) SAS ports can be used for host connections or a combination of host and expansion. When used in certain end-to-end WARP systems, they may be connected to SAS switches.

JBOD Monitoring and Reporting
Monitoring for temperature, advanced power and cooling modules including blower speed control, disk drives and I/O module(s). In-band reporting of all serial number, part number and revision of each FRU and chassis via SES.

JBOD Partitioning / SAS Zoning
JBOD I/O controller modules can be zoned as 1x60, 2x30 or 4x15 via in-band SES tools. (Provided for WARPware hosts.) The two I/O Modules may be configured as redundant or an exclusive Split Bus mode can be set such that 30 HDDs are mutually exclusive to the first module and the other 30 HDDs are mutually exclusive to the second module.

Major OEM Hardware Component Providers
Seagate, WD, Intel, Samsung, and Sanmina-SCI

Warranty Information
Standard one year; up to three years via normal renewable support; up to five years for large accounts. Contact us to discuss special requirements.

AC Power
- Input voltage: Auto ranging, 90-264V AC
- Input frequency: 47-63Hz
- Power factor correction: Per EN61000-3-2
- Input current 14.5A RMS max @ 110 VAC
- Maximum system continuous DC output power rating 1200W
- Efficiency:
  - 20% load @ 230V ~ 88%
  - 50% load @ 230V ~ 92%
  - 20% load @ 115V ~ 87%
  - 50% load @ 115V ~ 90%

Operating Environment
- Temperature: 5°C to 35°C
- Temperature gradient: 20°C per hour
- Relative humidity: 10 to 80 percent (non-condensing)
- Humidity gradient: 10% per hour
- Altitude: -200 to 10,000 ft.
- Shock: 5G at 11ms, 1/2 sine wave pulse
- Vibration: 0.15Grms

Non-Operating Environment
- Transit Non-Operating
  - Temperature: -40°C to 60°C
  - Relative humidity: 10% to 90% (non-condensing)
  - Vibration: 0.75G
  - Shock: 10G at 11ms, 1/2 sine wave pulse

Standards Compliance
IEC/EN/UL/CSA 60950-1, 2nd Edition; RoHS and WEEE compliant; EN55022
-2006 + A1:2007; EN55024-IT product family for immunity; meets requirements of IEC-606; manufactured under ISO 9002 registered quality system