

# White paper Fujitsu JX DAS Subsystems

Data is growing exponentially. Keeping up with the storage requirements is at the forefront of all businesses. When storage needs exceed beyond the internal storage capacity of servers, Direct-attached storage (DAS) system provides an excellent solution as it is easy to set up, simple to use and provides great value. FUJITSU JX DAS Subsystem delivers a perfect DAS solution for PRIMERGY Servers by seamlessly expanding the server storage capacity in an easy and cost-effective way. FUJITSU JX DAS Subsystem provides incredible storage capacity with low footprint and is highly reliable with support for fully redundant components and multiple RAID levels. It is well suited for SME's looking to quickly ramp their server storage and for various use cases like file servers, data backup, virtualization, multimedia storage, HPC etc.



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## Introduction

It is not uncommon to see an SMB grow the volume of data sets by 200% or more in one year. This is not surprising, given the SMB's growing reliance on e-mail, shared files, critical application data, and the need to digitize/store prior "paper" records or documents, not to mention the increasing use of large video and image files, which are all readily available via the internet.

However, the internal disk capacity of servers has its limits. The scalability options to just add new servers with internal hard disks are not efficient and increase the IT complexity. On the other hand, SMBs will continue to have limited IT staff and constrained IT spending budgets. SMBs will continue to wrestle with budget constraints while managing an ever-expanding amount of digital data. However, for a big portion of customers shared storage systems are far too expensive and comes along with new levels of complexity and skill needs.

Filling the gap in between local storage and shared storage is a domain of direct attached storage solutions. The Fujitsu JX DAS subsystem perfectly addresses the capacity requirements for these use cases and the relevant customer segments. With JX DAS Subsystem, the integration is simple and straightforward. There are two options on how to connect and to operate. The first way is to run the JX DAS subsystem behind an internal RAID controller of the server. This allows enormous capacity expansion in combination with fully featured data protection capabilities in various RAID levels. The second way is to connect directly via SAS links. In these configurations, the data protection function is provided by the operating system of the server. In most cases, this is a software-based data protection approach. Using SAS links offers the ability for redundant configurations based on clustering technologies. Prominent examples are Microsoft Cluster Solutions or Parallel File System solutions in the HPC environments.

The JX DAS subsystem consists of two products, the JX40 S2 and the JX60 S2. The opportunity of adjustable disk drive configurations according to the customer needs gives you the possibility to choose the JX40 S2 2.5" for performance or the JX60 S2 or JX40 S2 3.5" for capacity. In this White Paper, we will show an overview of usage.

## Positioning and target groups of JX DAS Subsystems

JX DAS Subsystems with SAS technology is fast, reliable and cost-effective JBOD (Just a bunch of disks) systems, which are positioned in the Direct Attached Storage segment (DAS) for small and medium-sized businesses as well as for data centers.

The JX DAS Subsystems provide an easy and flexible extension to the external storage capacity of PRIMERGY servers. Its use in companies and organizations is not tied to their size but depends on the objective and resultant requirements, such as maximum availability and scope of resources. You have to consider the performance and memory capacity of the server, which you want to connect, and the used disk drives for the JX DAS subsystem.

As a passive storage subsystem, the JX DAS Subsystems can be connected to PRIMERGY servers with the approved LSI MegaRAID® PCI Express SAS controller. RAID Management solutions such as ServerView RAID Manager, which provides uniform administration for RAID solution, or MegaRAID® WebBIOS, which supports the layout of RAID configurations for different requirements and application areas.

This can be done with either the JX60 S2 or JX40 S2. Each system provides its benefits.

The JX60 S2 is a high-density, easy-to-use storage subsystem. It offers maximum high capacity with low-cost 3.5-inch Nearline SAS hard disk drives and it needs a minimum of space to handle the constant increase in data volumes. It provides up to 1,440 Terabytes with a maximum of 2 enclosures which can be directly attached to a server.

The JX40 S2 is a reliable and highly performant easy-to-use storage subsystem. As Direct Attached Storage (DAS), it extends the storage capacity of Fujitsu PRIMERGY servers through a fastest 12 Gbit/s SAS connection by up to 737 Terabyte with the maximum of 4 enclosures.

## Use Cases

There are several typical use cases for JX DAS Subsystems.

### File Server

A very common scenario is the use of direct attached storage for file serving purposes. Connecting one or more JX40 S2 or JX60 S2 Subsystems to the server delivers huge space for millions of files, documents, images, videos, spreadsheets, home drives and other documents – serving high numbers of users in parallel.

