

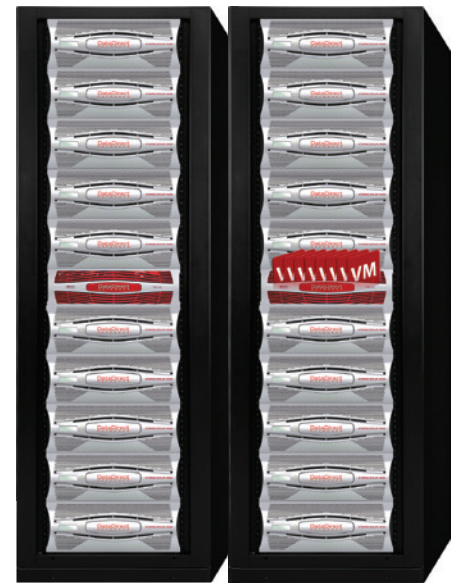
SFA12KX™ Product Family

The Most Advanced Storage Platforms for Big Data
Massively Scalable • Highest Performance & Density • In-Storage Processing

Fusing unprecedented IOPS and bandwidth performance with highly efficient capacity management, this is the storage foundation for the next generation of data intensive applications sets.

Big Data is here and it's unruly. Capacity and performance requirements are exploding and increasingly more difficult to predict. Data patterns have changed, requiring new, massive multi-threaded storage processing capabilities designed for today's multi-core, multi-application sets.

Innovative, award winning and proven in the world's largest and most demanding production environments, DDN's Storage Fusion Architecture (SFA) utilizes the most advanced processor technology, busses and memory with an optimized RAID engine and sophisticated data management algorithms. The SFA12KX product family is designed to derive peak performance out of your compute investments with a massive I/O infrastructure and multi-media disk drives that maximize system performance and lower storage investment costs. The SFA12KX product family is purpose-built to simplify and tame big data growth, enabling you to architect and scale your environment more intelligently, efficiently and cost effectively than ever before.



12KX
High Performance
FC/IB Storage
Appliance

12KXE
Embedded
File Storage
Appliance

BUSINESS ADVANTAGES

- ▶ **Industry Leading Performance & Capacity**
Significantly reduces capital and operational expenses with fewer systems to purchase and manage
- ▶ **SFX™**
Get Flash performance at close to SATA prices with intelligent flash caching.
- ▶ **Industry Leading Density**
Reclaim valuable floorspace, reduce power and cooling costs
Up to 84 drives per 4U enclosure; 5.04PB per rack
- ▶ **Lower Overall TCO by 50%**
Reduced floorspace, power and cooling requirements
- ▶ **Supports the Most Drives**
Up to 1,680 disk drives in a single a storage system for simple, cost-effective scalability & the freedom to mix SAS, SATA and SSD media
- ▶ **In-Storage Processing™**
Enables latency-sensitive applications to live right inside of the storage controller, removing the need to purchase and manage external servers, network adapters and switches
- ▶ **Reduces Energy Consumption**
By 50% eliminating unnecessary storage enclosures, switches, fans and power supplies
- ▶ **Transparently Protect Your Data**
Data-At-Rest Encryption ensures that the potential exposure of sensitive data is eliminated in the event of stolen, misplaced or discarded drives.

