



The Original Innovator  
of the iSCSI Protocol



# StoneFly Storage

## Product Catalog



NAS, SAN, S3,  
& Unified Storage  
Solutions



Hypervisor-agnostic  
Hyperconverged  
Infrastructure (HCI)



Powered by  
8th gen patented  
storage OS

### Affordable, Scale Out, & High Performance Solutions

Explore StoneFly's diverse range of budget-friendly hardware & cloud-based storage solutions for SMBs, SMEs, & large enterprises.



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# About StoneFly, Inc.

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## **The Beginning**

StoneFly's journey started with the creation of the iSCSI storage protocol and the registration of the domain name "iscsi.com" in March 1996. Headquartered in Silicon Valley (Hayward, California), StoneFly was among the first to manufacture and ship iSCSI storage appliances in 2002. Ever since, StoneFly has contributed in making the iSCSI protocol into the globally standard storage protocol used by industry professionals across the globe.

## **Our Vision**

StoneFly was founded with the singular vision of delivering simple and affordable enterprise grade data management solutions to SMBs, SMEs, and large organizations worldwide.

## **Wide Range of Enterprise Products – Physical Servers & Cloud-Based Solutions**

This vision has guided innovation at every step of the way and enabled StoneFly to introduce several enterprise-grade storage solutions such as NAS, SAN, Unified (NAS, SAN and Object), and Hyperconverged Infrastructure (HCI). StoneFly also stepped into the backup and disaster recovery market with purpose-built unified server and storage hyperconverged backup solutions capable of delivering reduced RTPOs for enterprise workloads.

With more than two decades in the industry, StoneFly has now built a wide range of enterprise products and solutions that extend beyond physical solutions and also include serverless and cloud-based offerings. Our strategic technology partnerships with Veeam, Microsoft Azure, Amazon AWS, and other industry leaders has enabled us to offer cloud storage, cloud backup, cloud storage gateways, and data migration solutions to our customers worldwide.

## **Our Patents**

All StoneFly physical and virtual data management solutions are protected by StoneFly storage virtualization patents as certified by the United States Patent and Trademark Office (Patent#: 7302500, 7555586, 7558885, 8069292).

## **Our Memberships**

StoneFly is a member of the Storage Networking Industry Association (SNIA) and the founding member of the IP Storage Institute (IPSI).

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## Our Partnerships

StoneFly has longstanding partnerships with industry giants such as Veeam, Microsoft, Amazon, VMware, and several others.

A brief list of StoneFly partnerships is as follows:

### Veeam

- Veeam Technology Alliance Partner
- Veeam Cloud Service Provider (CSP)



### Microsoft

- Certified Microsoft Azure Marketplace Partner
- Microsoft Cloud Solution Provider (CSP) Partner
- Microsoft Government Cloud Service Provider Partner



### VMware

- VMware TAP Advanced Partner
- VMware Professional Solution Provider



### Amazon

- Amazon AWS Technology Partner



## Chapter 1:

# StoneFly Storage Products & Solutions Overview

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StoneFly shipped its first IP SAN appliance in 2002. Throughout the years we have been continuously adding new features and connectivity options to our products. Since then, StoneFly has introduced several enterprise-grade and value-tier feature-rich storage solutions, building a wide range of products. In 2014, StoneFly began offering enterprise-grade backup and Disaster Recovery (DR) solutions to complement our already robust variety of storage products. Our lineup of products now include hardware storage solutions and cloud-based (or serverless) data storage solutions. For more information about our backup solutions, please refer to the **StoneFly Backup & DR Product Catalog**.

All StoneFly storage products are powered by our patented storage Operating System (OS): StoneFusion™ (or SCVM™ for hyperconverged environments).

Following is a list of StoneFly's enterprise and value-tier data storage solutions:

### 1.1. Storage Operating System (OS)

---

Our storage OS integrates several enterprise-grade features with StoneFly storage appliances such as snapshots, replication, volume encryption and more. The patented software also simplifies data storage management with a single centralized management interface capable of managing storage resources across hundreds of storage appliance nodes.

- [Storage Concentrator Virtual Machine \(SCVM™\)](#) – Storage Virtualization Software
- [StoneFusion for Bare-Metal](#) – Storage OS
- [StoneFusion MSP Edition](#) – Enterprise Storage Provisioning Solution
- [StoneFusion OEM](#) – White Labeling / Rebranding

### 1.2. On-Premises Data Storage Solutions

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#### 1.2.1 Network-Attached Storage (NAS) Appliances

Highly-scalable NAS solutions with storage capacities ranging from a few terabytes to multiple petabytes. StoneFly NAS appliances are built to deliver a feature-rich, reliable, secure, and cost-effective file storage and sharing experience.

#### StoneFly NAS Appliances:

- Super Scale Out (SSO™) NAS Appliances
-

**Supported Hardware Configurations for SSO Appliances:**

- [Integrated Appliances](#)
- [Dual-Node Shared Nothing Appliances](#)
- [Scale Out Appliances](#)

**Appliance Series:**

- SSO NAS Appliances: [I-Series](#), [D-Series](#), [XS-Series](#) & [XD-Series](#)

To learn more about StoneFly NAS appliances, refer to [Chapter 4 Section 4.1](#).

**1.2.2 Storage Area Network (SAN) Storage Appliances**

High-performance SAN solutions with standard iSCSI configuration and (optional Fibre Channel SAN target) support serving small, medium and large enterprises as primary or secondary storage, main data center, remote and branch offices.

**StoneFly SAN Appliances:**

- Integrated Storage Concentrator (ISC™) SAN Appliances
- Voyager Cluster SAN Appliances

**Supported Hardware Configurations for ISC Appliances:**

- [Integrated Appliances](#)

**Supported Hardware Configurations for Voyager Appliances:**

- [Disaggregated High-Availability \(HA\) Appliances](#)

**Appliance Series:**

- ISC SAN Appliances: [I-Series](#), [D-Series](#), [XS-Series](#) & [XD-Series](#)
- Voyager SAN Cluster Appliances: [I-Series](#), [D-Series](#), [XS-Series](#) & [XD-Series](#)

To learn more about StoneFly SAN appliances, refer to [Chapter 4 Section 4.2](#).

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### 1.2.3 Unified Storage Appliances

Hyperscale unified storage solutions with support for NAS, SAN and object storage. StoneFly converged storage appliances are capable of scaling out to thousands of nodes with support for petabytes of enterprise data.

#### StoneFly Unified Appliances:

- Unified Scale Out (USO™) Appliances

#### Supported Hardware Configurations for USO Appliances:

- [Integrated Appliances](#)
- [Dual-Node Shared Nothing Appliances](#)
- [Scale Out Appliances](#)
- [Disaggregated High-Availability \(HA\) Appliances](#) (USO-HA)

#### Appliance Series:

- USO: [I-Series](#), [D-Series](#), [XS-Series](#) & [XD-Series](#)
- USO-HA: [I-Series](#), [D-Series](#), [XS-Series](#) & [XD-Series](#)
- USO-FC: [XS-Series](#) & [XD-Series](#)

To learn more about StoneFly Unified NAS + SAN + Object storage appliances, refer to [Chapter 4 Section 4.3](#).

### 1.2.4 Live VM Migration (VMware Plugin + DTDs)

Complete end-to-end service for live VMware Virtual Machine (VM) migration comprised of a certified VMware plugin, Data Transfer Devices (DTDs), and professional services.

#### StoneFly VM Migration Appliances:

- Live VM Migration DTDs

#### Appliance Series:

- VM Migration DTDs: [D-Series](#), [XS-Series](#) & [XD-Series](#)

To learn more about StoneFly Live Migration solutions, refer to [Chapter 4 Section 4.4](#).

### 1.2.5 S3 Object Storage Solutions

Purpose-built cloud-native S3 object storage appliances with multi-core processors, high speed network ports and four-tiered storage.

#### StoneFly S3 Object Storage Appliances:

- Cloud-Native S3 Object Storage Appliances

#### Appliance Series:

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- S3 Storage Appliances: [I-Series](#), [D-Series](#), [XS-Series](#) & [XD-Series](#)

To learn more about StoneFly S3 object storage solutions, refer to [Chapter 4 Section 4.5](#).

### 1.2.6 Hyperconverged Infrastructure (HCI) Storage Appliances

StoneFly HCI storage appliances support VMware, Hyper-V, Citrix (formerly XenServer), KVM and StoneFly Persepolis hypervisors. Our HCI appliances are highly scalable and are built to facilitate a variety of enterprise and SMB use-cases. Hypervisor availability may vary depending on the StoneFly product series selected.

#### StoneFly HCI Appliances:

- Unified Storage & Server (USS) Appliances

#### Supported Hardware Configurations for USS Appliances:

- [Integrated Appliances](#)
- [Dual-Node Shared Nothing Appliances](#)
- [Scale Out Appliances](#)
- [Disaggregated High-Availability \(HA\) Appliances](#) (USS-HA)

#### Appliance Series:

- USS: [D-Series](#), [XS-Series](#) & [XD-Series](#)
- USS-HA: [D-Series](#), [XS-Series](#) & [XD-Series](#)

To learn more about StoneFly HCI storage appliances, refer to [Chapter 4 Section 4.6](#).

### 1.2.7 SAN Gateway Appliance

Effortlessly convert existing Fibre Channel, SAS, Infiniband, or iSCSI Storage (EMC, NetApp, HPE) into your choice of unified advanced iSCSI SAN storage or optional NAS or Fibre Channel SAN Storage with StoneFly SAN gateway appliances.

#### StoneFly SAN Gateway Appliances:

- Unified Storage Concentrator (USC) Appliances

#### Supported Hardware Configurations for USC Appliances:

- Disaggregated Single-Node Appliances
- [Disaggregated High-Availability \(HA\) Appliances \(USC-HA\)](#)

#### Appliance Series:

- USC: [XS-Series](#) & [XD-Series](#)
- USC-HA: [XS-Series](#) & [XD-Series](#)

To learn more about StoneFly SAN gateway appliances, refer to [Chapter 4 Section 4.7](#).

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To learn more about available StoneFly hardware configurations, please refer to [Chapter 2: Hardware Overview](#). For more details about the hardware specifications of the I-Series, D-Series, XS-Series and XD-Series platforms, please refer to the respective specifications page for the specific StoneFly solution.

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### 1.3. Integrated Appliance Expansion Units

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StoneFly single-node expansion units support enterprise SSDs and SAS hard drives, and facilitate storage capacity expansion via scale up or vertical scaling. The single-node expansion units are compatible with all StoneFly D-Series, XS-Series, XD-Series integrated, dual-node shared nothing, and scale out hardware configurations that are 12-bays or larger.

For more information about the hardware specifications of integrated appliance expansion units, please refer to [Chapter 4 Section 4.8](#).

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### 1.4. High Availability (HA) RAID Arrays for Disaggregated HA Clusters

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StoneFly HA RAID arrays are comprised of built-in dual active-active hardware RAID controllers with support for up to 12, 16 or 24 enterprise SSDs and SAS drives. The HA RAID array chassis is a part of StoneFly disaggregated HA storage hardware architectures (Refer to [Chapter 2: Hardware Overview](#)).

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### 1.5. HA Expansion Units for Disaggregated HA Clusters

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StoneFly HA expansion units are similar in function to the single-node expansion units; they are used to increase the storage capacities of disaggregated HA cluster appliances. HA expansion units support up to 12, 16, 24 or 60 enterprise SSDs and SAS drives to facilitate scale up (scale vertically) storage.

For more information about the hardware specifications of HA appliance expansion units, please refer to [Chapter 4 Section 4.9](#).

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### 1.6. Enterprise Cloud Storage Solutions

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Our partnerships enable us to offer hybrid storage solutions and pure serverless cloud storage solutions.

To integrate cloud storage tiers, StoneFly storage appliance users can leverage the preconfigured storage OS and the built-in cloud connect to integrate Azure, AWS, and StoneFly private cloud storage tiers.

StoneFly also offers the following standalone cloud storage solutions (Storage as a Service – STaaS) for businesses looking to set up cloud-only or cloud-first environments:

- [Enterprise Cloud Storage in Azure](#)
  - [Enterprise Cloud Storage in Amazon S3](#)
  - [Enterprise Cloud Storage in StoneFly Private Cloud](#)
-

## 1.7. Cloud Storage Gateway Solutions

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StoneFly offers hardware gateway appliances and virtual storage appliances that facilitate cloud integration with existing storage infrastructure. Our cloud storage gateways are compatible with most mainstream servers such as HPE, EMC, and others.

- [Azure Cloud Storage Gateway for Veeam](#)
  - [AWS Cloud Storage Gateway for Veeam](#)
  - [Smart Cloud Storage Gateway](#)
-

## Chapter 2:

# Storage Hardware Overview

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StoneFly data storage solutions support a number of hardware architectures facilitating a variety of enterprise and SMB use-cases. In this chapter, we take a closer look at these storage hardware architectures, the different key components within the hardware, supported storage drives, and the maximum storage capacities of the available storage appliances.

## 2.1 Available Storage Hardware Architectures

---

StoneFly storage appliances support the following hardware architectures:

- 2.1.1 [Integrated Storage Appliance](#)
- 2.1.2 [Dual-Node Shared Nothing Storage System](#)
- 2.1.3 [Scale Out Storage System](#)
- 2.1.4 [Disaggregated Storage System \(High Availability\)](#)

### Key Hardware Components of StoneFly Storage Appliances

Before exploring the aforementioned hardware architectures, it is important to know about the four key components of StoneFly storage appliances:

- Storage Controller (SC) or HCI Controller
- RAID Controller (Integrated Solutions)
- HA RAID Array (Disaggregated Solutions)
- Expandable Bunch of Drives (EBODs)

### *Storage Controller or HCI Controller*

#### **Storage Controller (SC)**

The storage controller is a hardware component (or an independent hardware chassis for disaggregated hardware architectures) that functions as the management layer for the storage system.

The StoneFly storage OS (StoneFusion) is configured on a dedicated SSD or PCI-E based NVMe SSD (depending on the product model and series) which runs independently of the data storage.

#### **HCI Controller**

Similar to the SC, the HCI controller is a hardware component (or an independent hardware chassis for disaggregated hardware architectures) that functions as the management and virtualization layer for the storage system.

The StoneFly storage virtualization operating system (SCVM) and the hypervisor (VMware, Hyper-V, Citrix, KVM, or StoneFly Persepolis) are deployed on a dedicated SSD or PCI-E based

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NVMe SSD (depending on the product model and series) which runs independently of the storage.

The difference between the SC and the HCI controller is that in addition to the storage operating system, the HCI controller also has a hypervisor.

### Storage Controller or HCI Controller Form Factors

The integrated appliance, dual-node shared nothing, and scale out storage hardware architectures have built-in SCs or HCI controllers while the disaggregated HA storage systems have two or more dedicated hardware chassis for the SCs or HCI controllers.

The following are the available form factors of SCs or HCI controllers for disaggregated HA hardware architectures:

- Dual 1U SC or HCI controller with support for 12Gb SAS storage expansion
- Dual 1U SC or HCI controller with support for 16Gb FC storage expansion
- Dual 2U SC or HCI controller with support for 12Gb SAS storage expansion
- Dual 2U SC or HCI controller with support for 16Gb FC storage expansion

### RAID Controller

The high-performance hardware Redundant Array of Independent Disks (RAID) controller configures multiple drives (depending on the configured RAID level) to work as redundant drives for fault-tolerance and high availability. Supported RAID levels depend on the appliance series and model.

	I-Series	D-Series	XS-Series	XD-Series
<b>RAID Controller</b>	Standard	Standard	Standard	Standard
<b>RAID Cache Battery Backup</b>	Optional	<b>4-bay to 6-bay:</b> Not Supported <b>8-bay &amp; higher:</b> Standard	Standard	Standard

### HA RAID Array (Disaggregated Solutions)

The HA RAID storage expansion array (or simply HA RAID array) is a hardware chassis with storage drives and dual active-active hardware RAID controllers. This hardware chassis is a key component of StoneFly disaggregated HA storage systems.

The HA RAID array supports RAID levels 0, 1, 0+1, 3, 5, 6, 10, 30, 50, and 60. RAID Cache battery backup is standard on each active RAID controller. Supported storage drives include 2.5" and 3.5" enterprise SSD and SAS hard drives depending on the model.

The two types of StoneFly HA RAID arrays include the choice of either 12Gb SAS or 16Gb Fibre Channel Host Interfaces for connections to the StoneFly HA cluster nodes.

**Note:** Supported RAID levels vary depending on appliance series and model. For details, [contact StoneFly pre-sales engineers.](#)

#### Available Form Factors for StoneFly HA RAID Arrays

##### **HA RAID Arrays with support for 3.5” enterprise SAS drives and SSDs:**

- 12-bay 2U Rackmount (12Gb SAS or 16Gb Fibre Channel host interface)
- 16-bay 3U Rackmount (12Gb SAS or 16Gb Fibre Channel host interface)
- 24-bay 4U Rackmount (12Gb SAS or 16Gb Fibre Channel host interface)

##### **HA RAID Arrays with support for 2.5” enterprise SAS SSDs:**

- 24-bay 2U Rackmount (12Gb SAS or 16Gb Fibre Channel host interface)

**Note:** The compatible HA RAID array may vary depending on the chosen disaggregated storage solution and appliance model. For more information, refer to the relevant **Hardware Specifications** section of the relevant storage product or [contact StoneFly pre-sales engineers.](#)

#### *Expandable Bunch of Drives (EBODs)*

EBODs are storage expansion units compatible with most StoneFly storage solutions. EBODs are used to add more storage capacities to existing StoneFly appliances (scale up or vertical scaling). With support for enterprise SAS drives, StoneFly EBODs enable users to set up multi-tiered storage capacities with their existing storage infrastructure.