### Virtualization

Another important deployment is the area of server virtualization. Very common especially for SMBs is DataCore. The DataCore's storage virtualization enables elastic capacity provisioning for virtual machines and adds exciting management features like thin provisioning or mirroring to the configuration.

### Video Surveillance

An emerging trend is the observation and protection of facilities in private and public area. The heavy use of video surveillance solutions

generates a tremendous amount of data. For that purpose, the JX60 S2 with capacity up to 720 TB is a perfect fit.

#### Backup to disk

One more option for the JX60 S2 to be positioned is back up. Using one backup server with extended capacity in a backup-to-disk concept represent a cost-effective solution for small businesses.

#### Microsoft Exchange Server

Mail and communication belong to the most critical IT services of any organization. Major challenges to cope with are:

- Reliable operation and handling of the mail traffic growth without breaking the budget limit.
- The combination of PRIMERGY servers, JX60 S2 and JX40 S2 storage and the Storage Spaces feature in Windows Server 2012 R2 and Windows Server 2016 provides the right platform for Microsoft Exchange. Storage Spaces is a software virtualization and abstraction layer, which is used to improve manageability and data protection.

#### High-Performance Computing

Small and medium businesses are following the lead of enterprise organizations deploying HPC solutions. The reason for that is that more and more scientific and technical problems are being studied based on computer simulations. We as Fujitsu see high potential for two nodes HPC cluster configurations in the field. With the upcoming offering on the bases of PRIMERGY, JX60 S2 and the Fujitsu highly scalable parallel file system (FEFS) we deliver in combination with HPC applications the ability to analyze, research and model a large amount of data for relevant business tasks.

Of course, these are only a few examples of how to position the JX systems, but there are many more. One more option for the JX60 S2 to be positioned is backup. Using one backup server with extended capacity in a backup-to-disk concept represent a cost-effective solution for small businesses.

#### Product description

The JX are JBOD storage Subsystems with Point-to-Point SAS x4 host interconnects (wide port).

- Integration in PRIMERGYs ServerView Suite, especially ServerView RAID Manager
- Hot-plug redundant power supply with integrated redundant fans

The JX60 S2 offers:

- Up to 60 hot-plug 3.5" Nearline-SAS disk drives in one 4U rack enclosure

Up to two JBOD's can be cascaded in a daisy chain.

The JX40 S2 offers:

- Up to 24 hot-plug 2.5" SAS disk drives or up to 12 hot-plug 3.5" Nearline-SAS disk drives in one 2U rack enclosure
- Up to four JBOD's can be cascaded in a daisy chain.
- Mix and match of different disk drive types - SAS and SSDs

#### Basic functions

The external and passive JX DAS Subsystems have been designed to extend the capacity of PRIMERGY servers. It complies with the specifications of the PRIMERGY server family in terms of design, choice of drive technology and integration in the PRIMERGY server management concept. Outstanding features of the subsystem are the future-oriented SAS technology (Serial Attached SCSI) as well as the storage capacity of 720 Terabyte with up to 60 x 3.5" disk drives in a compact designed JX60 S2 4U- 19-inch rack enclosure. The JX40 S2 2.5" provides higher performance with 12Gb/s SAS3.0 disk drives with up to 24 disk drives and a maximum capacity of 192 Terabyte (Nearline SAS HDD with cascading) and 737.28 TB (SSD with cascading) in 2U- 19-inch rack enclosure. The JX40 S2 3.5" provides higher capacity with up to 12x Nearline disks with a maximum capacity of 576 Terabytes (cascading) in 2U- 19-inch rack. The combination of both JX40 S2 in a chain is possible.

The housing possesses redundant hot plug power supplies (JX60 S2: two plus two/JX40S2: one plus one) and one or two I/O-Modules with 2 SAS x4 ports (one host and one cascading interface) and an integrated SAS expander. The fans of the power supplies are redundant, too. The redundant power supply can be swapped during operation without shutting down the system. For administration, it provides ServerView integration, e.g. for serial and revision numbers of power supplies and I/O modules, housing ID, temperature monitoring and the most important modules like disk drives, fans and many more.

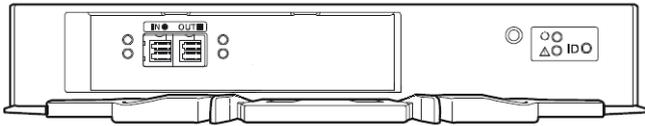
To ensure continuous operation of the JX DAS Subsystems, backup with a UPS is recommended.

#### General configuration information

PRIMERGY server and JX DAS Subsystems have to be installed directly on top or among each other in the rack.

