StorPool System Requirements

2017-06-15

1. Hardware components

This is a list of hardware StorPool is expected to work well on. In most cases any controller model which uses the same driver (in parenthesis) will work well. Components marked in blue are the ones we recommend based on experience. StorPool aims for wide hardware support. If your specific model of controller or drive is not on this list, please ask.

CPU:
 - Nehalem generation (Xeon 5500) or newer Intel Xeon processor
 - AMD family 10h (Opteron 6100) or newer AMD Opteron processor
 - Note: older supported CPUs and server platforms often have severe architectural I/O bottlenecks. We recommend Sandy Bridge (E3-12xx / E5-26xx) or newer CPUs.
Note: Usually one or more CPU cores are dedicated for the storage system. This significantly improves overall performance and performance consistency and avoids negative effects of CPU saturation with hardware interrupts during high load. Please refer to the StorPool User Guide for more information on the recommended CPU setup.

RAM: 32GB (or more) ECC memory per server for normal operation of the server of which 8-20GB is typically used by StorPool. Exact memory requirement depends on the size of the drives and the amount of RAM used for caching in StorPool. Contact StorPool Support for a detailed memory requirement assessment. Non-ECC memory is not supported.

HBAs and RAID controllers:
 - Intel C200, C600, ICH10(82801JI) (ahci)
 - LSI 2008,2108,2208,2308 and 2116-based HBAs and integrated controllers (mpt2sas)
 - LSI 3008,3108,3216,3224-based HBAs and integrated controllers (mpt3sas)
 - LSI MegaRAID controllers (megaraid_sas)
 - Dell PERC H700, H710, H710P, H730, H730 Mini, H730P Mini (megaraid_sas)
 - HPE H240, P840ar (hpsa)
 - Intel C600 SCU (isci)

Datacenter SSDs:
 - Samsung SV843, SM863, PM863, PM863a
 - Samsung NVMe SSD PM963
 - Intel SATA SSD DC S3500, S3510, S3520, S3610, S3700, S3710
 - Intel NVMe SSD P3520, P3600, P3608, P3700
 - Micron M500DC, M510DC, 5100
 - HPE 1.92TB SATA 6G RI SFF SC DS SSD (868826-B21)
 - Toshiba SATA SSD HK4 Series
 - SanDisk (ex. Smart Storage Systems) CloudSpeed 1000E, Eco, Ascend

HDDs:
 - Any enterprise-grade SAS or SATA hard drive

- On expander backplanes we recommend SAS HDDs
- On direct backplanes we recommend SATA or SAS HDDs
- We've had good experience with HGST Ultrastar, WD Re and Seagate drives.

10 Gigabit Ethernet controllers:
 - Mellanox ConnectX-3 EN, ConntectX-3 Pro EN (mlx4_en)
 - Mellanox ConnectX-4 Lx EN, ConnectX-4 EN (mlx5_en)
 - Intel 82599, X520, X540, X550 (ixgbe)
 - Intel X710 and XL710 (i40e)
 - Qlogic QLE3440-CU, QLE3442-CU (bnx2x)
 - Broadcom BCM57840S (bnx2x)

25 Gigabit Ethernet controllers:
 - Mellanox ConnectX-4 Lx EN (mlx5_en)

40/56 Gigabit Ethernet controllers:
 - Mellanox ConnectX-3 EN, ConnectX-3 Pro EN (mlx4_en)
 - Mellanox ConnectX-4 Lx EN, ConnectX-4 EN (mlx5_en)

Infiniband controllers:
 - Mellanox MCX353A-QCBT, MCX354A-QCBT (mlx4_ib)
 - Intel (ex. Qlogic) QLE7340, QLE7342 (qib)

Ethernet Switches:
- StorPool works with any standards-compliant 10/25/40/50/56/100 GbE switch with jumbo frames and flow control
- Mellanox SX1012, SX1016, SN2100B, SN2100, SN2410, SN2700
- Dell S4810, S6000

2. Network/fabric architectures
-   Flat Ethernet networks
-   Routed leaf-spine datacenter ethernet networks
-   Ethernet with RDMA - RoCE
-   Infiniband RDMA

Gigabit Ethernet networks are not supported by StorPool at the moment.

3. Firmware versions
All network controllers, storage controllers, and SSDs must run the latest known-stable version of firmware available from the vendor. This is to prevent occurrence of known firmware bugs.

Known good versions for some devices:

Avago/LSI 2008,2108,2208,2308 and 2116-based controllers	19.00.00.00

Avago/LSI 3008	12.00.02.00
Avago/LSI 3108	4.650.00-6223
Avago/LSI 3ware 9690SA-4I	FH9X 4.10.00.027
HP HBA H240	Firmware Version: 4.52
HP Smart Array P840ar	Firmware Version: 4.52
Micron M500DC	0144
Micron M510DC	0013
Intel S3500	D2012370

4. Example storage node configurations

4.1 Example hardware configuration for dedicated storage - All-SSD pool
The following example server configuration covers the requirements:

Barebone	SYS-1018R-WC0R - 1RU 10x2.5" bays	1
CPU	Intel Xeon E5-1620 v4	1
RAM	8GB DDR4-2400 ECC RDIMM	4
HBA	AOC-S3008L-L8e - Avago/LSI 3008 controller	1
Cable	CBL-SAST-0593	2
NIC	Mellanox MCX312B-XCCT - 2x 10GE SFP+	1
NIC alternative	Intel X520-DA2 / Supermicro AOC-STGN-I2S - 2x 10GE SFP+	0
Boot drive	64GB SATADOM - SSD-DM064-PHI	1