The EBODs used for integrated, dual-node shared nothing, and scale out storage systems differ from the EBODs used for disaggregated HA storage systems.

For more information, please refer to sections 4.6 and 4.7.

#### Available Form Factors for EBODs

##### **EBODs for Integrated Hardware with support for 3.5” enterprise SAS drives and SSDs:**

- 12-bay 2U 12Gb SAS Expansion Unit
- 16-bay 3U 12Gb SAS Expansion Unit
- 24-bay 4U 12Gb SAS Expansion Unit
- 44-bay 4U 12Gb SAS Expansion Unit
- 60-bay 4U 12Gb SAS Expansion Unit

##### **EBODs for Integrated Hardware with support for 2.5” enterprise SAS SSDs:**

- 24-bay 2U 12Gb SAS Expansion Unit

For the hardware specifications of integrated appliance EBODs, please refer to section 4.6.

##### **EBODs for Disaggregated HA Hardware with support for 3.5” enterprise SAS hard drives and SSDs:**

- 12-bay 2U 12Gb SAS HA Expansion Unit
-

- 16-bay 3U 12Gb SAS HA Expansion Unit
- 60-bay 4U 12Gb SAS HA Expansion Unit, Single Drawer
- 60-bay 4U 12Gb SAS HA Expansion Unit, Three Drawers

#### **EBODs for Disaggregated HA Hardware with support for 2.5” enterprise SAS SSDs:**

- 24-bay 2U 12Gb SAS HA Expansion Unit

For the hardware specifications of HA appliance EBODs, please refer to section 4.7.

#### **2.1.1 Integrated Storage Appliances**

The integrated storage appliance hardware architecture delivers the “storage in a box” experience. This hardware architecture is comprised of a single hardware chassis with built-in SC or HCI controller, RAID Controller (if any), and storage drives.

StoneFly integrated appliance hardware supports 6Gb SATA (4-bay and 6-bay D-Series appliances only), enterprise 12Gb SAS 7200RPM drives and enterprise 12Gb SAS SSDs with storage capacities ranging from a few terabytes to multiple petabytes.

#### ***Available Integrated Appliance Form Factors***

##### **Integrated appliances that support 3.5” 6Gb SATA hard drives:**

- 4-bay Mini-Tower (D-Series only)
- 6-bay 2U Rackmount (D-Series only)



**12-bay 2U 3.5” Rackmount**

##### **Integrated appliances that support 3.5” 12Gb SAS drives & SSDs:**

- 8-bay 2U Rackmount
- 12-bay 2U Rackmount
- 16-bay 3U Rackmount
- 24-bay 4U Rackmount
- 36-bay 4U Rackmount

##### **Integrated appliances that support 2.5” 12Gb SAS SSDs:**

- 24-bay 2U Rackmount

**Note:** Supported integrated appliance form factors vary depending on the storage solution. For more information, please refer to the **Hardware Specifications** section of the relevant StoneFly storage product or [contact StoneFly pre-sales engineers](#).

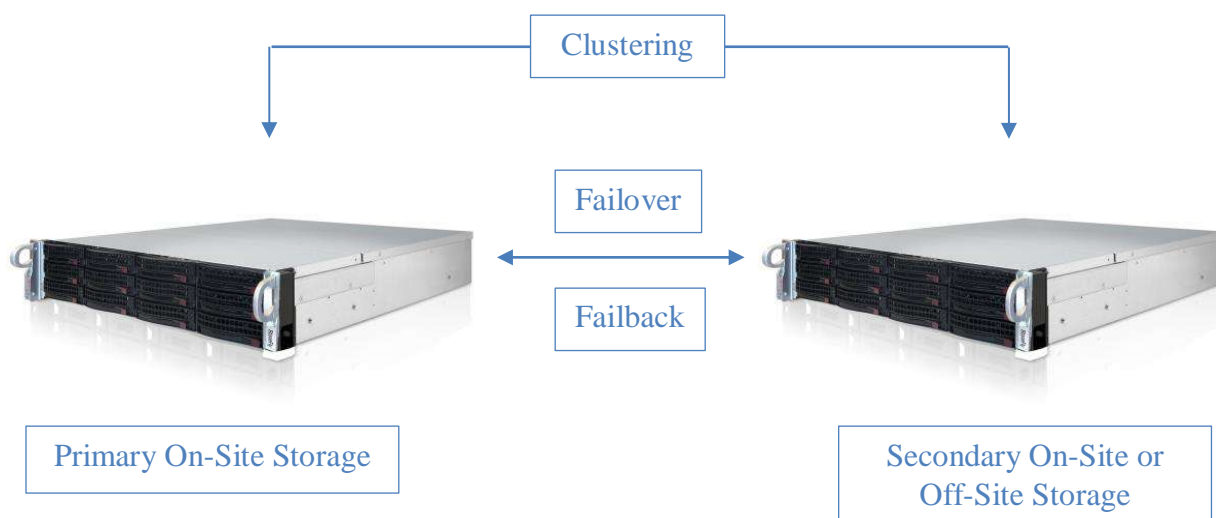
#### **2.1.2. Dual-Node Shared Nothing Storage Systems**

StoneFly dual-node shared nothing storage systems are comprised of two synchronized integrated appliance nodes. This hardware configuration is built to deliver fault-tolerance and

high-availability in the event of the complete hardware failure of an entire integrated appliance node.

This high-availability hardware configuration leverages the StoneFly storage OS to replicate data between the two appliance nodes in real-time thereby creating redundant copies of data.

In the event of hardware failure of a single integrated appliance node, the system automatically fails over to the secondary node, delivering a disruption-free storage experience while the primary system is repaired. This makes this configuration the best fit for enterprise environments that cannot tolerate downtime and are looking for storage systems that do not have a single point-of-failure.



**Note:** The available form factors, appliance models and hardware components of the dual-node shared nothing storage systems are the same as the integrated appliance hardware architecture. The only difference between the two is that integrated appliances are comprised of a single hardware chassis whereas the dual-node shared nothing solution use two synchronized integrated appliances.

### 2.1.3. Scale Out Storage Systems

Scale out storage systems start with three integrated appliance nodes. As the name suggests, StoneFly scale out hardware architecture is built to deliver the ability to scale out to virtually an unlimited number of appliance nodes for petabytes of storage capacity.



Each integrated appliance node has a built-in processor, SC or HCI controller, RAID controller and storage drives. The total workload is aggregated over the total number of appliance nodes in the storage system. The addition of each new scale out node delivers a gradual increase in performance, along with an increase in storage capacity. The ability to dually scale makes scale out storage systems the perfect fit for business environments that process and store big data.

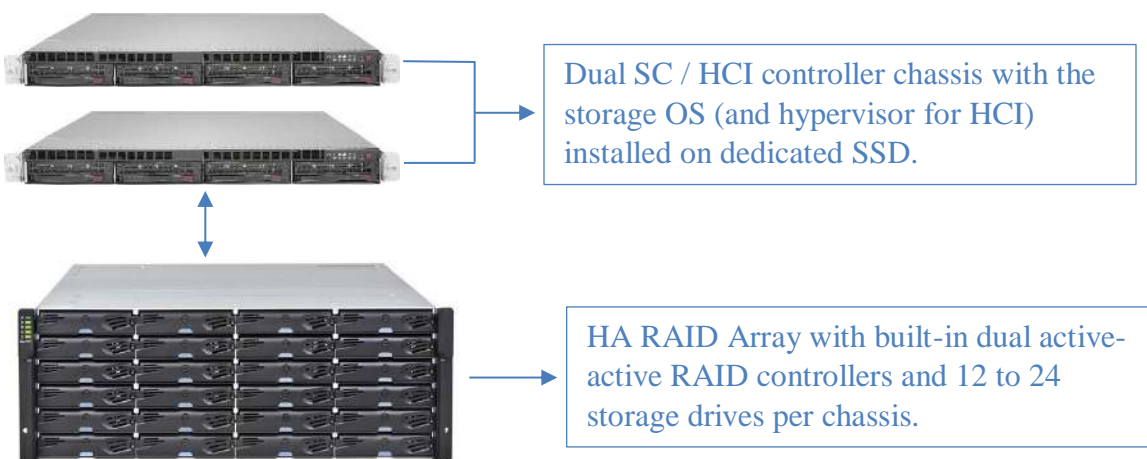
**Note:** The available form factors, appliance models and hardware components of the scale out storage systems are the same as the integrated appliance hardware architecture. The only difference between the two is that integrated appliances are a single hardware chassis whereas the scale out storage systems are comprised of at least three integrated appliance nodes.

#### 2.1.4. Disaggregated Storage Systems (High-Availability)

The disaggregated storage system is a high-availability modular hardware architecture built to deliver fault-tolerance, remove single point-of-failure, and simplify scalability for enterprise-level workloads.

StoneFly disaggregated storage systems are comprised of three or more hardware chassis:

- Two Storage Controllers or Two HCI Controllers (1U or 2U Chassis)
- One or More HA RAID Array(s)
- Optional HA Expandable Bunch of Drives (EBODs)



With hardware independent SCs or HCI controllers, the disaggregated storage systems prevent downtime due to SC or HCI controller failure. Moreover, dual SCs or HCI controllers prevent bottlenecks by delivering multi-path access to the storage hardware chassis (HA RAID array) with the optional multipath upgrade option.

Due to the fact that the SCs or HCI controllers are in separate hardware chassis, the process of repairing them is simpler and budget-friendly. Disaggregated storage solution users can replace the malfunctioned storage controller chassis while the secondary / redundant controller continues to facilitate access.

Even in the event of a SC or HCI controller hardware failure, the appliance continues to operate without experiencing downtime. The disaggregated high-availability hardware architecture is thus best fit for enterprises and data centers that cannot tolerate downtime, while providing easy data center management.

### *Available Form Factors for Disaggregated Storage Systems*

For information about the available form factors for the SC or HCI controller chassis, please refer to the **Storage Controller or HCI Controller** section.

For information about the available form factors for the HA RAID arrays, please refer to the **HA RAID Array** section.

## 2.2 Supported Storage Drives

Following is a list of storage drives supported by StoneFly storage appliances.

<b>3.5" Enterprise Drives</b>	
<b>12Gb 7200RPM SAS</b>	10TB, 14TB, 16TB, 18TB
<b>6Gb 7200RPM SATA (4 and 6-bay D-Series)</b>	10TB, 14TB, 16TB

<b>2.5" Enterprise Drives</b>	
<b>12GB SAS SSD (1x DWPD)</b>	960GB, 1.9TB, 3.8TB, 7.6TB
<b>12GB SAS SSD (3x DWPD)</b>	800GB, 1.6TB, 3.2TB, 6.4TB
<b>12Gb SAS SSD (10x DWPD)</b>	400GB, 800GB, 1.6TB, 3.2TB
<b>6Gb SATA SSD (3x DWPD) (4 and 6-bay D-Series only)</b>	240GB, 480GB, 960GB, 1.9TB, 3.8TB

\* 2.5" Enterprise SAS SSDs are supported in most StoneFly appliances supporting 3.5" Enterprise SAS drives when combined with a special converter or tray.

### 2.2.1 Raw Storage Capacities for StoneFly Storage Appliances

The following is a measure of the raw storage capacities of StoneFly storage appliances. The usable and effective storage capacities differ based on the configured RAID and optional deduplication features.

All StoneFly D, XS and XD-Series integrated appliances with 12-bays or larger are capable of **scaling up** to 256 drives per appliance node when combined with StoneFly expansion units.

All StoneFly appliances can **scale out** to a virtually unlimited number of appliance nodes and corresponding storage capacities.

#### *Raw Storage Capacities (Integrated Appliances, Dual-Node Shared Nothing, Scale Out Systems, Disaggregated HA Clusters, HA RAID Arrays & EBODs)*

<b>4-Bay Mini Tower (3.5")</b>	6Gb 7200 RPM SATA	64TB
	6Gb SATA SSD (3x DWPD)	15.2TB
<b>6-Bay 2U Rackmount (3.5")</b>	6Gb 7200 RPM SATA	96TB
	6Gb SATA SSD (3x DWPD)	22.8TB
<b>8-Bay 2U Rackmount (3.5")</b>	12Gb 7200 RPM SAS	144TB
	12Gb SAS SSD (1x DWPD)	60.8TB
	12Gb SAS SSD (3x DWPD)	51.2TB
<b>12-Bay 2U Rackmount (3.5")</b>	12Gb 7200 RPM SAS	216TB
	12Gb SAS SSD (1x DWPD)	91.2TB
	12Gb SAS SSD (3x DWPD)	76.8TB
<b>16-Bay 3U Rackmount (3.5")</b>	12Gb 7200 RPM SAS	288TB
	12Gb SAS SSD (1x DWPD)	121.6TB
	12Gb SAS SSD (3x DWPD)	102.4TB
<b>24-Bay 4U Rackmount (3.5")</b>	12Gb 7200 RPM SAS	432TB
	12Gb SAS SSD (1x DWPD)	182.4TB
	12Gb SAS SSD (3x DWPD)	153.6TB
<b>36-Bay 4U Rackmount (3.5")</b>	12Gb 7200 RPM SAS	648TB
	12Gb SAS SSD (1x DWPD)	276.4TB
	12Gb SAS SSD (3x DWPD)	230.4TB

<b>44-Bay 4U Rackmount (3.5")</b> [EBOD only]	12Gb 7200 RPM SAS	792TB
	12Gb SAS SSD (1x DWPD)	337.9TB
	12Gb SAS SSD (3x DWPD)	281.6TB
<b>60-Bay 4U Rackmount (3.5")</b> [EBOD/HA EBOD only]	12Gb 7200 RPM SAS	1,080TB
	12Gb SAS SSD (1x DWPD)	456TB
	12Gb SAS SSD (3x DWPD)	384TB

**Note:** The raw storage capacities listed above are for appliances fully-populated with a single type of drive. StoneFly appliances can be configured with a combination of different drive types and capacities, thus offering variable raw storage capacities. For more information about the raw capacity of a StoneFly storage appliance, please [contact StoneFly pre-sales engineers](#).



## 2.3 Network Ports

StoneFly D-Series, XS-Series and XD-Series appliances come standard with at least two 10Gb ports per node. The standard ports vary depending on the appliance series and model.

Following is a list of the supported network ports and available network port upgrade options for StoneFly I-Series, D-Series (Gen 2), XS-Series and XD-Series integrated (including dual-node shared nothing & scale out) appliances:

### 2.3.1 Network Port Upgrades for StoneFly Integrated Appliances

- Dual 1Gb Copper Ports
- Quad 1Gb Copper Ports
- Dual 10Gb RJ-45 Copper Ports
- Quad 10Gb RJ-45 Copper Ports
- Dual 10Gb SR Optical Ports with 10Gb SFP+ SR Optical Transceiver Modules
- Single 10Gb LR Optical Port with 10Gb SFP+ LR Optical Transceiver Module
- Dual 10Gb SFP+ Ports (Cables/Transceiver Modules Not Included)
- Quad 10Gb SFP+ Ports (Cables/Transceiver Modules Not Included)
- Dual 40Gb QSFP+ Ports (Cables/Transceiver Modules Not Included)

### 2.3.2 Network Port Upgrades for I-Series, StoneFly D-Series (Gen 2) and XS-Series, and XD-Series Disaggregated (HA) Cluster Storage Systems

Quad 1Gb Copper Ethernet Ports for HA Cluster	2 per Node
Eight 1GB Copper Ethernet Ports for HA Cluster	4 per Node
Quad 10Gb RJ-45 Copper Ethernet Ports for HA Cluster	2 per Node
Eight 10Gb RJ-45 Copper Ethernet Ports for HA Cluster	4 per Node
Quad 10Gb CX4 Copper Ethernet Ports for HA Cluster	2 per Node
Quad 10Gb SR Optical Ethernet Ports with 10Gb SFP+ SR Optical Transceiver Modules for HA Cluster	2 per Node
Dual 10Gb LR Optical Ethernet Ports with 10Gb SFP+ LR Optical Transceiver Modules for HA Cluster	1 per Node
Quad 10Gb SFP+ Ports for HA Cluster	2 per Node
Eight 10Gb SFP+ Ports for HA Cluster	4 per Node
Quad 40Gb QSFP+ Ports for HA Cluster	2 per Node

**Note:** Available network port upgrades vary depending on the appliance series and available PCI-E slots in the appliance. For more information, [contact StoneFly pre-sales engineers](#).

## 2.4 Processor, System Memory & SSD for OS

This section lists the available processors, system memory and SSD options for the OS.