- For each of the redundant power supplies, there is an external power line needed. The power supplies can be connected phase redundant in two plus two modes (JX60 S2) or one plus one mode (JX40 S2). Power cables and the rack mounting kit are included for Fujitsu rack installation. The disk bays of the JX can be flexibly equipped.
- The SAS-ID of the disk drives is placed automatically.
- The JX DAS Subsystems can be operated attached to the released Fujitsu PRAID EP420e and Fujitsu PSAS CP400e SAS Controller. The currently released controllers and operating systems for the relevant PRIMERGY servers are described in the support matrix (<http://ts.fujitsu.com/matrixep>).

- The external connection between the first SAS x4 port on the I/O-module (SAS in) of the JBOD and the PRIMERGY RAID controller of the PRIMERGY server is established over a SAS x4 wide port connection with a up to 3.5 m ( JX60 S2; 12 Gb/s) SAS cable, which is approved by Fujitsu.

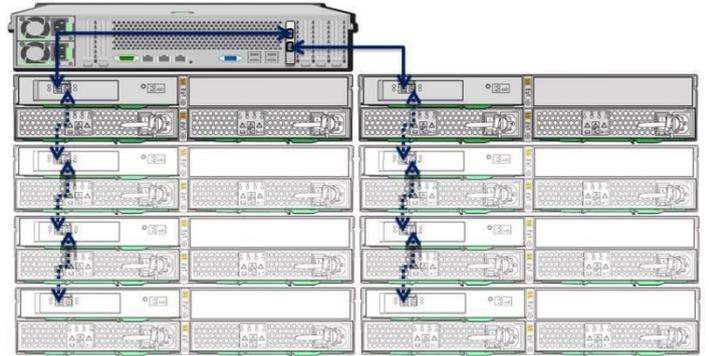
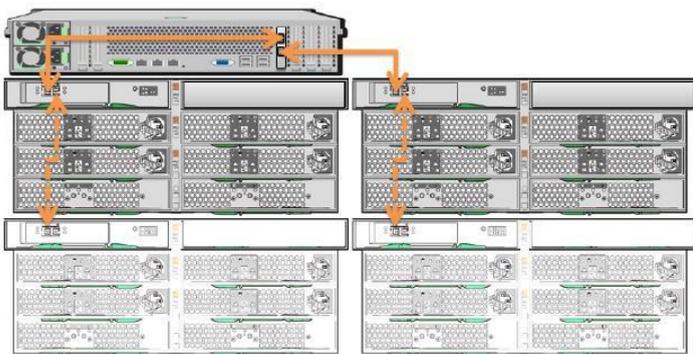


- The external SAS x4 wide port connection (initiator) of an I/O-module comes with a bandwidth of up to 4.8 GB/s to the RAID controller. Assuming that each disk drive has a throughput of 40 MB/s (random read/write) this leads to a maximum of 60 disk drives, which can be connected with high performance over the external x4 wide port of the controller in the server.

Using the PRIMERGY RAID controller MegaRAID® SAS9286CV-8e with 1 GB cache or Fujitsu PRAID EP420e with 2 GB cache is possible in connection with ServerView RAID Manager or MegaRAID® WebBIOS to configure RAID levels 0, 1, 5, 6, 1E, 1/0, 5/0, 6/0.

- The JX60 S2 and JX40 S2 are certified as Microsoft Windows Server 2012 R2 and 2016 Storage Spaces Enclosure and clusterable with Fujitsu's PRIMERGY server.
- The hot-plug function of the disk drives can only be used with an appropriate RAID configuration, to ensure that no data is lost during the exchange procedure.
- The integration of an JX JBOD Subsystems into ServerView Suite especially ServerView RAID Manager does not require any additional components. Server management information is provided through the SES protocol.

Max. storage configuration with Fujitsu PRAID EP420e and Fujitsu PSAS CP400e SAS Controller<sup>1</sup>.