Typically used with 10x 1.92 TB SSDs or 10x 1.6 TB SSDs in each node

4.2. Example hardware configuration for dedicated storage - SSD-Hybrid pool
The following example server configuration covers the requirements:

Chassis	Supermicro CSE-826TQ-R500LPB - 2RU, 12x 3.5" bays	1
Motherboard	Supermicro X11SSL-F	1
CPU	Intel Xeon E3-1230 v5/v6	1
RAM	16GB DDR4 ECC UDIMM	2
RAID controller	AOC-S3108L-H8IR-16DD - Avago/LSI 3108 controller	1
Cache protection	BTR-TFM8G-LSICVM02 - CacheVault kit	1
NIC	Mellanox MCX312B-XCCT - 2x 10GE SFP+	1
NIC alternative	Intel X520-DA2 / Supermicro AOC-STGN-I2S - 2x 10GE SFP+	0
Boot drive	Supermicro SSD-DM064-PHI	1

| | Build notes: install NIC and RAID controller in SLOT6 and SLOT7. Connect 8 3.5" slots ot LSI 3108 controller. Connect 4 remaining slots to Intel AHCI controller. | |

Typically used with 4x 1.92 TB SSDs and 8x 2TB HDDs in each node.

4.3. Example of a hyper-converged hardware configuration - SSD-Hybrid pool

The following example server configuration covers the requirements:

Chassis	Supermicro SC826BAC4-R920LPB - 2RU, 12x 3.5" bays	1
	Rear hot-swap bay for 2 drives MCP-220-82609-0N	
Motherboard	Supermicro X10DRH-C - dual-socket motherboard with integrated 3108 controller	1
CPU	Intel Xeon Processor E5-2690 v4 - 14 cores, 35MB cache, 3.2 GHz	2
RAM	32GB DDR4 ECC RDIMM	16
Cache protection	BTR-TFM8G-LSICVM02 - CacheVault kit for 3108 controller	1
NIC	Mellanox MCX312B-XCCT – 2x 10GE SFP+	2
NIC alternative	Intel X520-DA2 / Supermicro AOC-STGN-I2S - 2x 10GE SFP+	0
Boot drive	64GB+ Datacenter SATA SSD, e.g. Intel S3520, Samsung PM863	1

4.4. Other configurations

Several other configurations have been omitted from this guide for brevity.
- Hyper-converged All-SSD
- HDD-only for primary and DR
- HDD-only for backup and archive

Please contact StorPool support to obtain a full solution design for your use-case.

5. Example drives pool configurations

5.1. StorPool All-SSD storage pools
 - 2 copies on SSDs
 - Distribute drives evenly across 3+ servers
 - 100 000+ IOPS and 2000+ MB/s!
 - Quoted usable space is before gains from snapshots/clones, thin provisioning and zeroes detection.
 - 6x 1.92TB SSDs - 5.2 TB usable
 - 30x 1.92 TB SSDs - 26.2 TB usable (3x 10-bay nodes)
 - other combinations and sizes are possible

5.2. StorPool SSD-Hybrid storage pools
 - 1 copy on SSDs and 2 spare copies on HDDs

- Total space on HDDs is two times the space on SSDs
- Distribute drives evenly across 3+ servers
- 100 000+ IOPS and 2000+ MB/s! The performance of an all-flash array at a fraction of the cost.
- Quoted usable space is before gains from snapshots/clones, thin provisioning and zeroes detection.
- 3x 1.92TB SSDs, 12x 2TB HDDs - 5.2 TB usable (common starting configuration)
- 6x 1.92TB SSDs, 12x 2TB HDDs - 10.5 TB usable (common starting configuration)
- 12x 1.92TB SSDs, 24x 2TB HDDs - 20.9 TB usable (3x 12-bay nodes)
- other combinations and sizes are possible

5.3. StorPool triple-replicated HDD storage pool
- 3 copies of data on HDDs in different servers
- Distribute drives evenly across 3+ servers
- Exceptional performance for a HDD-only system
- Quoted usable space is before gains from snapshots/clones, thin provisioning and zeroes detection.
- 36x 4TB HDDs - 43.6 TB usable
- 108x 4TB HDDs - 130.9 TB usable
- other combinations and sizes are possible

6. Operating systems
- CentOS 6, 7
- Debian 8
- Ubuntu 14.04 LTS, 16.04 LTS
- VMware ESXi 6.5 (host only, through iSCSI)
- If you are using another Linux distribution, e.g. RHEL, OEL, SuSE, just let us know. We can support StorPool on all Linux distributions with good build and packaging systems.
- Only the x86_64 (amd64) architecture is supported

7. Virtualization technologies
- KVM,
- Xen, XenServer
- LXC
- VMware vSphere

8. Cloud management systems
- for KVM: OpenStack, OpenNebula, OnApp, CloudStack
- for Xen: OnApp, XenServer/XenCenter
- VMware vCenter
- Custom cloud management systems through StorPool API

9. Burn-in test
Hardware must pass a burn-in stress test before installing StorPool.

10. Stable server booting
When a server is restarted for whatever reason (e.g. power outage, administrator typed

"reboot" at the console) it must get back up without human intervention.

11. Remote console and reboot capability

The server must have an IPMI module, including remote reboot and remote KVM capability.

12. Working kernel crash dump mechanism and debug symbols

If the Linux kernel crashes for whatever reason, we want to be able to investigate. We investigate by doing a post-mortem analysis of a kernel crash dump file from /var/crash/. StorPool requires working kernel crash dump on all servers participating in the StorPool cluster, as well as available kernel debug symbols for the running kernel.

Contacts:

For more information reach out to us.

support@storpool.com

+1 415 670 9320