**Note:** Standard and compatible hardware components may vary depending on the appliance series and model. Please refer to the **Hardware Specifications** of the relevant storage solution or contact StoneFly pre-sales engineers for more information.

### 2.4.1 Processor Options

#### *Processor Options for Integrated & Disaggregated HA Appliances (Per Node)*

	<b>I-Series</b>	<b>D-Series (Gen 1)</b>	<b>D-Series (Gen 2)</b>	<b>XS-Series</b>	<b>XD-Series</b>
<b>Standard</b>	4-Core Intel Processor	4-Core (Non-HCI) or 8-Core (HCI) Xeon Processor	4-Core (HCI)	10-Core Xeon Processor	Dual 10-Core Xeon Processors
<b>Upgrade Options</b>	<ul style="list-style-type: none"> <li>• 6-Core Intel</li> <li>• 8-Core Intel</li> </ul>	<ul style="list-style-type: none"> <li>• 6-Core Xeon (Non-HCI)</li> <li>• 8-Core Xeon (Non-HCI)</li> </ul>	8-Core Xeon (HCI)	<ul style="list-style-type: none"> <li>• 12-Core Xeon</li> <li>• 16-Core Xeon</li> <li>• 18-Core Xeon</li> <li>• 20-Core Xeon</li> <li>• 24-Core Xeon</li> <li>• 28-Core Xeon</li> </ul>	<ul style="list-style-type: none"> <li>• Dual 12-Core Xeons</li> <li>• Dual 16-Core Xeons</li> <li>• Dual 18-Core Xeons</li> <li>• Dual 20-Core Xeons</li> <li>• Dual 24-Core Xeons</li> <li>• Dual 28-Core Xeons</li> </ul>

**Note:** The processor options listed above are also supported for the dual-node shared nothing and scale out systems.

## 2.4.2 System Memory Options

### *System Memory Options for Integrated Appliances*

	I-Series	D-Series	XS-Series	XD-Series
<b>Standard</b>	8GB	32GB	32GB	64GB
<b>Upgrade Options</b>	<ul style="list-style-type: none"> <li>• 16GB</li> <li>• 32GB</li> <li>• 64GB</li> </ul>	<ul style="list-style-type: none"> <li>• 64GB</li> <li>• 128GB</li> <li>• 256GB (Gen 2)</li> </ul>	<ul style="list-style-type: none"> <li>• 64GB</li> <li>• 128GB</li> <li>• 256GB</li> <li>• 384GB</li> <li>• 512GB</li> <li>• 1TB</li> </ul>	<ul style="list-style-type: none"> <li>• 128GB</li> <li>• 256GB</li> <li>• 384GB</li> <li>• 512GB</li> <li>• 768GB</li> <li>• 1TB</li> <li>• 2TB</li> </ul>

**Note:** The system memory options listed above are also supported for the dual-node shared nothing and scale out systems.

### *System Memory Options for Disaggregated HA Appliances (Per Node)*

	I-Series	D-Series	XS-Series	XD-Series
<b>Standard</b>	8GB	32GB	32GB	64GB
<b>Upgrade Options</b>	<ul style="list-style-type: none"> <li>• 16GB</li> <li>• 32GB</li> <li>• 64GB</li> </ul>	<ul style="list-style-type: none"> <li>• 64GB</li> <li>• 128GB</li> <li>• 256GB (Gen 2)</li> </ul>	<ul style="list-style-type: none"> <li>• 64GB</li> <li>• 128GB</li> <li>• 256GB</li> <li>• 384GB</li> <li>• 512GB</li> <li>• 768GB</li> <li>• 1TB</li> <li>• 1TB (2U only)</li> </ul>	<ul style="list-style-type: none"> <li>• 128GB</li> <li>• 256GB</li> <li>• 384GB</li> <li>• 512GB</li> <li>• 768GB</li> <li>• 1TB</li> <li>• 2TB</li> <li>• 3TB (1U only)</li> </ul>

## 2.4.3 SSD for OS

StoneFly storage appliances use SSD or Flash for the SC or HCI Controller and OS. This section describes in detail the standard and available upgrade options for the SSD dedicated for the OS.

**Note:** NVMe SSD support varies depending on appliance series (I-Series, D-Series, XS-Series & XD-Series) and solution. Non-hyperconverged D-Series integrated appliances use 128GB flash only. For more information, please contact [StoneFly pre-sales engineers](#).

*NVMe SSD for OS Options – Integrated Appliances*

	<b>I-Series, Hyperconverged D-Series, XS-Series, XD-Series</b>
<b>Standard</b>	256GB PCI-E Based NVMe SSD for Hypervisor/OS
<b>Upgrade Options</b>	<ul style="list-style-type: none"> <li>• 512GB PCI-E Based NVMe SSD for Hypervisor/OS</li> <li>• 1TB PCI-E Based NVMe SSD for Hypervisor/OS</li> <li>• 2TB PCI-E Based NVMe SSD for Hypervisor/OS</li> <li>• 3.8TB PCI-E Based NVMe SSD for Hypervisor/OS</li> </ul>

*NVMe SSD for OS Options – Disaggregated HA Appliances (Per Node)*

	<b>I-Series, XS-Series, D-Series Gen 2, Dual 2U XD-Series</b>	<b>D-Series Gen 1, Dual 1U XD-Series</b>
<b>Standard</b>	256GB NVMe SSD for Hypervisor/OS	240GB SSD for Hypervisor/OS
<b>Upgrade Options</b>	<ul style="list-style-type: none"> <li>• 512GB NVMe SSD for Hypervisor/OS</li> <li>• 1TB NVMe SSD for Hypervisor/OS</li> <li>• 2TB NVMe SSD for Hypervisor/OS</li> <li>• 3.8TB NVMe SSD for Hypervisor/OS</li> </ul>	<ul style="list-style-type: none"> <li>• 480GB SSD for Hypervisor/OS</li> <li>• 960GB SSD for Hypervisor/OS</li> <li>• 1.9TB SSD for Hypervisor/OS</li> </ul>

## Chapter 3:

# StoneFly Storage Operating System (OS)

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StoneFusion, the StoneFly storage OS is an 8<sup>th</sup> generation patented storage operating system that is included in all StoneFly storage solutions. It was developed to simplify the enterprise data storage experience, reduce storage costs, and enhance storage resource utilization.

The patented OS can be installed as a standalone OS on bare-metal servers for storage consolidation and storage provisioning. The software can also be run on virtualized environments such as VMware, Hyper-V, KVM, Citrix (formerly XenServer), and StoneFly Persepolis hypervisors. The latest “StoneFusion MSP Edition” enables Managed Service Providers, storage resellers, and large organizations to provision dedicated high performance storage for their end users.

Before we explore the different options StoneFly offers for the OS, let’s review the data services that can be integrated using the enterprise-grade storage OS.

### 3.1. Enterprise-Grade Standard & Optional Features of the StoneFly Storage Operating System

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- Support for **iSCSI**, **Fibre Channel SAN** Target, and **NAS** (CIFS/SMB & NFS)
  - Delta-based **Snapshots** with Mountable SAN Read-Write Snapshot Volumes
  - Synchronous & Asynchronous **Replication**
  - **Data Deduplication**
  - Built-In Virus, Malware and **Ransomware Detection & Removal**
  - Hardware-Enabled **Volume Encryption**
  - NAS Segment AES 256-bit Encryption for Data at Rest
  - **Cloud Connect** to StoneFly Private Cloud, Microsoft Azure, Amazon S3, and any other S3 Compatible Cloud
  - SSL/TLS Tunneling for Data at Transit
  - **Thin Provisioning** with Space Reclamation of iSCSI Volumes
  - **Tiered Storage** Architecture with Hardware & Software Support
  - **Flash Cache™ SSD Caching**
  - **NAS Tiering**
  - **Multi-Site/Multi-Appliance Replication** and Unified Central Management System
  - **WORM** (Write Once Read Many) NAS Storage Provisioning Protects Data from Deletion, Modification, Viruses & Ransomware
  - Logical Volume Creation & Patented Advanced Storage Virtualization
  - Port Teaming, **Failover** and Load Balancing
  - Volume-Level Access Control and Dynamic Volume Management
  - Support for SNMP Traps, UPS, Nagios, **RAID Monitoring**, Call Home, **VMware VAAI**
-

- Real-Time Graphical Performance Monitoring with Tracking & Utilization Reporting
- Integrated Veeam Backup Agent
- Capable of Supporting **200 iSCSI Hosts** and **Unlimited NAS Clients**

### 3.2. Storage Concentrator Virtual Machine (SCVM)

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The StoneFly storage OS can be deployed as a Virtual Machine (VM) on VMware, Hyper-V, KVM, Citrix and StoneFly Persepolis hypervisors to deliver enterprise-grade features and facilitate virtual storage provisioning and data center consolidation.

StoneFly SCVM enables data center owners to provision virtual NAS, virtual SAN, and virtual unified storage (SAN + NAS + Object) on their on-premises infrastructure. This reduces the need to configure additional network switches or set up purpose-built appliances while there is available space on existing storage infrastructure. These characteristics enable data center owners to make the most of their data storage infrastructure.

StoneFly SCVM comes preconfigured on all StoneFly HCI appliances and it is also available as a standalone software package.

For details, visit the StoneFly website: <https://stonefly.com/hyper-converged/scvm-virtual-storage-appliance>

### 3.3. StoneFusion for Bare-Metal

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StoneFusion (the StoneFly storage operating system), can also be installed directly on bare-metal servers. By leveraging StoneFusion as the storage OS for their bare-metal servers, users can integrate several enterprise-grade features (refer to section 3.1) and optimize their data storage experience.

Furthermore, StoneFusion enables users to integrate preferred cloud storage tiers as local storage repositories. This allows for the creation of cost-effective data storage suitable for long term data retention and archiving purposes.

StoneFusion also enables users to configure volumes in Azure, AWS, or the StoneFly private cloud. Users can leverage the provisioned volumes to run structured data such as MySQL, NoSQL, PostGreSQL databases and CRM applications such as SAP HANA, and others.

StoneFusion comes preconfigured on all StoneFly NAS, SAN, and unified storage enterprise and value-tier appliances. The enterprise-grade storage OS is also available as a standalone solution for bare-metal servers.

**Note:** StoneFusion for Bare-Metal is supported for specific motherboards and servers. Please contact StoneFly technical support to discuss compatibility concerns.

For details, visit the StoneFly website: <https://stonefly.com/stonefusion-bare-metal>

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### 3.4. StoneFusion MSP Edition

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StoneFusion MSP Edition is an enterprise storage provisioning software that helps MSPs, storage resellers, and large organizations to provision multi-tenant NAS (CIFS/SMB and NFS), SAN (iSCSI and Fibre Channel) and Object Storage repositories for their clients, multiple departments, projects or teams.

The StoneFusion MSP edition offers “parent-child” SCVM licenses that enable MSPs and large organizations to manage thousands of provisioned storage resources using a single unified management interface while the end-users get the full, purpose-built and feature-rich data storage experience.

StoneFusion MSP edition can be deployed on Hyper-V, VMware, Citrix, KVM and StoneFly Persepolis hypervisors and supports most mainstream storage appliances such as Nutanix, HPE Nimble, Dell EMC and several others.

For details, visit the StoneFly website: <https://stonefly.com/managed-service-provider>

### 3.5. StoneFusion OEM

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As part of our Original Equipment Manufacturer (OEM) program, we’re offering MSPs and storage resellers the opportunity to sell StoneFusion as their product.

Resellers interested in partnering with StoneFly are welcomed to visit the StoneFly website to apply directly or contact StoneFly sales to initiate the process.

For details, visit the StoneFly website: <https://stonefly.com/hyper-converged/stonefusion-oem>

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## Chapter 4:

# On-Premises Data Storage Solutions

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In this chapter, we'll describe our on-premises data storage solutions, the available models and the hardware specifications of different appliance series and models.

This chapter contains detailed information about the following StoneFly hardware storage solutions:

- NAS Storage Appliances (SSO)
- SAN Storage Appliances (ISC and Voyager)
- Unified Storage Platform (USO & USO-HA/USO-FC)
- Hyperconverged Storage Appliances (USS & USS-HA)
- Live VM Migration DTDs
- S3 Object Storage Appliances
- SAN Gateway Appliance (USC & USC-HA)

## 4.1 NAS Storage Appliances

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StoneFly NAS appliances leverage our patented storage OS to deliver a highly scalable, cost-effective and enterprise-grade data storage experience for unstructured data or file-level data.

As mentioned in chapter 1, StoneFly NAS appliances are:

- Super Scale Out (SSO) NAS appliances: I-Series, D-Series, XS-Series & XD-Series

### Supported Hardware Configurations

The SSO NAS appliances can be set up as:

- Integrated Appliances
- Dual-Node Shared Nothing
- Scale Out Appliances

#### 4.1.1 Enterprise-Grade Features of StoneFly NAS Appliances

- Logical Volume Creation and Patented Advanced Storage Virtualization Services
  - Supports NAS Protocols CIFS/SMB and NFS, NAS Port Teaming and Failover
  - Volume-Level Access Control and Dynamic Volume Management, Easy Active Directory Integration
  - Support for SNMP Traps, UPS, Nagios, RAID Monitoring, Call Home
  - Real-Time Graphical Performance Monitoring with Tracking & Utilization Reporting
  - Automated Online Volume / Storage Expansion
  - Scale Out NAS using a Single Name Space to Scale Capacity and Performance
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- StoneFly Synchronous Replication of NAS Volumes (Failover Cluster Only)
- StoneFly Snapshot Services with 945 Delta-Based Snapshots per Subsystem
- Mountable Read-Only Snapshot Volumes
- Snapshot Schedule Utility, NAS Volume and Directory Quotas
- Multi-Appliance Campus Mirroring, Spanning and Central Management System
- NAS Segment AES256 Data Encryption
- WORM (Write-Once, Read-Many) Compliant Policy-Based Storage Support Protects Data from Deletion, Modification, Viruses & Ransomware
- Built-In Virus, Malware and Ransomware Detection and Removal
- NAS Tiering, Tiered Storage Architecture with Hardware and Software Support
- Integrated Veeam Backup Agent

#### *Available Upgrade Options:*

- Data Deduplication

#### *Highly Scalable Storage Architecture*

StoneFly SSO enterprise NAS appliances are dually scalable; they can scale up (when combined with optional high-performance hardware RAID controller upgrade option) and scale out.

**Scale Up:** To scale up or scale vertically, users can add EBODs (refer to Chapter 2). The addition of EBODs increases storage capacities.

**Scale Out:** To scale out or scale horizontally, users can add NAS integrated appliance nodes. Each integrated node increases the storage capacity and the performance of the NAS system. The total workload is aggregated over the available number of appliance nodes thereby delivering better performance proportional to the increase in storage capacity.

#### *Built-in Cloud Connect*

All StoneFly NAS appliances have built-in cloud connect that can be configured with Azure, AWS, any other S3 compatible cloud or the StoneFly private cloud.

By leveraging the cloud connect feature, users can configure a hybrid NAS storage system. The feature also facilitates use-cases such as cloud archiving and surveillance video archiving.

For details, visit the StoneFly website: <https://stonefly.com/storage/nas-storage>

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### Hardware Specification – StoneFly SSO Integrated Appliance Models: I-Series

	8-bay	12-bay	16-bay	24-bay	36-bay
<b>Storage OS</b>	StoneFly StoneFusion NAS Management 64-Bit Operating System				
<b>Processor</b>	4-Core Intel Processor (Standard) / 6 or 8-Core Intel Processor (Optional)				
<b>System Memory</b>	8GB (Standard) / Up to 64GB (Optional)				
<b>SSD for OS</b>	256GB NVMe SSD (Standard) / Up to 3.8TB NVMe SSD (Optional)				
<b>Fast Storage</b>	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage (Optional)				
<b>RAID Controller</b>	High Performance 12Gb SAS Hardware RAID Controller (Standard) / with RAID Cache Battery Backup (Optional) / No RAID Controller – Erasure Coding Only (Optional)				
<b>Supported RAID Levels</b>	RAID 0, 1, 3, 5, 6, 10, 30, 50, 60				
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"
<b>Supported Storage Drives</b>	12Gb SAS: 7.2k, SSD				
<b>Network Ports</b>	1Gb RJ-45 Ethernet Connection Shared for NAS Data and Management Requires PCI-E Network Card for Data Ports (See Below)				
<b>Available Slots for Additional Network Ports</b>	1 PCI-E Slot for Required Network Card (1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical or 40Gb QSFP+); Up to 2 PCI-E Slots Can Be Used for Optional RAID Cache Battery Backup or FC SAN Target Upgrades				
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable	Redundant 80-PLUS Platinum Hot-Swappable	Redundant 80-PLUS Titanium Hot-Swappable PS		
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)		
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount	
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"		5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"

### Hardware Specification – StoneFly SSO Integrated Appliance Models: D-Series

**Note:** The following integrated appliance models are also used to build Dual-Node Shared Nothing and Scale Out NAS systems.