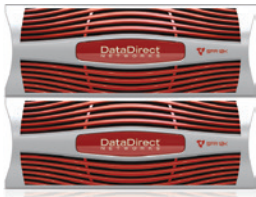
TECHNICAL ADVANTAGES

- ▶ **Balanced Storage Performance**
For both highly transactional and high-bandwidth applications
- ▶ **Hybrid Controller**
Combine flash with rotating media to accelerate application performance and lower TCO up to 70%
- ▶ **ReACT™ Intelligent Cache Management**
Optimizes writes in real-time: sequential data goes directly to disk media while small, random IO utilizes extremely fast cache
- ▶ **Read I/O Quality of Service**
Read IO doesn't suffer due to a single, unresponsive disk
- ▶ **DirectProtect™ Real-Time Error Detection & Correction**
Increases data resiliency and reliability with little performance impact
- ▶ **Unparalleled Back-end SSD Support**
Fully utilizes SSDs for unprecedented levels of sustained random IOPS
- ▶ **Journalled Drive Rebuilds**
Reduces rebuild times by only requiring new/changed blocks to be written to recoverable drives
- ▶ **Data-At-Rest Encryption**
Transparent hardware based encryption without performance degradation



Storage Fusion Architecture

As the leader in Big Data, we provide a number of innovations that increase performance, efficiency and data protection. Designed for multiple classes of data and storage performance requirements, this unique multi-RAID architecture combines up to 1,680 SATA, SAS and SSD drives into a simply managed, multi-petabyte platform. Data resides on the optimal disk technology according to priority and access pattern, while selecting the appropriate RAID level to maximize performance and cost-effectiveness. In the background, the system performs multiple levels of parity generation and real-time data integrity verification and error correction without impacting application performance.



800% Faster

Consolidate, Simplify, Save

Leverage industry leading storage performance to satisfy growing IOPS & Bandwidth requirements with the fewest number of systems. Single

systems provide up to 48GB/s and reaching 1TB/s can be achieved in just 21 systems.



40% Denser

Reclaim Your Datacenter

Resolve space and power limitations with the industry's densest storage platform. Each enclosure houses 84 drives in just 4U to deliver up to 5.04PB per rack.



50% Lower TCO

Smarter Big Data Storage

Choosing SFA12KX's industry leading performance, capacity density and In-Storage Processing as your storage

building block, means deploying the fewest number of systems to manage, power and maintain.



In-Storage Processing™

Eliminate Servers & Switches

DDN's breakthrough innovation enables latency-sensitive applications to live right inside of the storage controller. Enjoy

the fastest application performance available with up to 16 embedded virtual machines while removing the need to purchase and manage external servers, network adapters and switches.



Storage Fusion Fabric™

Enormous Internal Bandwidth

Redundant & non-blocking internal SAS fabric provides the internal bandwidth needed to support data protection & access concurrency. This high-speed

conduit to HDDs and SSDs aggregate performance and allow for easy consolidation. SFA12KX protects performance during drive rebuilds, while competing systems lose as much as 40%.



Ease Administration

Simplify Management

Flexible management options enable you manage with ease: GUI • CLI • SNMP • New API



SFX

Get Flash performance at SATA prices

Hybrid Controller with a suite of storage acceleration tools that combine spinning and solid state disk technology to deliver

higher cache hit, higher performance and better resource utilization.



File Storage Simplified

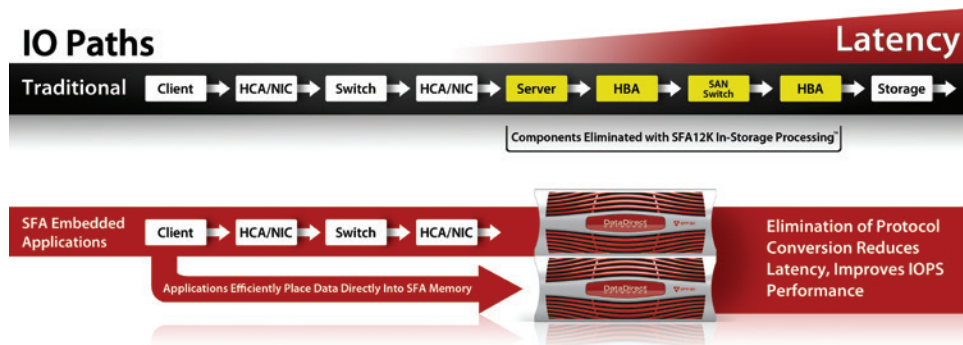
Turn-key Server-less Appliances

Deploying, managing and scaling file storage has never been easier. The SFA12KXE arrives pre-configured with the file system embedded right inside the storage

controller's virtual machines, eliminating the need for external servers, network adapters and switches.