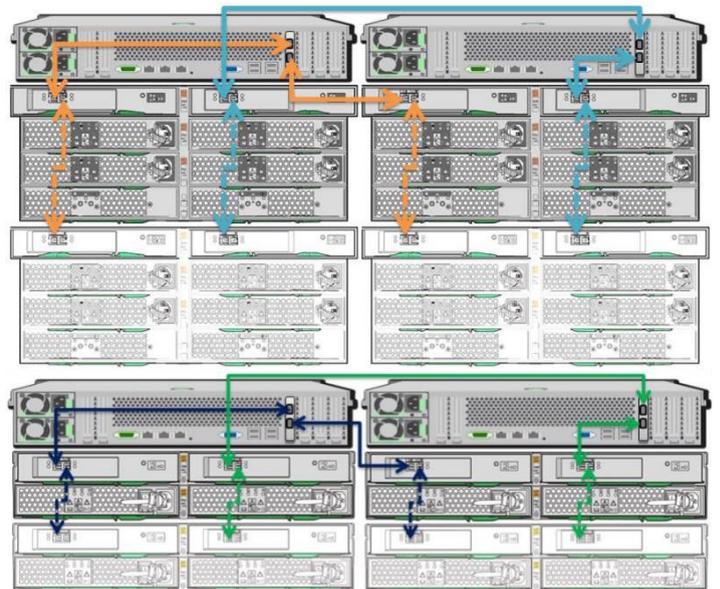
#### Capacity extension

A dual I/O-module configuration is currently released with LSI SAS9200-8e and one JX60 S2 per external x4 wide port in a Microsoft Windows Server 2012R2 and 2016 Storage Spaces environment only (2<sup>nd</sup> JBOD for cascading part of further releases).

The second SAS x4 port on the JX60 S2 I/O-Module (SAS out) connects another JX60 and can be extended with a maximum of one more JX60 (cascading or daisy chain). In case of JX40 S2 the cascading can be extended with a maximum of three more JX40 S2.

For cascading (daisy chain) the second SAS x4 port (SAS out) of the I/O-Module is used via a Fujitsu approved SAS cable with the length of 2.5/3.5m (with JX60 S2 also 3.5 m). It is connected with the first SAS x4 port (SAS in) of the cascaded JBOD.

#### Cluster Configurations with Fujitsu PSAS CP400e SAS Controller in Windows Server 2012 R2



## Technical data

	JX60 S2	JX40 S2	
			
<b>General system specification</b>			
		2.5-inch Enclosure	3.5-inch Enclosure
Max. no. of drives	3.5"; max 120 disks by cascading 2 enclosure (max 60 disks in single 4U enclosure)	max 96 disks by cascading 4 enclosures (max 24 disks in single 2U enclosure)	max 48 disks by cascading 4 enclosures (max 12 disks in single 2U enclosure)
Max. no. of drive enclosures	2	4	
Redundancies	Power Supply Fan		
Supported RAID levels	0, 1, 1+0, 5, 5+0, 6, 6+0		
Host interfaces	1 MiniSAS-HD (SFF-8644) port on a standard SAS 3.0 I/O-module (expander)		
Supported PRIMERGY server controller	Fujitsu PRAID EP420e; Fujitsu PSAS CP400e SAS Controller; LSI MegaRAID SAS9286CV-8e, PCIe3.0 x8, 1GB Cache with ECC; LSI SAS9200-8e 6Gb/s 8ext PCIe FH/LP SAS Controller		
Max. storage capacity - physical	1,440 TB (with cascading)	192TB (Nearline SAS with cascading), 737.28 TB (SSD with cascading)	576 TB (with cascading)
Drive Type	HDD, SAS 12G, 15krpm, 512n (300GB/600GB/900GB) HDD, SAS 12G, 10krpm, 512n (600GB/900GB/1.2TB) HDD, SAS 12G, 10krpm, 512e (600GB/1.2TB/1.8TB) HDD, Nearline SAS 12G, 7.2krpm, 512n (2TB/4TB) HDD, Nearline SAS 12G, 7.2krpm, 512e (2TB/4TB/6TB/8TB/10TB/12TB) SSD, MLC, 10DWPD (400GB/800GB/1.6TB) SSD, MLC, 3DWPD (400GB/800GB/1.6TB) SSD, MLC, 1DWPD (480GB/960GB/3.84TB/7.68TB)	2.5" enclosure; HDD, SAS 12G, 15krpm, 512n (300GB/600GB/900GB) HDD, SAS 12G, 10krpm, 512n (600GB/900GB/1.2TB) HDD, SAS 12G, 10krpm, 512e (600GB/1.2TB/1.8TB) HDD, Nearline SAS, 7.2krpm, 512e (1TB/2TB) SSD, MLC, 10DWPD (400GB/800GB/1.6TB) SSD, MLC, 3DWPD (400GB/800GB/1.6TB/3.2TB) SSD, MLC, 1DWPD (480GB/960GB/3.84TB/7.68TB) 3.5" enclosure; HDD, Nearline SAS 12G, 7.2krpm, 512n (2TB/4TB) HDD, Nearline SAS 12G, 7.2krpm, 512e (2TB/4TB/6TB/8TB/10TB/12TB)	
Drive interface	Serial Attached SCSI 12Gbit/ss)	Serial Attached SCSI (12 Gbit/s)	
<b>Dynamic configuration</b>			
Hot part replacement/ expansion	Yes (HDD, PSU)		
<b>Management</b>			
Administration	Web-based graphical user interface		
Supported configurations	All major host operating systems, servers and business applications Detailed support matrix: <a href="http://ts.fujitsu.com/products/storage/matrixEP.html">http://ts.fujitsu.com/products/storage/matrixEP.html</a>		
Hardware certification	Windows 2012R2 x64 Storage Spaces Enclosure Windows 2016 x64 Storage Spaces Enclosure		
<b>Installation specification</b>			
19" rackmount	Yes		
Dimension - per rack (W x D x H)	482 x 980 x 176 mm 19 x 38.6 x 6.9 inch	482 x 540 x 88 mm 19 x 21.3 x 3.5 inch	482 x 560 x 88 mm 19 x 22.1 x 3.5 inch
Height unit standard	4 U		