	4-bay	6-bay	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion NAS Management 64-Bit Operating System							
<b>Processor</b>	4-Core Xeon Processor (Standard) / 6 or 8-Core Xeon Processor (Optional)							
<b>System Memory</b>	32GB (Standard) / Up to 128GB (Optional)							
<b>SSD for OS</b>	128GB Flash							
<b>RAID Controller</b>	High-Performance 6Gb SATA Hardware RAID Controller		High Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup (Standard) / No RAID Controller – Erasure Coding Only and No Scale Up Expansion (Optional)					
<b>Supported RAID Levels</b>	RAID 0, 1, 5, 6, 10	RAID 0, 1, 5, 6, 10, 50	RAID 0, 1, 3, 5, 6, 10, 30, 50, 60					
<b>Drive Bays</b>	4 x 3.5"	6 x 3.5"	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	6Gb SATA: • 7.2k, SSD		12Gb SAS: 7.2k, SSD				12Gb SAS: SSD	
<b>Expansion</b>	No External Expansion			Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 NAS Connections (Standard) / Dual Bonded 10Gb SFP+ on Select 8-Core Xeon Models* (Optional) <small>* SFP+ network upgrade option not available on 4-bay or 6-bay models.</small>							
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN							
<b>Power Supplies</b>	80-PLUS Bronze PS	High Efficiency PS	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS		Redundant 80-PLUS Platinum Hot-Swappable PS	
<b>Power Output/Input</b>	250W (100-240Vac)	500W (100-240Vac)	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)		920W (100-240Vac)	
<b>Form Factor</b>	Mini-Tower	2U Rackmount			3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	9.5" x 8.3" x 11"	3.5" x 16.9" x 26"	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

### Hardware Specification – StoneFly SSO Integrated Appliance Models: XS-Series

**Note:** The following integrated appliance models are also used to build Dual-Node Shared Nothing and Scale Out NAS systems.

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion NAS Management 64-Bit Operating System					
<b>Processor</b>	10-Core Xeon Processor (Standard) / 12, 16, 18, 20, 24 or 28-Core Xeon Processor (Optional)					
<b>System Memory</b>	32GB (Standard) / Up to 1TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, SSD					12Gb SAS drives: SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 NAS Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 2 PCI-E Slots Can Be Used For Optional Network Card or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

**Hardware Specification – StoneFly SSO Integrated Appliance Models: XD-Series**

**Note:** The following integrated appliance models are also used to build Dual-Node Shared Nothing and Scale Out NAS systems.

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion NAS Management 64-Bit Operating System					
<b>Processors</b>	Dual 10-Core Xeon Processors (Standard) / Dual 12, 16, 18, 20, 24 or 28-Core Xeon Processors (Optional)					
<b>System Memory</b>	64GB (Standard) / Up to 2TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>Fast Storage</b>	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, SSD					12Gb SAS drives: SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 NAS Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 4 PCI-E Slots Can Be Used For Optional Network Card(s) or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

## 4.2 Storage Area Network (SAN) Appliances

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StoneFly SAN appliances deliver high performance block-level storage for structured data such as MySQL, NoSQL, PostgreSQL databases, SAP HANA application, and many more.

StoneFly StoneFusion enables users to integrate several enterprise-grade features and optimize their block data storage experience. With redundant key components such as hot-swappable drives and power supplies, our SAN appliances deliver simplicity, ease of management and maintenance to companies of all sizes.

StoneFly offers the following SAN storage appliances:

- Integrated Storage Concentrator (ISC) SAN Appliances: I-Series, D-Series, XS-Series & XD-Series
- Disaggregated HA Cluster SAN – Voyager DX & Voyager FC: I-Series, D-Series, XS-Series & XD-Series

### 4.2.1 Enterprise-Grade Features of StoneFly SAN Appliances

#### Standard SAN Management 64-bit Operating System Features

- Logical Volume Creation and Patented Advanced Storage Virtualization Services
- 200 iSCSI Volumes Supported with 1022 Concurrent Host iSCSI Sessions
- iSCSI Port Teaming, Failover and Load-Balancing
- Volume-Level Access Control and Dynamic Volume Management
- Support for iSCSI, SNMP Traps, UPS, Nagios, RAID Monitoring, Call Home, VMware VAAI
- Real-Time Graphical Performance Monitoring with Tracking & Utilization Reporting
- Automated Online Volume / Storage Expansion
- Supports up to 200 iSCSI Hosts

#### Advanced SAN Management 64-bit Operating System Features

- StoneFly Snapshot Services with 2520 Delta-Based Snapshots per Subsystem
- Mountable Read-Write Snapshot Volumes
- Snapshot Schedule Utility, Command Line Interface Utility
- StoneFly Real-Time Synchronous Mirroring of iSCSI Volumes and Nodes (Campus Mirroring)
- Multi-Site/Multi-Appliance Replication and Unified Central Management System
- Thin Provisioning with Space Reclamation
- Tiered Storage Architecture with Hardware and Software Support

#### Available Upgrade Options:

- Asynchronous Replication (One-to-Many & Many-to-One), Hardware-Enabled Volume Encryption, Fibre Channel SAN Target Bundle, NAS (Support for CIFS/SMB and NFS Protocols), Block-Level Data Deduplication, Flash Cache SSD Caching, VSS Support

For details, visit the StoneFly website: <https://stonefly.com/storage/san-storage>

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**Hardware Specification – StoneFly ISC Integrated SAN Appliance Models: I-Series**

	8-bay	12-bay	16-bay	24-bay	36-bay
<b>Storage OS</b>	StoneFly StoneFusion SAN Management 64-Bit Operating System				
<b>Processor</b>	4-Core Intel Processor (Standard) / 6 or 8-Core Intel Processor (Optional)				
<b>System Memory</b>	8GB (Standard) / Up to 64GB (Optional)				
<b>SSD for OS</b>	256GB NVMe SSD (Standard) / Up to 3.8TB NVMe SSD (Optional)				
<b>Fast Storage</b>	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage (Optional)				
<b>RAID Controller</b>	High Performance 12Gb SAS Hardware RAID Controller (Standard) / with RAID Cache Battery Backup (Optional)				
<b>Supported RAID Levels</b>	RAID 0, 1, 3, 5, 6, 10, 30, 50, 60				
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"
<b>Supported Storage Drives</b>	12Gb SAS: 7.2k, SSD				
<b>Network Ports</b>	1Gb RJ-45 Ethernet Connection Shared for iSCSI Data and Management Requires PCI-E Network Card for Data Ports (See Below)				
<b>Available Slots for Additional Network Ports</b>	1 PCI-E Slot for Required Network Card (1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical or 40Gb QSFP+); Up to 2 PCI-E Slots Can Be Used for Optional RAID Cache Battery Backup or FC SAN Target Upgrades				
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable	Redundant 80-PLUS Platinum Hot-Swappable	Redundant 80-PLUS Titanium Hot-Swappable PS		
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)		
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount	
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"		5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"

### Hardware Specification – StoneFly ISC Integrated SAN Appliance Models: D-Series

	4-bay	6-bay	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion SAN Management 64-Bit Operating System							
<b>Processor</b>	4-Core Xeon Processor (Standard) / 6 or 8-Core Xeon Processor (Optional)							
<b>System Memory</b>	32GB (Standard) / Up to 128GB (Optional)							
<b>SSD for OS</b>	128GB Flash							
<b>RAID Controller</b>	High-Performance 6Gb SATA Hardware RAID Controller		High Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup					
<b>Supported RAID Levels</b>	RAID 0, 1, 5, 6, 10	RAID 0, 1, 5, 6, 10, 50	RAID 0, 1, 3, 5, 6, 10, 30, 50, 60					
<b>Drive Bays</b>	4 x 3.5"	6 x 3.5"	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	6Gb SATA: • 7.2k, SSD		12Gb SAS: 7.2k, SSD				12Gb SAS: SSD	
<b>Expansion</b>	No External Expansion			Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 iSCSI Connections (Standard) / Dual Bonded 10Gb SFP+ on Select 8-Core Xeon Models* (Optional) <small>* SFP+ network upgrade option not available on 4-bay or 6-bay model.</small>							
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN							
<b>Power Supplies</b>	80-PLUS Bronze PS	High Efficiency PS	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	250W (100-240Vac)	500W (100-240Vac)	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	Mini-Tower	2U Rackmount			3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	9.5" x 8.3" x 11"	3.5" x 16.9" x 26"	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"



### Hardware Specification – StoneFly ISC Integrated SAN Appliance Models: XS-Series

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion SAN Management 64-Bit Operating System					
<b>Processor</b>	10-Core Xeon Processor (Standard) / 12, 16, 18, 20, 24 or 28-Core Xeon Processor (Optional)					
<b>System Memory</b>	32GB (Standard) / Up to 1TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, SSD					12Gb SAS drives: SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 iSCSI Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 2 PCI-E Slots Can Be Used For Optional Network Card or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

### Hardware Specification – StoneFly ISC Integrated SAN Appliance Models: XD-Series

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion SAN Management 64-Bit Operating System					
<b>Processors</b>	Dual 10-Core Xeon Processors (Standard) / Dual 12, 16, 18, 20, 24 or 28-Core Xeon Processors (Optional)					
<b>System Memory</b>	64GB (Standard) / Up to 2TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>Fast Storage</b>	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, SSD					12Gb SAS drives: SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 iSCSI Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 4 PCI-E Slots Can Be Used For Optional Network Card(s) or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

All StoneFly ISC appliances (I-Series, D-Series, XS-Series & XD-Series) come standard with iSCSI, but can also support the following Fibre Channel (FC) SAN Target port upgrades: 2 x 8Gb, 4 x 8Gb or 2 x 16Gb FC Ports. Please refer to Chapter 2 for more information about available network port upgrades ([2.3](#)), supported storage drive capacities ([2.2](#)), raw storage capacities ([2.2.1](#)), processor ([2.4](#)), system memory ([2.4](#)), and SSD for OS ([2.4](#)), and other upgrades.

### 4.2.2 Hardware Specifications of StoneFly Voyager DX & Voyager FC Disaggregated HA SAN Cluster Appliance Models

The Voyager DX and Voyager FC are disaggregated and modular HA cluster appliances. The Voyager DX supports 12Gb SAS-attached HA RAID arrays whereas the Voyager FC supports 16Gb Fibre Channel-attached HA RAID arrays.

This section details the hardware specifications of the storage controllers and the HA RAID arrays (RAID storage expansion arrays) of both the Voyager DX and Voyager FC appliances. For more information about StoneFly’s disaggregated storage system hardware architectures, refer to Chapter 2, section [2.1.4](#).

#### Hardware Specification – StoneFly Voyager Storage Controller Appliance Models: I-Series

	Dual 2U Rackmount with 12Gb SAS Storage Expansion Support
<b>Storage OS</b>	StoneFly StoneFusion SAN Management 64-Bit Operating System with Active-Active Clustering Services on each Node
<b>Processor</b>	4-Core Intel Processor (Standard) / 6 or 8-Core Intel Processor (Optional)
<b>System Memory</b>	8GB per Node (Standard) / Up to 64GB per Node (Optional)
<b>NVMe SSD for OS</b>	256GB NVMe SSD for OS in Each Node (Standard) / Up to 3.8TB NVMe SSD for OS in Each Node (Optional)
<b>Expansion Array Connections</b>	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays Optional Upgrade to 4 x 12Gb SAS Ports on Each Cluster Node
<b>Maximum Supported Storage Drives</b>	Supports up to 1776 Drives with HA RAID/EBOD Expansion (888 Drive Maximum with Multipathing Upgrade Option)
<b>Network Ports</b>	Two 1Gb RJ-45 Ethernet Connections Shared for iSCSI Data and Management per Cluster Requires PCI-E Network Cards for Data Ports (See Below)
<b>Available Slots for Additional Cards</b>	1 PCI-E Slot per Node for Required Network Card (1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical or 40Gb QSFP+); Up to 1 PCI-E Slot per Node for Optional FC SAN Target or HBA for HA Expansion Upgrades
<b>Power Supply</b>	600W (100-240Vac) 80-PLUS Platinum PS per Node
<b>Form Factor</b>	Two 2U Rackmounts
<b>Dimensions (H x W x D)</b>	3.5” x 17.2” x 25.5” per Node (7” Total Rack Height for Two-Node Cluster)

**Note:** For the hardware specifications of supported I-Series HA RAID arrays, please refer to the [Voyager HA RAID Expansion Array Models](#) section.

**Hardware Specification – StoneFly Voyager Storage Controller Appliance Models: D-Series**

	<b>Dual 2U Rackmounts with 12Gb SAS Storage Expansion Support</b>
<b>Storage OS</b>	StoneFly StoneFusion SAN Management 64-Bit Operating System with Active-Active Clustering Services on each Node
<b>Processor</b>	4-Core Xeon Processor per Node (Standard) / 6 or 8-Core Xeon Processor per Node (Optional)
<b>System Memory</b>	32GB per Node (Standard) / Up to 128GB per Node (Optional)
<b>SSD for OS</b>	240GB SSD for OS per Node (Standard) / Up to 3.8TB SSD for OS per Node (Optional)
<b>Expansion Array Connections</b>	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Array(s)
<b>Maximum Supported Storage Drives</b>	Supports up to 888 Drives with HA RAID/EBOD Expansion (444 Drive Maximum with Multipathing Upgrade Option)
<b>Network Ports</b>	Quad Bonded 10Gb RJ-45 iSCSI Connections per Cluster (Backwards Compatible with 1Gb) / Quad Bonded 10Gb SFP+ Connections per Cluster on Select 8-Core Xeon Models (Optional)
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN per Node
<b>Power Supply</b>	600W (100-240Vac) 80-PLUS Platinum PS per Node
<b>Form Factor</b>	Two 2U Rackmounts
<b>Dimensions (H x W x D)</b>	3.5” x 17.2” x 25.5” per Node (7” Total Rack Height for Two-Node Cluster)

**Note:** For the hardware specifications of supported D-Series HA RAID arrays, please refer to the [Voyager HA RAID Expansion Array Models](#) section.

**Hardware Specification – StoneFly Voyager Storage Controller Appliance Models: XS-Series**

	Dual 1U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 1U Rackmounts with 16Gb FC Storage Expansion Support	Dual 2U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 2U Rackmounts with 16Gb FC Storage Expansion Support
<b>Storage OS</b>	StoneFly StoneFusion SAN Management 64-Bit Operating System with Active-Active Clustering Services on each Node			
<b>Processor</b>	10-Core Xeon Processor per Node (Standard) / 12, 16, 18, 20, 24 or 28-Core Xeon Processor per Node (Optional)			
<b>System Memory</b>	32GB per Node (Standard) / Up to 768GB per Node (Optional)		32GB per Node (Standard) / Up to 1TB per Node (Optional)	
<b>NVMe SSD for OS</b>	256GB NVMe SSD for OS per Node / Up to 3.8TB NVMe SSD for OS per Node (Optional)			
<b>Expansion Array Connections</b>	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 16Gb FC Ports on Each Node	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 8 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 8 x 16Gb FC Ports on Each Node
<b>Max. Supported Storage Drives*</b>	Supports up to 1776 Drives with HA RAID/EBOD Expansion (888 Drive Maximum with Multipathing Upgrade Option)		Supports up to 3552 Drives with HA RAID/EBOD Expansion (1776 Drive Maximum with Multipathing Upgrade Option)	
<b>Network Ports</b>	Four Bonded 10Gb RJ-45 iSCSI Connections per Cluster (Backwards Compatible with 1Gb)			
<b>Available Slots for Additional Cards</b>	Up to 1 PCI-E Slot per Node Can Be Used For Optional Network Card, FC SAN Target or HBA for HA Expansion Upgrades		Up to 3 PCI-E Slots per Node Can Be Used For Optional Network Card, FC SAN Target and/or HBA for HA Expansion Upgrades	
<b>Interface Options</b>	Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC			
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN per Node			
<b>Power Supplies</b>	500W (100-240Vac) Redundant 80-PLUS Platinum Hot-Swappable PS per Node		800W (100-127Vac) / 1000W (200-240Vac) Redundant 80-PLUS Titanium Hot-Swappable PS per Node	
<b>Form Factor</b>	Two 1U Rackmounts		Two 2U Rackmounts	
<b>Dimensions (H x W x D)</b>	1.7" x 17.2" x 25.6" per Node (3.5" Total Rack Height for Two-Node Cluster)		3.5" x 17.2" x 25.5" per Node (7" Total Rack Height for Two-Node Cluster)	

\* Cluster Nodes with 16Gb FC Storage Expansion support a nearly unlimited number of drives with addition of FC switch(es).

**Note:** For the hardware specifications of supported XS-Series HA RAID arrays, please refer to the [Voyager HA RAID Expansion Array Models](#) section.