DDN | In-Storage Processing Embedded File Storage Appliance

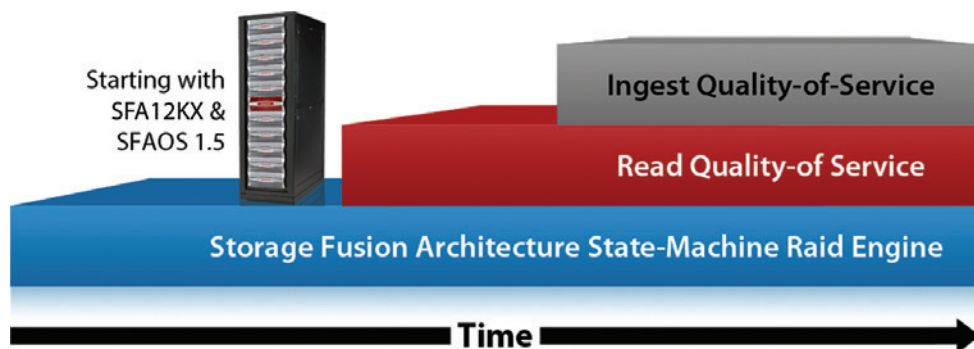
DDN's SFA technology continues to lead the world in high performance, In-Storage Processing with embedded file systems performing at 20GB/s or higher. This allows applications to have unprecedented levels of low latency, high bandwidth access to disk storage. DDN currently offers two solutions utilizing this technology: ES12K™ and GS12K™ Appliances.



DDN | Read Quality of Service Retain Full Performance for SLAs

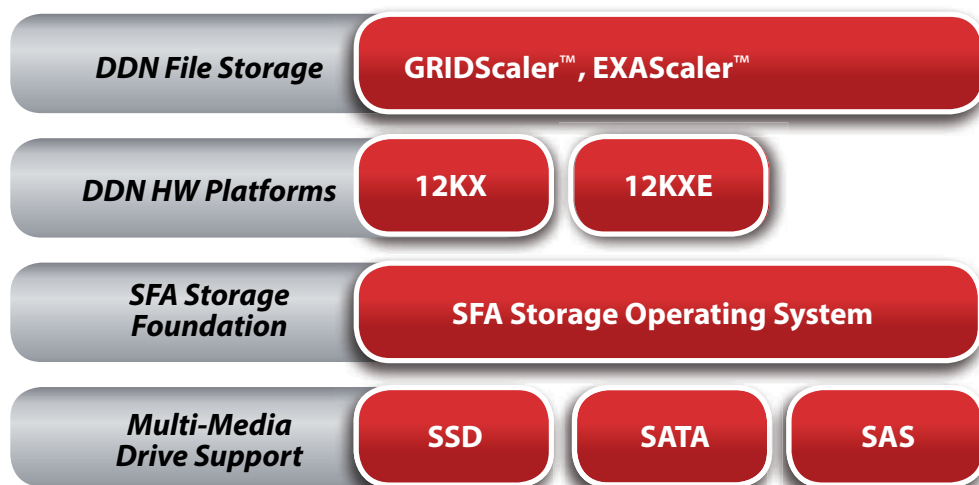
Traditional Storage systems lose performance during drive rebuilds, data integrity checks and error events degrading performance.

With SFA, your system will operate at full-speed to ensure consistently predictable performance, data availability and maintain SLAs.



DDN | Storage Fusion Architecture Enables Applications to Thrive

The design concepts of SFA are delivered across a comprehensive storage portfolio featuring DAS, SAN, NAS and VTL storage access.