Weight	max. 100kg with hard disk drives	max. 35 kg (77 lb) with hard disk drives	
Service Area	Front: 850 mm (31.5 inch) or more Rear: 850 mm (31.5 inch) or more		
Power voltage	AC 100 - 120 V / AC 200 - 240 V		
Power frequency	50 / 60 Hz		
Power supply efficiency	92 % (80 PLUS gold)		
Maximum Power Consumption	AC 100 - 120 V: 1300 W (1320 VA)	AC 100 - 120 V: 430 W	AC 100 - 120 V: 340 W (350 VA)
Maximum Power Consumption	AC 200 - 240 V: 1300 W (1320 VA)	AC 200 - 240 V: 430 W	AC 200 - 240 V: 340 W (350 VA)
Power phase	Single (phase redundancy possible)		
<b>Environmental</b>			
Maximum Heat Generation	AC 100 - 120 V: 4750: kJ/h AC 200 - 240 V: 4750: kJ/h	AC 100 - 120 V: 1600: kJ/h AC 200 - 240 V: 1600: kJ/h	AC 100 - 120 V: 1300: kJ/h AC 200 - 240 V: 1300: kJ/h
Temperature (operating)	10 - 40 °C (50 - 104 °F)		
Temperature (not operating)	0 - 50 °C		
Humidity (operating)	20 - 80 % (relative humidity, non-condensing)		
Humidity (not operating)	8 - 80 % (relative humidity, non-condensing)		
Altitude	3,000 m (10,000 ft.)		
Sound power (LWAd; 1B = 10dB)	6.0 B		
Sound pressure (LpAm)	43.5 dB(A)		
Noise notes	measured according to ISO7779 and declared according to ISO9296		
Operating environment	FTS 04230 - Guideline for Data Center (installation specification)		
Compliance			
Product safety	UL 60950-1, CSA-C22.2 No. 60950-1, EN 60950-1, IEC 60950-1		
Electromagnetic Compatibility	CNS 13438, FCC Part-15 Class A, ICES 003 Class A, EN 55022 Class A, VCCI Class A, AS/NZS CISPR 22 Class A		
Electromagnetic Immunity	EN 55024		
CE certification	2004/108/EC, 2006/95/EC, 2011/65/EC		
Approvals	CB, CE, C-Tick, EAC, FCC, VCCI		
Environmental compliance	RoHS compliant, WEEE compliant		
Compliance notes	There is general compliance with the safety requirements of all European countries and North America.		
Compliance link	<a href="http://globalsp.ts.fujitsu.com/sites/certificates">http://globalsp.ts.fujitsu.com/sites/certificates</a>		
<b>Warranty</b>			
Standard Warranty	3 years		
Service level	Onsite Service		
Warranty Terms & Conditions	<a href="http://www.fujitsu.com/support">www.fujitsu.com/support</a>		

### **PRIMEFLEX Cluster-in-a-box featured by JX DAS subsystem**

Fujitsu Cluster-in-a-box is perfectly suited for organizations with experience in administration of Microsoft Windows Server. Just turn it on, spend a few minutes with our configuration wizard and you are ready to work. Designed for mid-market organizations and branch offices, Fujitsu Cluster-in-a-box offers continuous availability at low costs to protect important data and business-critical services.

The JX60 S2 is part of the Cluster-in-a-box configuration with PRIMERGY CX servers.

Cluster-in-a-box offers a well-balanced combination of server, storage, and networking components in one compact package. With Fujitsu Cluster-in-a-box, customers receive a "small and entire configuration" including Microsoft Windows Server 2012 R2 and 2016 pre-installed and pre-configured as a high availability cluster.

### **Conclusion**

To simply expand server-internal storage capacity, JX DAS Subsystems are the perfect solution thanks to its high-density concept or to its high performance. It supports all typical use cases – also in clustered configurations – and goes along with easy handling and low investment costs.