**Hardware Specification – StoneFly Voyager Storage Controller Appliance Models: XD-Series**

	Dual 1U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 1U Rackmounts with 16Gb FC Storage Expansion Support	Dual 2U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 2U Rackmounts with 16Gb FC Storage Expansion Support
<b>Storage OS</b>	StoneFly StoneFusion SAN Management 64-Bit Operating System with Active-Active Clustering Services on each Node			
<b>Processors</b>	Dual 10-Core Xeon Processors per Node (Standard) / Dual 12, 16, 18, 20, 24 or 28-Core Xeon Processors per Node (Optional)			
<b>System Memory</b>	64GB per Node (Standard) / Up to 3TB per Node (Optional)		64GB per Node (Standard) / Up to 2TB per Node (Optional)	
<b>SSD for OS</b>	240GB SSD for OS per Node (Standard) / Up to 3.8TB SSD for OS per Node (Optional)		256GB NVMe SSD for OS per Node / Up to 3.8TB NVMe SSD for OS per Node (Optional)	
<b>Fast Storage</b>	N/A		256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage per Node (Optional)	
<b>Expansion Array Connections</b>	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 16Gb FC Ports on Each Node	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 12 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 12 x 16Gb FC Ports on Each Node
<b>Max. Supported Storage Drives*</b>	Supports up to 1776 Drives with HA RAID/EBOD Expansion (888 Drive Maximum with Multipathing Upgrade Option)		Supports up to 5328 Drives with HA RAID/EBOD Expansion (2664 Drive Maximum with Multipathing Upgrade Option)	
<b>Network Ports</b>	Six Bonded 10Gb RJ-45 (Backwards Compatible with 1Gb) or Four Bonded 10Gb SFP+ Connections per Cluster		Four Bonded 10Gb RJ-45 iSCSI Connections per Cluster (Backwards Compatible with 1Gb)	
<b>Available Slots for Additional Cards</b>	Up to 1 PCI-E Slot per Node Can Be Used For Optional Network Card, FC SAN Target or HBA for HA Expansion Upgrades		Up to 5 PCI-E Slots per Node Can Be Used For Optional Network Card, FC SAN Target and/or HBA for HA Expansion Upgrades	
<b>Interface Options</b>	Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC			
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN per Node			
<b>Power Supplies</b>	750W (100-240Vac) Redundant 80-PLUS Platinum Hot-Swappable PS per Node		800W (100-127Vac) / 1000W (200-240Vac) Redundant 80-PLUS Titanium Hot-Swappable PS per Node	
<b>Form Factor</b>	Two 1U Rackmounts		Two 2U Rackmounts	
<b>Dimensions (H x W x D)</b>	1.7” x 17.2” x 29.7” per Node (3.5” Total Rack Height for Two-Node Cluster)		3.5” x 17.2” x 25.5” per Node (7” Total Rack Height for Two-Node Cluster)	

**Note:** For the hardware specifications of supported XS-Series HA RAID arrays, please refer to the [Voyager HA RAID Expansion Array Models](#) section. Please refer to Chapter 2 for more information about available network port upgrades (2.3), supported storage drive capacities (2.2), raw storage capacities (2.2.1), processor (2.4), system memory (2.4), and SSD for OS (2.4), and other upgrades.

### Hardware Specification - StoneFly Voyager High-Availability RAID Array Appliance Models

Following are the hardware specifications of supported HA RAID arrays for the Voyager DX and Voyager FC enterprise disaggregated HA cluster appliances.

**Note:** The following HA RAID array models are supported by Voyager I-Series, D-Series, XS-Series & XD-Series HA appliances.

	24 x 2.5" 2U HA RAID Array	12 x 3.5" 2U HA RAID Array	16 x 3.5" 3U HA RAID Array	24 x 3.5" 4U HA RAID Array
<b>Host Interface</b>	12Gb SAS or 16Gb FC (depending on Voyager model selected)			
<b>RAID</b>	Built-in Dual Active-Active Hot-Swappable RAID Controllers with Transparent Failover/Failback			
<b>Supported RAID Levels</b>	0, 1, 0+1, 3, 5, 6, 10, 30, 50 and 60 and Global Spares with RAID Cache Backup Module on Each Controller			
<b>Drive Bays</b>	24 x 2.5"	12 x 3.5" (or 2.5")	16 x 3.5" (or 2.5")	24 x 3.5" (or 2.5")
<b>Supported Storage Drives</b>	12Gb SAS drives: SSD	12Gb SAS drives: 7.2k, SSD		
<b>Expansion</b>	Supports up to 444 Drives with HA EBOD Expansion	Supports up to 432 Drives with HA EBOD Expansion	Supports up to 436 Drives with HA EBOD Expansion	Supports up to 444 Drives with HA EBOD Expansion
<b>Power Supplies</b>	Redundant 80-PLUS® Certified Hot-Swappable Power Supplies			
<b>Power Output/Input</b>	460W (100-240Vac)			
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount
<b>Dimensions (H x W x D)*</b>	3.5" x 17.7" x 19.7"	3.5" x 17.7" x 19.7"	5.2" x 17.7" x 19.7"	7" x 17.7" x 19.7"

\* Excluding chassis ears and protrusions.

## 4.3 Unified Storage Appliances

StoneFly Unified Scale Out (USO) storage appliances deliver the converged storage experience with the ability to store NAS (file-level), SAN (block-level), and Cloud (object-level / S3) storage in a single, easy-to-manage storage system.

Our storage OS enables StoneFly USO appliance users to integrate enterprise-grade data services, optimize data storage and simplify their data storage journey by leveraging a single solution for all their storage needs.

StoneFly offers the following Unified storage appliances:

- Unified Scale Out (USO) Appliances: I-Series, D-Series, XS-Series & XD-Series
- Disaggregated High Availability (HA) Appliances – USO-HA: I-Series, D-Series, XS-Series & XD-Series
- Disaggregated High Availability (HA) Appliances –USO-FC: XS-Series & XD-Series

### Supported Hardware Configuration of USO Appliances:

- Integrated Appliance
- Dual-Node Shared Nothing
- Scale Out

### 4.3.1 Enterprise-Grade Features of StoneFly USO Appliances

#### Standard SAN + NAS Management 64-bit Operating System Features

- Logical Volume Creation and Patented Advanced Storage Virtualization Services
- 200 iSCSI Volumes Supported with 1022 Concurrent Host iSCSI Sessions
- iSCSI/NAS Port Teaming, Failover and Load-Balancing
- Volume-Level Access Control and Dynamic Volume Management
- Support for iSCSI, NAS (CIFS/SMB & NFS Protocols), SNMP Traps, UPS, Nagios, RAID Monitoring, Call Home, VMware VAAI Support for iSCSI Volumes
- Real-Time Graphical Performance Monitoring with Tracking & Utilization Reporting
- Automated Online Volume / Storage Expansion
- Supports up to 200 iSCSI Hosts and Unlimited NAS Clients

#### Advanced SAN + NAS Management 64-bit Operating System Features

- StoneFly Snapshot Services with 2520 Delta-Based Snapshots per Subsystem of iSCSI Volumes and 945 Delta-Based Snapshots per Subsystem of NAS Volumes
  - Mountable Read-Write (iSCSI) / Read-Only (NAS) Snapshot Volumes
  - Snapshot Schedule Utility, Command Line Interface Utility, NAS Volume and Directory Quotas
  - Scale Out NAS using a Single Name Space to Scale Capacity & Performance
  - StoneFly Real-Time Synchronous Mirroring of iSCSI Volumes and Nodes (Campus Mirroring)
-



- StoneFly Synchronous Replication of NAS Volumes (Failover Cluster Only)
- Multi-Site/Multi-Appliance Replication and Unified Central Management System
- NAS Segment AES256 Data Encryption
- WORM (Write-Once, Read-Many) Compliant Policy-Based NAS Storage Support Protects Data from Deletion, Modification, Viruses & Ransomware
- Built-In Virus, Malware and Ransomware Detection and Removal for NAS Volumes
- Thin Provisioning with Space Reclamation of iSCSI Volumes
- Tiered Storage Architecture with Hardware and Software Support
- Available Upgrade Options (Not Included Standard): iSCSI Asynchronous Replication (One-to-Many & Many-to-One), Hardware-Enabled iSCSI Volume Encryption, Fibre Channel SAN Target Bundle, NAS/iSCSI Data Deduplication, iSCSI Flash Cache SSD Caching, VSS Support

### **Cloud-Enabled Storage Platform**

StoneFly USO appliances come in the base iSCSI + NAS configuration with support for optional Fibre Channel SAN Target upgrade and cloud integration.

By leveraging the StoneFly StoneFusion OS, users can integrate Azure, Amazon S3, any other S3-compatible cloud, or the StoneFly private cloud with their existing storage infrastructure. This delivers cloud-like experiences to the on-premises platform; making it simpler for end-users to store terabytes to petabytes of data in a budget friendly hybrid storage solution.

### **Highly Scalable SAN + NAS Solution**

StoneFly's unified storage platform is a unique storage experience because it delivers scalability for SAN workloads. With integrated NAS volumes support, StoneFly USO users are enabled to scale out to as many nodes as they need and leverage the available storage capacity for not just NAS workloads, but also SAN workloads.

The addition of appliance nodes also increases performance capabilities proportional to the storage capacities. For enterprises and SMBs looking to facilitate a variety of workloads in a simple storage solution, StoneFly USO SAN + NAS appliances are the best choice to make.

For details, visit the StoneFly website: <https://stonefly.com/storage/uso-appliance>

**Hardware Specification - USO SAN + NAS Integrated Appliance Models: I-Series**

	8-bay	12-bay	16-bay	24-bay	36-bay
<b>Storage OS</b>	StoneFly StoneFusion SAN + NAS Management 64-Bit Operating System				
<b>Processor</b>	4-Core Intel Processor (Standard) / 6 or 8-Core Intel Processor (Optional)				
<b>System Memory</b>	8GB (Standard) / Up to 64GB (Optional)				
<b>SSD for OS</b>	256GB NVMe SSD (Standard) / Up to 3.8TB NVMe SSD (Optional)				
<b>Fast Storage</b>	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage (Optional)				
<b>RAID Controller</b>	High Performance 12Gb SAS Hardware RAID Controller (Standard) / with RAID Cache Battery Backup (Optional)				
<b>Supported RAID Levels</b>	RAID 0, 1, 3, 5, 6, 10, 30, 50, 60				
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"
<b>Supported Storage Drives</b>	12Gb SAS: 7.2k, SSD				
<b>Network Ports</b>	1Gb RJ-45 Ethernet Connection Shared for SAN + NAS Data and Management Requires PCI-E Network Card for Data Ports (See Below)				
<b>Available Slots for Additional Network Ports</b>	1 PCI-E Slot for Required Network Card (1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical or 40Gb QSFP+); Up to 2 PCI-E Slots Can Be Used for Optional RAID Cache Battery Backup or FC SAN Target Upgrades				
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable	Redundant 80-PLUS Platinum Hot-Swappable	Redundant 80-PLUS Titanium Hot-Swappable PS		
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)		
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount	
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"		5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"

### Hardware Specification - USO SAN + NAS Integrated Appliance Models: D-Series

The following appliance models can also be used to configure USO Dual-Node Shared Nothing and Scale Out storage systems.

	4-bay	6-bay	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion SAN + NAS Management 64-Bit Operating System							
<b>Processor</b>	4-Core Xeon Processor (Standard) / 6 or 8-Core Xeon Processor (Optional)							
<b>System Memory</b>	32GB (Standard) / Up to 128GB (Optional)							
<b>SSD for OS</b>	128GB Flash							
<b>RAID Controller</b>	High-Performance 6Gb SATA Hardware RAID Controller		High Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup					
<b>Supported RAID Levels</b>	RAID 0, 1, 5, 6, 10	RAID 0, 1, 5, 6, 10, 50	RAID 0, 1, 3, 5, 6, 10, 30, 50, 60					
<b>Drive Bays</b>	4 x 3.5"	6 x 3.5"	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	6Gb SATA: • 7.2k, SSD		12Gb SAS: 7.2k, SSD				12Gb SAS: SSD	
<b>Expansion</b>	No External Expansion			Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 iSCSI + NAS Connections (Standard) / Dual Bonded 10Gb SFP+ on Select 8-Core Xeon Models* (Optional) <small>* SFP+ network upgrade option not available on 4-bay or 6-bay model.</small>							
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN							
<b>Power Supplies</b>	80-PLUS Bronze PS	High Efficiency PS	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	250W (100-240Vac)	500W (100-240Vac)	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	Mini-Tower	2U Rackmount			3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	9.5" x 8.3" x 11"	3.5" x 16.9" x 26"	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

### Hardware Specification - USO SAN + NAS Integrated Appliance Models: XS-Series

The following appliance models can also be used to configure USO Dual-Node Shared Nothing and Scale Out storage systems.

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion SAN + NAS Management 64-Bit Operating System					
<b>Processor</b>	10-Core Xeon Processor (Standard) / 12, 16, 18, 20, 24 or 28-Core Xeon Processor (Optional)					
<b>System Memory</b>	32GB (Standard) / Up to 1TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, SSD					12Gb SAS drives: SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 iSCSI + NAS Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 2 PCI-E Slots Can Be Used For Optional Network Card or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

### Hardware Specification - USO SAN + NAS Integrated Appliance Models: XD-Series

The following appliance models can also be used to configure USO Dual-Node Shared Nothing and Scale Out storage systems.

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion SAN + NAS Management 64-Bit Operating System					
<b>Processors</b>	Dual 10-Core Xeon Processors (Standard) / Dual 12, 16, 18, 20, 24 or 28-Core Xeon Processors (Optional)					
<b>System Memory</b>	64GB (Standard) / Up to 2TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>Fast Storage</b>	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, SSD					12Gb SAS drives: SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 iSCSI + NAS Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 4 PCI-E Slots Can Be Used For Optional Network Card(s) or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

All StoneFly USO appliances come standard with NAS, iSCSI and S3 support, but can also support the following Fibre Channel (FC) SAN Target port upgrades: 2 x 8Gb, 4 x 8Gb, and 2 x 16Gb FC Ports.

Please refer to Chapter 2 for more information about available network port upgrades (2.3), supported storage drive capacities (2.2), raw storage capacities (2.2.1), processor (2.4), system memory (2.4), and SSD for OS (2.4), and other upgrades.

### 4.3.2 Hardware Specifications of StoneFly USO-HA & USO-FC Disaggregated Cluster SAN + NAS Appliance Models

The USO-HA and USO-FC are disaggregated and modular HA cluster appliances. The USO-HA supports 12Gb SAS-attached HA RAID arrays whereas the USO-FC supports 16Gb Fibre Channel-attached HA RAID arrays.

This section details the hardware specifications of the storage controllers and the HA RAID arrays (RAID storage expansion arrays) of both the USO-HA and USO-FC appliances. For more information about StoneFly’s disaggregated storage system hardware architectures, refer to Chapter 2, section 2.1.4.

#### Hardware Specification – StoneFly USO-HA Storage Controller Appliance Models: I-Series

	Dual 2U Rackmount with 12Gb SAS Storage Expansion Support
<b>Storage OS</b>	StoneFly StoneFusion SAN + NAS Management 64-Bit Operating System with Active-Active Clustering Services on each Node
<b>Processor</b>	4-Core Intel Processor (Standard) / 6 or 8-Core Intel Processor (Optional)
<b>System Memory</b>	8GB per Node (Standard) / Up to 64GB per Node (Optional)
<b>NVMe SSD for OS</b>	256GB NVMe SSD for OS in Each Node (Standard) / Up to 3.8TB NVMe SSD for OS in Each Node (Optional)
<b>Expansion Array Connections</b>	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays Optional Upgrade to 4 x 12Gb SAS Ports on Each Cluster Node
<b>Maximum Supported Storage Drives</b>	Supports up to 1776 Drives with HA RAID/EBOD Expansion (888 Drive Maximum with Multipathing Upgrade Option)
<b>Network Ports</b>	Two 1Gb RJ-45 Ethernet Connections Shared for iSCSI + NAS Data and Management per Cluster Requires PCI-E Network Cards for Data Ports (See Below)
<b>Available Slots for Additional Cards</b>	1 PCI-E Slot per Node for Required Network Card (1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical or 40Gb QSFP+); Up to 1 PCI-E Slot per Node for Optional FC SAN Target or HBA for HA Expansion Upgrades
<b>Power Supply</b>	600W (100-240Vac) 80-PLUS Platinum PS per Node
<b>Form Factor</b>	Two 2U Rackmounts
<b>Dimensions (H x W x D)</b>	3.5” x 17.2” x 25.5” per Node (7” Total Rack Height for Two-Node Cluster)

**Note:** For the hardware specifications of supported I-Series HA RAID arrays, please refer to the [USO-HA & USO-FC HA RAID Expansion Array Models](#) section.

**Hardware Specification – StoneFly USO-HA Storage Controller Appliance Models: D-Series**

	<b>Dual 2U Rackmounts with 12Gb SAS Storage Expansion Support</b>
<b>Storage OS</b>	StoneFly StoneFusion SAN + NAS Management 64-Bit Operating System with Active-Active Clustering Services on each Node
<b>Processor</b>	4-Core Xeon Processor per Node (Standard) / 6 or 8-Core Xeon Processor per Node (Optional)
<b>System Memory</b>	32GB per Node (Standard) / Up to 128GB per Node (Optional)
<b>SSD for OS</b>	240GB SSD for OS per Node (Standard) / Up to 3.8TB SSD for OS per Node (Optional)
<b>Expansion Array Connections</b>	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Array(s)
<b>Maximum Supported Storage Drives</b>	Supports up to 888 Drives with HA RAID/EBOD Expansion (444 Drive Maximum with Multipathing Upgrade Option)
<b>Network Ports</b>	Quad Bonded 10Gb RJ-45 iSCSI + NAS Connections per Cluster (Backwards Compatible with 1Gb) / Quad Bonded 10Gb SFP+ Connections per Cluster on Select 8-Core Xeon Models (Optional)
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN per Node
<b>Power Supply</b>	600W (100-240Vac) 80-PLUS Platinum PS per Node
<b>Form Factor</b>	Two 2U Rackmounts
<b>Dimensions (H x W x D)</b>	3.5” x 17.2” x 25.5” per Node (7” Total Rack Height for Two-Node Cluster)

**Note:** For the hardware specifications of supported D-Series HA RAID arrays, please refer to the [USO-HA & USO-FC HA RAID Expansion Array Models](#) section.