Storage Fusion Architecture supports multiple, high-speed RAID levels within a single system. Designed for multiple classes of data and storage performance requirements, SFA multi-RAID architecture combines up to 1,680 **SATA, SAS and SSD** disks into a simply managed architecture where the optimum media serves, stores & archives prioritized data.

With up to 120GB/s of Storage Fusion Fabric bandwidth, the SFA12KX family can perform multiple levels of parity generation, drive correction and data integrity verification without detracting from an application's performance.

DDN | SFA12KX Configurations

Start Small and Scale Flexibly

These standard configurations provide maximum performance and capacity density. Powerfully consolidate multiple traditional systems and utilize the most efficient storage building block as you scale performance and/or capacity to meet ever growing data and application requirements.

World Leading Enterprise Storage Data Center Efficiency		
		
5 Enclosures 28U: 1/2 Rack	10 Enclosures 48U: 1 Rack (48U)	20 Enclosures 88U: 2 Racks
Up to 420 Drives Up to 2.52PB	Up to 840 Drives Up to 5.04PB	Up to 1,680 Drives Up to 10.08PB
60TB / RU	76.25TB / RU	76.36TB / RU

System Features	Active/Active Storage Controllers RAID 6 8+2, 4+2 RAID 5 8+1, 4+1 RAID 1 1+1 Sequential Read and Write Performance up to 48GB/s Random 4K IOPS of 1.7 Million to cache and over 1.4 Million sustained to media Max Drives 1680 Max Capacity 10.08PB Cache Up to 64GB - Battery backed and mirrored Client Support Windows, Linux and Mac OSX
Active/Active Controller Storage Host Ports	16 x 56 Gb/s (FDR) Infiniband Ports 32 x 16 Gb/s (FC16) Fibre Channel Ports
Standard Software Features	SFX, LUN Mapping and Masking, Intelligent Write Striping, Read QoS Port Zoning Detection, Data-At-Rest Encryption, DirectProtect Data Integrity Check/Correction SFA Scriptable API, Web XML API, CLUI and Web GUI, Pager and E-Mail Fault Console with SNMP Notification
Optional DDN Storage Gateways	GRIDScaler Parallel File Storage System, EXAScaler Parallel File Storage System

Drive Enclosure Models	SS8460	SS7000	SS2460
Description	4U, 84 Drive Enclosure	4U, 60 Drive Enclosure	2U, 24 Drive Enclosure
Supported Drive Types	SSD, SAS and SATA	SSD, SAS and SATA	SSD, SAS and SATA
Supported Drive Sizes	3.5"	3.5", 2.5"	2.5"
For additional details on the SS8460, SS7000 or SS2460 drive enclosures, please see their respective data sheets at ddn.com .			

Environmental Attributes – Active/Active Dual Controllers (Couplet)			
Dimensions:			
Height 8RU, 14.0" (35.6 cm) (includes 2 x External Cache BBUs and dual cording support)			
Width 17.25" (43.8 cm)			
Depth: Storage Manager Only - 28.75" (73.0cm)			
Depth: Combined BBU/ATS – 38.9" (98.8cm) Depth 25.5" (64.8 cm)			
Average Power	(SFA12KX): 1200W nominal, 1500W max	Average Power	(SFA12KXE): 1050W nominal, 1300W max
Average Cooling	(SFA12KX): 4092 BTU nominal	Average Cooling	(SFA12KXE): 3580 BTU nominal
Airflow (CFM):	120CFM nominal, 200CFM max	Airflow (CFM):	120CFM nominal, 200CFM max
Voltage range: 200-240V, 50/60Hz			
Operating environment: Ambient inlet 10 to 35C with all fans operating			
Weight: 140lbs (63.5kg) Storage Controllers Only (Couplet), 246lbs (111.6kg) including 2 x BBU/2 x ATS			
Agency certifications UL, CE, cUL, C-Tick, FCC			

Learn more at ddn.com/products/SFA12KX



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