**Hardware Specification – StoneFly USO-HA & USO-FC Storage Controller Appliance Models: XS-Series**

	Dual 1U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 1U Rackmounts with 16Gb FC Storage Expansion Support	Dual 2U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 2U Rackmounts with 16Gb FC Storage Expansion Support
<b>Storage OS</b>	StoneFly StoneFusion SAN + NAS Management 64-Bit Operating System with Active-Active Clustering Services on each Node			
<b>Processor</b>	10-Core Xeon Processor per Node (Standard) / 12, 16, 18, 20, 24 or 28-Core Xeon Processor per Node (Optional)			
<b>System Memory</b>	32GB per Node (Standard) / Up to 768GB per Node (Optional)		32GB per Node (Standard) / Up to 1TB per Node (Optional)	
<b>NVMe SSD for OS</b>	256GB NVMe SSD for OS per Node / Up to 3.8TB NVMe SSD for OS per Node (Optional)			
<b>Expansion Array Connections</b>	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 16Gb FC Ports on Each Node	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 8 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 8 x 16Gb FC Ports on Each Node
<b>Max. Supported Storage Drives*</b>	Supports up to 1776 Drives with HA RAID/EBOD Expansion (888 Drive Maximum with Multipathing Upgrade Option)		Supports up to 3552 Drives with HA RAID/EBOD Expansion (1776 Drive Maximum with Multipathing Upgrade Option)	
<b>Network Ports</b>	Four Bonded 10Gb RJ-45 iSCSI + NAS Connections per Cluster (Backwards Compatible with 1Gb)			
<b>Available Slots for Additional Cards</b>	Up to 1 PCI-E Slot per Node Can Be Used For Optional Network Card, FC SAN Target or HBA for HA Expansion Upgrades		Up to 3 PCI-E Slots per Node Can Be Used For Optional Network Card, FC SAN Target and/or HBA for HA Expansion Upgrades	
<b>Interface Options</b>	Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC			
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN per Node			
<b>Power Supplies</b>	500W (100-240Vac) Redundant 80-PLUS Platinum Hot-Swappable PS per Node		800W (100-127Vac) / 1000W (200-240Vac) Redundant 80-PLUS Titanium Hot-Swappable PS per Node	
<b>Form Factor</b>	Two 1U Rackmounts		Two 2U Rackmounts	
<b>Dimensions (H x W x D)</b>	1.7" x 17.2" x 25.6" per Node (3.5" Total Rack Height for Two-Node Cluster)		3.5" x 17.2" x 25.5" per Node (7" Total Rack Height for Two-Node Cluster)	

**Note:** For the hardware specifications of supported XS-Series HA RAID arrays, please refer to the [USO-HA & USO-FC HA RAID Expansion Array Models](#) section.



**Hardware Specification – StoneFly USO-HA & USO-FC Storage Controller Appliance Models: XD-Series**

	Dual 1U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 1U Rackmounts with 16Gb FC Storage Expansion Support	Dual 2U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 2U Rackmounts with 16Gb FC Storage Expansion Support
<b>Storage OS</b>	StoneFly StoneFusion SAN + NAS Management 64-Bit Operating System with Active-Active Clustering Services on each Node			
<b>Processors</b>	Dual 10-Core Xeon Processors per Node (Standard) / Dual 12, 16, 18, 20, 24 or 28-Core Xeon Processors per Node (Optional)			
<b>System Memory</b>	64GB per Node (Standard) / Up to 3TB per Node (Optional)		64GB per Node (Standard) / Up to 2TB per Node (Optional)	
<b>SSD for OS</b>	240GB SSD for OS per Node (Standard) / Up to 3.8TB SSD for OS per Node (Optional)		256GB NVMe SSD for OS per Node / Up to 3.8TB NVMe SSD for OS per Node (Optional)	
<b>Fast Storage</b>	N/A		256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage per Node (Optional)	
<b>Expansion Array Connections</b>	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 16Gb FC Ports on Each Node	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 12 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 12 x 16Gb FC Ports on Each Node
<b>Max. Supported Storage Drives*</b>	Supports up to 1776 Drives with HA RAID/EBOD Expansion (888 Drive Maximum with Multipathing Upgrade Option)		Supports up to 5328 Drives with HA RAID/EBOD Expansion (2664 Drive Maximum with Multipathing Upgrade Option)	
<b>Network Ports</b>	Six Bonded 10Gb RJ-45 iSCSI + NAS (Backwards Compatible with 1Gb) or Four Bonded 10Gb SFP+ Connections per Cluster		Four Bonded 10Gb RJ-45 iSCSI + NAS Connections per Cluster (Backwards Compatible with 1Gb)	
<b>Available Slots for Additional Cards</b>	Up to 1 PCI-E Slot per Node Can Be Used For Optional Network Card, FC SAN Target or HBA for HA Expansion Upgrades		Up to 5 PCI-E Slots per Node Can Be Used For Optional Network Card, FC SAN Target and/or HBA for HA Expansion Upgrades	
<b>Interface Options</b>	Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC			
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN per Node			
<b>Power Supplies</b>	750W (100-240Vac) Redundant 80-PLUS Platinum Hot-Swappable PS per Node		800W (100-127Vac) / 1000W (200-240Vac) Redundant 80-PLUS Titanium Hot-Swappable PS per Node	
<b>Form Factor</b>	Two 1U Rackmounts		Two 2U Rackmounts	
<b>Dimensions (H x W x D)</b>	1.7" x 17.2" x 29.7" per Node (3.5" Total Rack Height for Two-Node Cluster)		3.5" x 17.2" x 25.5" per Node (7" Total Rack Height for Two-Node Cluster)	

\* Cluster Nodes with 16Gb FC Storage Expansion support a nearly unlimited number of drives with addition of FC switch(es).

**Note:** For the hardware specifications of supported XD-Series HA RAID arrays, please refer to the [USO-HA & USO-FC HA RAID Expansion Array Models](#) section.

**Hardware Specification - StoneFly USO-HA & USO-FC High-Availability RAID Array Appliance Models**

Following are the hardware specifications of supported HA RAID arrays for the USO-HA and USO-FC enterprise HA cluster appliances.

**Note:** The following HA RAID arrays can be configured with I-Series, D-Series, XS-Series and XD-Series storage controllers.

	24 x 2.5" 2U HA RAID Array	12 x 3.5" 2U HA RAID Array	16 x 3.5" 3U HA RAID Array	24 x 3.5" 4U HA RAID Array
<b>Host Interface</b>	12Gb SAS or 16Gb FC (depending on USS-HA model selected)			
<b>RAID</b>	Built-in Dual Active-Active Hot-Swappable RAID Controllers with Transparent Failover/Failback			
<b>Supported RAID Levels</b>	0, 1, 0+1, 3, 5, 6, 10, 30, 50 and 60 and Global Spares with RAID Cache Backup Module on Each Controller			
<b>Drive Bays</b>	24 x 2.5"	12 x 3.5" (or 2.5")	16 x 3.5" (or 2.5")	24 x 3.5" (or 2.5")
<b>Supported Storage Drives</b>	12Gb SAS drives: SSD	12Gb SAS drives: 7.2k, SSD		
<b>Expansion</b>	Supports up to 444 Drives with HA EBOD Expansion	Supports up to 432 Drives with HA EBOD Expansion	Supports up to 436 Drives with HA EBOD Expansion	Supports up to 444 Drives with HA EBOD Expansion
<b>Power Supplies</b>	Redundant 80-PLUS® Certified Hot-Swappable Power Supplies			
<b>Power Output/Input</b>	460W (100-240Vac)			
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount
<b>Dimensions (H x W x D)*</b>	3.5" x 17.7" x 19.7"	3.5" x 17.7" x 19.7"	5.2" x 17.7" x 19.7"	7" x 17.7" x 19.7"

\* Excluding chassis ears and protrusions.

## 4.4 Live VM Migration DTDs

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StoneFly's innovative storage technology enables users to migrate live VMware Virtual Machines (VMs) without turning them off or disrupting the workflow. We provide a complete end-to-end service that includes certified live VM migration DTDs and a VMware certified plugin.

The migration software is a one-time utility that can be removed from the virtualized environment after the migration process is completed. Our live VM migration solution enables users to migrate product VMs between:

- Physical-to-Physical VMware Environments
- Physical-to-Cloud VMware Environments
- Cloud-to-Physical VMware Environments
- Cloud-to-Cloud VMware Environments

### 4.4.1 Live VM Migration Software Features

The VMware certified migration software delivers the following standard features to StoneFly clients:

- Migration time estimation with I/O monitoring and migration time forecasting
- Dual backpressure control with throttling and I/O control
- Fault-tolerant data migration that continues the migration process in the event of disruption (instead of starting over)
- Automate migration, VM spin up and change-over
- VMware-ready with support for standard VMware protocols: VMFS, NFS, or vSAN
- Visual statistics and notifications about incidents, interruptions or task completion

### 4.4.2 Live VM Migration Data Transfer Devices (DTDs)

StoneFly live VM migration DTDs are available with support for the following hardware configurations and appliance series:

- Integrated Appliances: D-Series, XS-Series & XD-Series.

**Note:** The DTD appliances are high performance storage infrastructure that can be repurposed to provide on-going value after the VM migration is concluded. For more details, contact [StoneFly pre-sales engineers](#).

For details, visit the StoneFly website: <https://stonefly.com/live-vm-migration-dtds>

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## Hardware Specification – Live VM Migration Appliance Models: D-Series

	4-bay Gen 1	6-bay Gen 1	8-bay Gen 2	12-bay Gen 2	16-bay Gen 2	24-bay (3.5") Gen 2	36-bay Gen 2	24-bay (2.5") Gen 2
<b>Hypervisor</b>	Supports VMware vSphere, Microsoft Hyper-V, Citrix		Supports VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis					
<b>Processor</b>	8-Core Xeon Processor		4-Core Xeon Processor (Standard) / 8-Core Xeon Processor (Optional)					
<b>System Memory</b>	32GB (Standard) / Up to 128GB (Optional)		32GB (Standard) / Up to 256GB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)							
<b>RAID Controller</b>	High-Performance 6Gb SATA Hardware RAID Controller		High Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup					
<b>Supported RAID Levels</b>	RAID 0, 1, 5, 6, 10	RAID 0, 1, 5, 6, 10, 50	RAID 0, 1, 3, 5, 6, 10, 30, 50, 60					
<b>Drive Bays</b>	4 x 3.5"	6 x 3.5"	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	6Gb SATA: • 7.2k, SSD		12Gb SAS: 7.2k, SSD			12Gb SAS: SSD		
<b>Expansion</b>	No External Expansion			Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 Ports		Dual Bonded 10Gb RJ-45, Dual 10Gb SFP+ and Triple 1Gb RJ-45 Ports					
<b>Available Slots for Additional Network Ports</b>	No additional slots		Up to 1 PCI-E Slots Can Be Used For Optional Network Card or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN							
<b>Power Supplies</b>	80-PLUS Bronze PS	High Efficiency PS	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	250W (100-240Vac)	500W (100-240Vac)	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	Mini-Tower	2U Rackmount			3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	9.5" x 8.3" x 11"	3.5" x 16.9" x 26"	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

### Hardware Specification – Live VM Migration Appliance Models: XS-Series

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Hypervisor</b>	Supports VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis					
<b>Processor</b>	10-Core Xeon Processor (Standard) / 12, 16, 18, 20, 24 or 28-Core Xeon Processor (Optional)					
<b>System Memory</b>	32GB (Standard) / Up to 1TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, SSD					12Gb SAS drives: SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 Ethernet Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 2 PCI-E Slots Can Be Used For Optional Network Card or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

### Hardware Specification – Live VM Migration Appliance Models: XD-Series

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Hypervisor</b>	Supports VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis					
<b>Processors</b>	Dual 10-Core Xeon Processors (Standard) / Dual 12, 16, 18, 20, 24 or 28-Core Xeon Processors (Optional)					
<b>System Memory</b>	64GB (Standard) / Up to 2TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>Fast Storage</b>	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, SSD					12Gb SAS drives: SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 Ethernet Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 4 PCI-E Slots Can Be Used For Optional Network Card(s) or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

All StoneFly VM migration DTDs come standard with NAS, iSCSI and S3 support, but can also support the following Fibre Channel (FC) SAN Target port upgrades: 2 x 8Gb, 4 x 8Gb or 2 x 16Gb FC Ports.

## 4.5 S3 Object Storage Solutions

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The StoneFly storage operating system (StoneFusion on bare-metal or SCVM on HCI) enables users to provision cloud-native local S3 storage repositories. The storage OS also enables users to provision S3 storage repositories in AWS cloud (or any other S3 compatible cloud) and integrate it with on-premises servers and storage infrastructure.

With our storage OS, users can:

- Provision S3 storage in AWS cloud (refer to chapter 5 for cloud storage)
- Configure local S3 storage appliances

We also offer fully provisioned cloud-native S3 storage appliances: S3 storage software + storage hardware.

### Supported Hardware Configurations:

- Integrated Appliances
- Dual-Node Shared Nothing
- Scale Out
- Disaggregated High Availability (HA) Appliances

StoneFly offers three appliance series that can be used to set up any of the above hardware configurations: I-Series, D-Series, XS-Series and XD-Series.

### 4.5.1 Enterprise-Grade Features of StoneFly S3 Object Storage Appliances

#### Standard Storage Management 64-bit Operating System Features

- Logical Volume Creation and Patented Advanced Storage Virtualization Services
- 200 iSCSI Volumes Supported with 1022 Concurrent Host iSCSI Sessions
- iSCSI/NAS Port Teaming, Failover and Load-Balancing
- Volume-Level Access Control and Dynamic Volume Management
- Support for iSCSI, NAS (CIFS/SMB & NFS Protocols), SNMP Traps, UPS, Nagios, RAID Monitoring, Call Home, VMware VAAI Support for iSCSI Volumes
- Real-Time Graphical Performance Monitoring with Tracking & Utilization Reporting
- Automated Online Volume / Storage Expansion
- Supports up to 200 iSCSI Hosts and Unlimited NAS Clients

#### Advanced Storage Management 64-bit Operating System Features

- StoneFly Snapshot Services with 2520 Delta-Based Snapshots per Subsystem of iSCSI Volumes and 945 Delta-Based Snapshots per Subsystem of NAS Volumes
  - Mountable Read-Write (iSCSI) / Read-Only (NAS) Snapshot Volumes
  - Snapshot Schedule Utility, Command Line Interface Utility, NAS Volume and Directory Quotas
-

- Scale Out NAS using a Single Name Space to Scale Capacity & Performance
- StoneFly Real-Time Synchronous Mirroring of iSCSI Volumes and Nodes (Campus Mirroring)
- StoneFly Synchronous Replication of NAS Volumes (Failover Cluster Only)
- Multi-Site/Multi-Appliance Replication and Unified Central Management System
- NAS Segment AES256 Data Encryption
- WORM (Write-Once, Read-Many) Compliant Policy-Based NAS Storage Support Protects Data from Deletion, Modification, Viruses & Ransomware
- Built-In Virus, Malware and Ransomware Detection and Removal for NAS Volumes
- Thin Provisioning with Space Reclamation of iSCSI Volumes
- Tiered Storage Architecture with Hardware and Software Support

**Available Upgrade Options:** iSCSI Asynchronous Replication (One-to-Many & Many-to-One), Hardware-Enabled iSCSI Volume Encryption, Fibre Channel SAN Target Bundle, NAS/iSCSI Data Deduplication, iSCSI Flash Cache SSD Caching, VSS Support

### Highly Scalable Storage Infrastructure

StoneFly S3 object storage appliances can start from a single appliance node with terabytes of storage capacity and scale out to virtually unlimited number of appliance nodes with proportional compute capabilities and storage capacities.

The S3 storage appliances deliver cloud-like scalability and combine with the performance of on-premises systems with multi-core processors and several gigabytes to terabytes of system memory.

### Local S3 Storage for Rubrik, Veeam, Commvault, Veritas, etc.

The S3 storage appliances can be configured as storage repositories for any backup software or relational database that is compatible with the industry standard S3 storage protocol.

By setting up local S3 storage appliances, StoneFly customers do not have to worry about challenges such as:

- Egress costs
- Compliance
- File size limitations
- Bandwidth / Network usage
- Server security

For details, visit the StoneFly website: <https://stonefly.com/s3-object-storage>

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### Hardware Specification – S3 Object Storage Appliance Models: I-Series

	8-bay	12-bay	16-bay	24-bay	36-bay
<b>Storage OS</b>	StoneFly StoneFusion Storage Management 64-Bit Operating System				
<b>Processor</b>	4-Core Intel Processor (Standard) / 6 or 8-Core Intel Processor (Optional)				
<b>System Memory</b>	8GB (Standard) / Up to 64GB (Optional)				
<b>SSD for OS</b>	256GB NVMe SSD (Standard) / Up to 3.8TB NVMe SSD (Optional)				
<b>Fast Storage</b>	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage (Optional)				
<b>RAID Controller</b>	High Performance 12Gb SAS Hardware RAID Controller (Standard) / with RAID Cache Battery Backup (Optional)				
<b>Supported RAID Levels</b>	RAID 0, 1, 3, 5, 6, 10, 30, 50, 60				
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"
<b>Supported Storage Drives</b>	12Gb SAS: 7.2k, SSD				
<b>Network Ports</b>	1Gb RJ-45 Ethernet Connection Shared for Data and Management Requires PCI-E Network Card for Data Ports (See Below)				
<b>Available Slots for Additional Network Ports</b>	1 PCI-E Slot for Required Network Card (1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical or 40Gb QSFP+); Up to 2 PCI-E Slots Can Be Used for Optional RAID Cache Battery Backup or FC SAN Target Upgrades				
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable	Redundant 80-PLUS Platinum Hot-Swappable	Redundant 80-PLUS Titanium Hot-Swappable PS		
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)		
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount	
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"		5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"

### Hardware Specification – S3 Object Storage Appliance Models: D-Series

	4-bay	6-bay	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion S3 Storage Management 64-Bit Operating System							
<b>Processor</b>	4-Core Xeon Processor (Standard) / 6 or 8-Core Xeon Processor (Optional)							
<b>System Memory</b>	32GB (Standard) / Up to 128GB (Optional)							
<b>SSD for OS</b>	128GB Flash							
<b>RAID Controller</b>	High-Performance 6Gb SATA Hardware RAID Controller		High Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup					
<b>Supported RAID Levels</b>	RAID 0, 1, 5, 6, 10	RAID 0, 1, 5, 6, 10, 50	RAID 0, 1, 3, 5, 6, 10, 30, 50, 60					
<b>Drive Bays</b>	4 x 3.5"	6 x 3.5"	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	6Gb SATA: • 7.2k, SSD		12Gb SAS: 7.2k, SSD				12Gb SAS: SSD	
<b>Expansion</b>	No External Expansion			Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 Ethernet Connections (Standard) / Dual Bonded 10Gb SFP+ on Select 8-Core Xeon Models* (Optional) <small>* SFP+ network upgrade option not available on 4-bay and 6-bay models.</small>							
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN							
<b>Power Supplies</b>	80-PLUS Bronze PS	High Efficiency PS	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	250W (100-240Vac)	500W (100-240Vac)	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	Mini-Tower	2U Rackmount			3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	9.5" x 8.3" x 11"	3.5" x 16.9" x 26"	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

### Hardware Specification – S3 Object Storage Appliance Models: XS-Series

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion S3 Storage Management 64-Bit Operating System					
<b>Processor</b>	10-Core Xeon Processor (Standard) / 12, 16, 18, 20, 24 or 28-Core Xeon Processor (Optional)					
<b>System Memory</b>	32GB (Standard) / Up to 1TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, SSD					12Gb SAS drives: SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 Ethernet Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 2 PCI-E Slots Can Be Used For Optional Network Card or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

### Hardware Specification – S3 Object Storage Appliance Models: XD-Series

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Storage OS</b>	StoneFly StoneFusion S3 Storage Management 64-Bit Operating System					
<b>Processors</b>	Dual 10-Core Xeon Processors (Standard) / Dual 12, 16, 18, 20, 24 or 28-Core Xeon Processors (Optional)					
<b>System Memory</b>	64GB (Standard) / Up to 2TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>Fast Storage</b>	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, SSD					12Gb SAS drives: SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 Ethernet Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 4 PCI-E Slots Can Be Used For Optional Network Card(s) or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

All StoneFly S3 object storage appliances come standard with NAS, iSCSI and S3 support, but can also support the following Fibre Channel (FC) SAN Target port upgrades: 2 x 8Gb, 4 x 8Gb or 2 x 16Gb FC Ports.

## 4.6 Hyperconverged Infrastructure (HCI) Appliances

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The StoneFly Unified Storage and Server (USS) hyperconverged appliance provides a single data storage solution that combines virtualization, compute, networking and storage technologies. USS appliances can be integrated with Hyper-V, VMware, Citrix (formerly XenServer), KVM and StoneFly Persepolis hypervisors to facilitate a number of enterprise and SMB use-cases.

Our HCI appliances have the ability to support anything from terabytes to multiple petabytes of data and scale up or scale out to virtually an unlimited number of appliance nodes and storage capacities. The USS appliance series leverages the StoneFly SCVM virtual storage controller as the storage OS which enables users to simplify virtual storage provisioning, management and puts data centers owners in full control of their infrastructure and their data.

StoneFly offers the following HCI appliances:

- Unified Storage & Server (USS) Appliances: D-Series, XS-Series & XD-Series
- Disaggregated High Availability (HA) Appliances (USS-HA): D-Series, XS-Series & XD-Series

### Supported Hardware Configuration of USS Appliances:

- Integrated Appliance
- Dual-Node Shared Nothing
- Scale Out

### 4.6.1 Enterprise-Grade Features of StoneFly USS Appliances

#### Standard SCVM Virtual Storage Appliance Features

- Logical Volume Creation and Patented Advanced Storage Virtualization Services
  - 200 iSCSI Volumes Supported with 1022 Concurrent Host iSCSI Sessions
  - iSCSI Port Teaming, Failover and Load-Balancing
  - Volume-Level Access Control and Dynamic Volume Management
  - Support for iSCSI, SNMP Traps, UPS, Nagios, RAID Monitoring, Call Home, VMware VAAI
  - Real-Time Graphical Performance Monitoring with Tracking & Utilization Reporting
  - Automated Online Volume / Storage Expansion
  - Supports up to 200 iSCSI Hosts
-

### Advanced SCVM Virtual Storage Appliance Features

- StoneFly Snapshot Services with 2520 Delta-Based Snapshots per Subsystem
- Mountable Read-Write Snapshot Volumes
- Snapshot Schedule Utility, Command Line Interface Utility
- StoneFly Real-Time Synchronous Mirroring of iSCSI Volumes and Nodes (Campus Mirroring)
- Multi-Site/Multi-Appliance Replication and Unified Central Management System
- Thin Provisioning with Space Reclamation
- Tiered Storage Architecture with Hardware and Software Support
- Available Upgrade Options (Not Included Standard): Asynchronous Replication (One-to-Many & Many-to-One), Hardware-Enabled Volume Encryption, NAS (Support for CIFS/SMB and NFS Protocols), Flash Cache SSD Caching, VSS Support

### Cloud-Enabled HCI Appliances

StoneFly SCVM enables users to integrate preferred public clouds such as Azure, AWS, any other S3-compatible cloud or the StoneFly private cloud with their HCI infrastructure. This flexibility opens up a world of options for data center owners. They can replicate VMs, create backups for mission-critical data, store snapshots in the cloud, or just create redundant copies of data for high availability, business continuity and disaster recovery.

With the USS appliance series, users can build a hybrid HCI solution tailored to their business requirements.

### Highly Scalable HCI Storage

StoneFly USS appliances are easily scalable. The available form factors start from 12-bay to 36-bay and each appliance can scale up (vertical scaling) and scale out (horizontal scaling).

Each enterprise-tier appliance with 12-bays or larger can support up to 256 drives for petabytes of storage capacity. While the scale out capabilities of the USS appliances enables it to scale out to virtually an unlimited number of appliances nodes for nearly an unlimited amount of storage and proportional performance capabilities.

Simply put, the USS is a high performance enterprise-grade storage solution best fit for a number of enterprise and SMB use-cases.

For details, visit the StoneFly website: <https://stonefly.com/hyper-converged/unified-storage-server-appliances>

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### Hardware Specifications - StoneFly USS Appliance Models: D-Series

	4-bay Gen 1	6-bay Gen 1	8-bay Gen 2	12-bay Gen 2	16-bay Gen 2	24-bay (3.5") Gen 2	36-bay Gen 2	24-bay (2.5") Gen 2
<b>Hypervisor</b>	Supports VMware vSphere, Microsoft Hyper-V, Citrix		Supports VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis					
<b>Processor</b>	8-Core Xeon Processor		4-Core Xeon Processor (Standard) / 8-Core Xeon Processor (Optional)					
<b>System Memory</b>	32GB (Standard) / Up to 128GB (Optional)		32GB (Standard) / Up to 256GB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)							
<b>RAID Controller</b>	High-Performance 6Gb SATA Hardware RAID Controller		High Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup					
<b>Supported RAID Levels</b>	RAID 0, 1, 5, 6, 10	RAID 0, 1, 5, 6, 10, 50	RAID 0, 1, 3, 5, 6, 10, 30, 50, 60					
<b>Drive Bays</b>	4 x 3.5"	6 x 3.5"	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	6Gb SATA: • 7.2k, SSD		12Gb SAS: 7.2k, SSD				12Gb SAS: SSD	
<b>Expansion</b>	No External Expansion			Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 Ports		Dual Bonded 10Gb RJ-45, Dual 10Gb SFP+ and Triple 1Gb RJ-45 Ports					
<b>Available Slots for Additional Network Ports</b>	No additional slots		Up to 1 PCI-E Slots Can Be Used For Optional Network Card or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN							
<b>Power Supplies</b>	80-PLUS Bronze PS	High Efficiency PS	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	250W (100-240Vac)	500W (100-240Vac)	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	Mini-Tower	2U Rackmount			3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	9.5" x 8.3" x 11"	3.5" x 16.9" x 26"	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

### Hardware Specifications - StoneFly USS Appliance Models: XS-Series

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Hypervisor</b>	Supports VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis					
<b>Processor</b>	10-Core Xeon Processor (Standard) / 12, 16, 18, 20, 24 or 28-Core Xeon Processor (Optional)					
<b>System Memory</b>	32GB (Standard) / Up to 1TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, 10k, 15k, SSD					12Gb SAS drives: 10k, 15k, SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 Ethernet Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 2 PCI-E Slots Can Be Used For Optional Network Card or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"



### Hardware Specification - StoneFly USS Integrated Appliance Models: XD-Series

	8-bay	12-bay	16-bay	24-bay (3.5")	36-bay	24-bay (2.5")
<b>Hypervisor</b>	Supports VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis					
<b>Processors</b>	Dual 10-Core Xeon Processors (Standard) / Dual 12, 16, 18, 20, 24 or 28-Core Xeon Processors (Optional)					
<b>System Memory</b>	64GB (Standard) / Up to 2TB (Optional)					
<b>NVMe SSD for OS</b>	256GB (Standard) / Up to 3.8TB (Optional)					
<b>Fast Storage</b>	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage (Optional)					
<b>RAID Controller</b>	High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60					
<b>Drive Bays</b>	8 x 3.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	36 x 3.5"	24 x 2.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: 7.2k, 10k, 15k, SSD					12Gb SAS drives: 10k, 15k, SSD
<b>Expansion</b>	No Ext. Expansion	Supports up to 256 Total Drives via EBODs (4PB)				
<b>Network Ports</b>	Dual Bonded 10Gb RJ-45 Ethernet Connections (Backwards Compatible with 1Gb)					
<b>Available Slots for Additional Network Ports</b>	Up to 4 PCI-E Slots Can Be Used For Optional Network Card(s) or FC SAN Target Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+					
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN					
<b>Power Supplies</b>	Redundant 80-PLUS Titanium Hot-Swappable PS	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS			Redundant 80-PLUS Platinum Hot-Swappable PS
<b>Power Output/Input</b>	800W (100-127Vac) / 1000W (200-240Vac)	920W (100-240Vac)	1000W (100 – 127Vac) / 1200W (200 – 240Vac)			920W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		2U Rackmount
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 25.5"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	3.5" x 17.2" x 24.8"

All StoneFly USS appliances come standard with iSCSI, but XS-Series and XD-Series can also support the following Fibre Channel (FC) SAN Target port upgrades: 2 x 8Gb, 4 x 8Gb or 2 x 16Gb FC Ports.

Please refer to Chapter 2 for more information about available network port upgrades ([2.3](#)), supported storage drive capacities ([2.2](#)), raw storage capacities ([2.2.1](#)), processor ([2.4](#)), system memory ([2.4](#)), and SSD for OS ([2.4](#)), and other upgrades.

**Note:** StoneFly USS customers can bring their own hypervisor license, or choose to purchase Hyper-V, VMware, Citrix, KVM, or StoneFly Persepolis licenses from StoneFly.

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#### 4.6.2 Hardware Specifications of StoneFly USS-HA Enterprise Disaggregated HCI Cluster Appliance Models

StoneFly USS-HA is a disaggregated and modular HCI cluster appliance series. The USS-HA supports 12Gb SAS-attached HA RAID arrays and 16Gb Fibre Channel-attached HA RAID arrays depending on the model.

This section details the hardware specifications of the storage controllers and the HA RAID arrays (RAID storage expansion arrays) of the USS-HA appliances. For more information about StoneFly’s disaggregated storage system hardware architectures, refer to Chapter 2, [section 2.1.4](#).

#### Hardware Specification - StoneFly USS-HA Disaggregated HCI Cluster Storage Controller Appliance Models: D-Series

	Dual 2U Rackmounts with 12Gb SAS Storage Expansion Support
<b>Hypervisor</b>	Supports Cluster-Enabled High-Availability Hypervisor: VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis
<b>Processor</b>	4-Core Xeon Processor per Node (Standard) / 8-Core Xeon Processor per Node (Optional)
<b>System Memory</b>	32GB per Node (Standard) / Up to 256GB per Node (Optional)
<b>NVMe SSD for OS</b>	256GB NVMe SSD for OS per Node (Standard) / Up to 3.8TB SSD for OS per Node (Optional)
<b>Expansion Array Connections</b>	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Array(s)
<b>Maximum Supported Storage Drives</b>	Supports up to 1776 Drives with HA RAID/EBOD Expansion (888 Drive Maximum with Multipathing Upgrade Option)
<b>Network Ports</b>	Dual 10Gb RJ-45, Dual 10Gb SFP+ (Transceiver Modules Not Included), and Triple 1Gb RJ-45 Ethernet Connectivity on Each Node [Total of 14 Network Ports per Cluster for Data Access]
<b>Available Slots for Additional Cards</b>	Up to 1 PCI-E Slot per Node Can Be Used For Optional Network Card, FC SAN Target or HBA for HA Expansion Upgrades
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN per Node
<b>Power Supply</b>	600W (100-240Vac) 80-PLUS Platinum PS per Node
<b>Form Factor</b>	Two 2U Rackmounts
<b>Dimensions (H x W x D)</b>	3.5” x 17.2” x 25.5” per Node (7” Total Rack Height for Two-Node Cluster)

**Note:** For the hardware specifications of supported D-Series HA RAID Arrays, please refer to the [USS-HA RAID Expansion Array Models](#) section.

**Hardware Specification - StoneFly USS-HA Disaggregated HCI Cluster Storage Controller Appliance Models: XS-Series**

	Dual 1U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 1U Rackmounts with 16Gb FC Storage Expansion Support	Dual 2U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 2U Rackmounts with 16Gb FC Storage Expansion Support
<b>Hypervisor</b>	Supports Cluster-Enabled High-Availability Hypervisor: VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis			
<b>Processor</b>	10-Core Xeon Processor per Node (Standard) / 12, 16, 18, 20, 24 or 28-Core Xeon Processor per Node (Optional)			
<b>System Memory</b>	32GB per Node (Standard) / Up to 768GB per Node (Optional)		32GB per Node (Standard) / Up to 1TB per Node (Optional)	
<b>NVMe SSD for OS</b>	256GB NVMe SSD for OS per Node / Up to 3.8TB NVMe SSD for OS per Node (Optional)			
<b>Expansion Array Connections</b>	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 16Gb FC Ports on Each Node	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 8 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 8 x 16Gb FC Ports on Each Node
<b>Max. Supported Storage Drives*</b>	Supports up to 1776 Drives with HA RAID/EBOD Expansion (888 Drive Maximum with Multipathing Upgrade Option)		Supports up to 3552 Drives with HA RAID/EBOD Expansion (1776 Drive Maximum with Multipathing Upgrade Option)	
<b>Network Ports</b>	Four Bonded 10Gb RJ-45 Ethernet Connections per Cluster (Backwards Compatible with 1Gb)			
<b>Available Slots for Additional Cards</b>	Up to 1 PCI-E Slot per Node Can Be Used For Optional Network Card, FC SAN Target or HBA for HA Expansion Upgrades		Up to 3 PCI-E Slots per Node Can Be Used For Optional Network Card, FC SAN Target and/or HBA for HA Expansion Upgrades	
<b>Interface Options</b>	Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC			
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN per Node			
<b>Power Supplies</b>	500W (100-240Vac) Redundant 80-PLUS Platinum Hot-Swappable PS per Node		800W (100-127Vac) / 1000W (200-240Vac) Redundant 80-PLUS Titanium Hot-Swappable PS per Node	
<b>Form Factor</b>	Two 1U Rackmounts		Two 2U Rackmounts	
<b>Dimensions (H x W x D)</b>	1.7" x 17.2" x 25.6" per Node (3.5" Total Rack Height for Two-Node Cluster)		3.5" x 17.2" x 25.5" per Node (7" Total Rack Height for Two-Node Cluster)	

\* Cluster Nodes with 16Gb FC Storage Expansion support a nearly unlimited number of drives with addition of FC switch(es).

**Note:** For the hardware specifications of supported XS-Series HA RAID Arrays, please refer to the [USS-HA RAID Expansion Array Models](#) section.

**Hardware Specification - StoneFly USS-HA Disaggregated HCI Cluster Storage Controller Appliance Models: XD-Series**

	Dual 1U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 1U Rackmounts with 16Gb FC Storage Expansion Support	Dual 2U Rackmounts with 12Gb SAS Storage Expansion Support	Dual 2U Rackmounts with 16Gb FC Storage Expansion Support
<b>Hypervisor</b>	Supports Cluster-Enabled High-Availability Hypervisor: VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis			
<b>Processors</b>	Dual 10-Core Xeon Processors per Node (Standard) / Dual 12, 16, 18, 20, 24 or 28-Core Xeon Processors per Node (Optional)			
<b>System Memory</b>	64GB per Node (Standard) / Up to 3TB per Node (Optional)		64GB per Node (Standard) / Up to 2TB per Node (Optional)	
<b>SSD for OS</b>	240GB SSD for OS per Node (Standard) / Up to 3.8TB SSD for OS per Node (Optional)		256GB NVMe SSD for OS per Node / Up to 3.8TB NVMe SSD for OS per Node (Optional)	
<b>Fast Storage</b>	N/A		256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage per Node (Optional)	
<b>Expansion Array Connections</b>	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 4 x 16Gb FC Ports on Each Node	2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 12 x 12Gb SAS Ports on Each Node	2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays  Optional Upgrade to 12 x 16Gb FC Ports on Each Node
<b>Max. Supported Storage Drives*</b>	Supports up to 1776 Drives with HA RAID/EBOD Expansion (888 Drive Maximum with Multipathing Upgrade Option)		Supports up to 5328 Drives with HA RAID/EBOD Expansion (2664 Drive Maximum with Multipathing Upgrade Option)	
<b>Network Ports</b>	Six Bonded 10Gb RJ-45 (Backwards Compatible with 1Gb) or Four Bonded 10Gb SFP+ Ethernet Connections per Cluster		Four Bonded 10Gb RJ-45 Ethernet Connections per Cluster (Backwards Compatible with 1Gb)	
<b>Available Slots for Additional Cards</b>	Up to 1 PCI-E Slot per Node Can Be Used For Optional Network Card, FC SAN Target or HBA for HA Expansion Upgrades		Up to 5 PCI-E Slots per Node Can Be Used For Optional Network Card, FC SAN Target and/or HBA for HA Expansion Upgrades	
<b>Interface Options</b>	Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC			
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN per Node			
<b>Power Supplies</b>	750W (100-240Vac) Redundant 80-PLUS Platinum Hot-Swappable PS per Node		800W (100-127Vac) / 1000W (200-240Vac) Redundant 80-PLUS Titanium Hot-Swappable PS per Node	
<b>Form Factor</b>	Two 1U Rackmounts		Two 2U Rackmounts	
<b>Dimensions (H x W x D)</b>	1.7" x 17.2" x 29.7" per Node (3.5" Total Rack Height for Two-Node Cluster)		3.5" x 17.2" x 25.5" per Node (7" Total Rack Height for Two-Node Cluster)	

\* Cluster Nodes with 16Gb FC Storage Expansion support a nearly unlimited number of drives with addition of FC switch(es).

**Note:** For the hardware specifications of supported XD-Series HA RAID Arrays, please refer to the [USS-HA RAID Expansion Array Models](#) section.

Please refer to Chapter 2 for more information about available network port upgrades ([2.3](#)), supported storage drive capacities ([2.2](#)), raw storage capacities ([2.2.1](#)), processor ([2.4](#)), system memory ([2.4](#)), and SSD for OS ([2.4](#)), and other upgrades.

**Note:** StoneFly USS-HA customers can bring their own cluster-enabled hypervisor license, or choose to purchase Hyper-V, VMware, Citrix, KVM or StoneFly Persepolis licenses from StoneFly.



### Hardware Specification - Disaggregated High-Availability RAID Array Models for StoneFly USS-HA Cluster

**Note:** The following HA RAID arrays can be configured with D-Series, XS-Series and XD-Series storage controllers.

	24 x 2.5" 2U HA RAID Array	12 x 3.5" 2U HA RAID Array	16 x 3.5" 3U HA RAID Array	24 x 3.5" 4U HA RAID Array
<b>Host Interface</b>	12Gb SAS or 16Gb FC (depending on USS-HA model selected)			
<b>RAID</b>	Built-in Dual Active-Active Hot-Swappable RAID Controllers with Transparent Failover/Failback			
<b>Supported RAID Levels</b>	0, 1, 0+1, 3, 5, 6, 10, 30, 50 and 60 and Global Spares with RAID Cache Backup Module on Each Controller			
<b>Drive Bays</b>	24 x 2.5"	12 x 3.5" (or 2.5")	16 x 3.5" (or 2.5")	24 x 3.5" (or 2.5")
<b>Supported Storage Drives</b>	12Gb SAS drives: SSD	12Gb SAS drives: 7.2k, SSD		
<b>Expansion</b>	Supports up to 444 Drives with HA EBOD Expansion	Supports up to 432 Drives with HA EBOD Expansion	Supports up to 436 Drives with HA EBOD Expansion	Supports up to 444 Drives with HA EBOD Expansion
<b>Power Supplies</b>	Redundant 80-PLUS® Certified Hot-Swappable Power Supplies			
<b>Power Output/Input</b>	460W (100-240Vac)			
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount
<b>Dimensions (H x W x D)*</b>	3.5" x 17.7" x 19.7"	3.5" x 17.7" x 19.7"	5.2" x 17.7" x 19.7"	7" x 17.7" x 19.7"

\* Excluding chassis ears and protrusions.

Please refer to Chapter 2 for more information about available network port upgrades ([2.3](#)), supported storage drive capacities ([2.2](#)), raw storage capacities ([2.2.1](#)), processor ([2.4](#)), system memory ([2.4](#)), and SSD for OS ([2.4](#)), and other upgrades.

## 4.7 SAN Gateway Appliances

StoneFly Unified Storage Concentrator (USC) gateway appliances enable users to leverage their existing iSCSI (Dell EMC, HPE, etc.), Fibre Channel (FC), or Infiniband appliances into a unified pool of storage resources integrated with enterprise-grade features to facilitate a variety of use-cases.

With the USC gateway appliances, users can also integrate cloud storage tiers with existing infrastructure and modernize their data storage experience by leveraging desired cloud storage repositories such as Azure, AWS, StoneFly private cloud or any other S3 compatible cloud.

The USC gateway appliances are available as:

- USC SAN Gateway – Integrated Appliance : XS-Series & XD-Series
- USC-HA High Availability Disaggregated Gateway Appliance: XS-Series & XD-Series

### 4.7.1 Enterprise-Grade Features of StoneFly USC Gateway Appliances

#### Standard SCVM Virtual Storage Appliance Features

- Logical Volume Creation and Patented Advanced Storage Virtualization Services
- 200 iSCSI Volumes Supported with 1022 Concurrent Host iSCSI Sessions
- iSCSI Port Teaming, Failover and Load-Balancing
- Volume-Level Access Control and Dynamic Volume Management
- Support for iSCSI, SNMP Traps, UPS, Nagios, RAID Monitoring, Call Home, VMware VAAI
- Real-Time Graphical Performance Monitoring with Tracking & Utilization Reporting
- Automated Online Volume / Storage Expansion
- Licensed to Support up to 200 iSCSI Hosts

#### Advanced SCVM Virtual Storage Appliance Features

- StoneFly Snapshot Services with 2520 Delta-Based Snapshots per Subsystem
- Mountable Read-Write Snapshot Volumes
- Snapshot Schedule Utility, Command Line Interface Utility
- StoneFly Real-Time Synchronous Mirroring of iSCSI Volumes and Nodes (Campus Mirroring)
- Multi-Site/Multi-Appliance Replication and Unified Central Management System
- Thin Provisioning with Space Reclamation
- Tiered Storage Architecture with Hardware and Software Support
- Available Upgrade Options (Not Included Standard): Asynchronous Replication (One-to-Many & Many-to-One), Hardware-Enabled Volume Encryption, Fibre Channel SAN Target Bundle, NAS (Support for CIFS/SMB and NFS Protocols), Block-Level Data Deduplication, Flash Cache SSD Caching, VSS Support

For details, visit the StoneFly website: <https://stonefly.com/hyper-converged/san-gateway-appliances>



**Hardware Specification - StoneFly USC Single-Node Appliance Models: XS-Series**

	<b>1U Rackmount</b>	<b>2U Rackmount</b>
<b>Hypervisor</b>	VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis	
<b>Processor</b>	10-Core Xeon Processor (Standard) / 12, 16, 18, 20, 24 or 28-Core Xeon Processor (Optional)	
<b>System Memory</b>	32GB (Standard) / Up to 768GB (Optional)	32GB (Standard) / Up to 1TB (Optional)
<b>NVMe SSD for OS</b>	256GB NVMe SSD for OS / Up to 3.8TB NVMe SSD for OS (Optional)	
<b>Network Ports</b>	Two Bonded 10Gb RJ-45 Ethernet Connections (Backwards Compatible with 1Gb)	
<b>Available Slots</b>	Up to 2 PCI-E Slots Can Be Used For Optional Network Card, FC SAN Target or SAS/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage	Up to 4 PCI-E Slots Can Be Used For Optional Network Card, FC SAN Target or SAS/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage
<b>Interface Options</b>	Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC	
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN	
<b>Power Supplies</b>	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS
<b>Power Output/Input</b>	500W (100-240Vac)	800W (100-127Vac) / 1000W (200-240Vac)
<b>Form Factor</b>	1U Rackmount	2U Rackmount
<b>Dimensions (H x W x D)</b>	1.7" x 17.2" x 25.6"	3.5" x 17.2" x 25.5"

### Hardware Specification - StoneFly USC Single-Node Appliance Models: XD-Series

	1U Rackmount	2U Rackmount
<b>Hypervisor</b>	VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis	
<b>Processors</b>	Dual 10-Core Xeon Processors (Standard) / Dual 12, 16, 18, 20, 24 or 28-Core Xeon Processors (Optional)	
<b>System Memory</b>	64GB (Standard) / Up to 3TB (Optional)	64GB (Standard) / Up to 2TB (Optional)
<b>SSD for OS</b>	240GB SSD for OS (Standard) / Up to 3.8TB SSD for OS (Optional)	256GB NVMe SSD for OS / Up to 3.8TB NVMe SSD for OS (Optional)
<b>Fast Storage</b>	N/A	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage (Optional)
<b>Network Ports</b>	Three Bonded 10Gb RJ-45 (Backwards Compatible with 1Gb) or Two Bonded 10Gb SFP+ Ethernet Connections	Two Bonded 10Gb RJ-45 Ethernet Connections (Backwards Compatible with 1Gb)
<b>Available Slots</b>	Up to 2 PCI-E Slots Can Be Used For Optional Network Card, FC SAN Target or SAS/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage	Up to 6 PCI-E Slots Can Be Used For Optional Network Card, FC SAN Target or SAS/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage
<b>Interface Options</b>	Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC	
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN	
<b>Power Supplies</b>	Redundant 80-PLUS Platinum Hot-Swappable PS	Redundant 80-PLUS Titanium Hot-Swappable PS
<b>Power Output/Input</b>	750W (100-240Vac)	800W (100-127Vac) / 1000W (200-240Vac)
<b>Form Factor</b>	1U Rackmount	2U Rackmount
<b>Dimensions (H x W x D)</b>	1.7" x 17.2" x 29.7"	3.5" x 17.2" x 25.5"

**Hardware Specification - StoneFly USC-HA Disaggregated Cluster SAN Gateway  
Appliance Models: XS-Series**

	Dual 1U Rackmounts	Dual 2U Rackmounts
<b>Hypervisor</b>	Supports Cluster-Enabled High-Availability Hypervisor: VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis	
<b>Processor</b>	10-Core Xeon Processor in Each Node (Standard) / 12, 16, 18, 20, 24 or 28-Core Xeon Processor in Each Node (Optional)	
<b>System Memory</b>	32GB per Node (Standard) / Up to 768GB per Node (Optional)	32GB per Node (Standard) / Up to 1TB per Node (Optional)
<b>NVMe SSD for OS</b>	256GB NVMe SSD for OS in Each Node / Up to 3.8TB NVMe SSD for OS in Each Node (Optional)	
<b>Network Ports</b>	Four Bonded 10Gb RJ-45 Ethernet Connections per Cluster (Backwards Compatible with 1Gb)	
<b>Available Slots</b>	Up to 2 PCI-E Slots per Node Can Be Used For Optional Network Card, FC SAN Target or SAS/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage	Up to 4 PCI-E Slots per Node Can Be Used For Optional Network Card, FC SAN Target or SAS/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage
<b>Interface Options</b>	Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC	
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN per Node	
<b>Power Supplies</b>	Redundant 80-PLUS Platinum Hot-Swappable PS per Node	Redundant 80-PLUS Titanium Hot-Swappable PS per Node
<b>Power Output/Input</b>	500W (100-240Vac) per Node	800W (100-127Vac) / 1000W (200-240Vac) per Node
<b>Form Factor</b>	Two 1U Rackmounts	Two 2U Rackmounts
<b>Dimensions (H x W x D)</b>	1.7" x 17.2" x 25.6" per Node (3.5" Total Rack Height for Two-Node Cluster)	3.5" x 17.2" x 25.5" per Node (7" Total Rack Height for Two-Node Cluster)

## Hardware Specification - StoneFly USC-HA Disaggregated Cluster SAN Gateway Appliance Models: XD-Series

	Dual 1U Rackmounts	Dual 2U Rackmounts
<b>Hypervisor</b>	Supports Cluster-Enabled High-Availability Hypervisor: VMware vSphere, Microsoft Hyper-V, Citrix, KVM, StoneFly Persepolis	
<b>Processors</b>	Dual 10-Core Xeon Processors in Each Node (Standard) / Dual 12, 16, 18, 20, 24 or 28-Core Xeon Processors in Each Node (Optional)	
<b>System Memory</b>	64GB per Node (Standard) / Up to 3TB per Node (Optional)	64GB per Node (Standard) / Up to 2TB per Node (Optional)
<b>SSD for OS</b>	240GB SSD for OS in Each Node (Standard) / Up to 3.8TB SSD for OS in Each Node (Optional)	256GB NVMe SSD for OS in Each Node / Up to 3.8TB NVMe SSD for OS in Each Node (Optional)
<b>Fast Storage</b>	N/A	256GB up to 3.8TB PCI-E Based NVMe SSD for Fast Data Storage per Node (Optional)
<b>Network Ports</b>	Six Bonded 10Gb RJ-45 (Backwards Compatible with 1Gb) or Four Bonded 10Gb SFP+ Ethernet Connections per Cluster	Four Bonded 10Gb RJ-45 Ethernet Connections per Cluster (Backwards Compatible with 1Gb)
<b>Available Slots</b>	Up to 2 PCI-E Slots per Node Can Be Used For Optional Network Card, FC SAN Target or SAS/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage	Up to 6 PCI-E Slots per Node Can Be Used For Optional Network Card, FC SAN Target or SAS/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage
<b>Interface Options</b>	Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC	
<b>Management</b>	Gigabit Management Port and Intelligent Platform Management Interface (IPMI) with KVM-Over-LAN per Node	
<b>Power Supplies</b>	Redundant 80-PLUS Platinum Hot-Swappable PS per Node	Redundant 80-PLUS Titanium Hot-Swappable PS per Node
<b>Power Output/Input</b>	750W (100-240Vac) per Node	800W (100-127Vac) / 1000W (200-240Vac) per Node
<b>Form Factor</b>	Two 1U Rackmounts	Two 2U Rackmounts
<b>Dimensions (H x W x D)</b>	1.7" x 17.2" x 29.7" per Node (3.5" Total Rack Height for Two-Node Cluster)	3.5" x 17.2" x 25.5" per Node (7" Total Rack Height for Two-Node Cluster)

Please refer to Chapter 2 for more information about available network port upgrades ([2.3](#)), supported storage drive capacities ([2.2](#)), raw storage capacities ([2.2.1](#)), processor ([2.4](#)), system memory ([2.4](#)), and SSD for OS ([2.4](#)), and other upgrades.

#### 4.8 Expansion Units for Integrated Appliances (EBODs)

The storage expansion units or EBODs (Expandable Bunch of Drives) are used to add more storage capacity to integrated storage appliances. StoneFly integrated appliance expansion units are capable of supporting 12Gb SAS hard drives and SSDs to increase storage capacities from a few terabytes to petabytes.

All StoneFly D-Series, XS-Series and XD-Series integrated backup & DR appliances with 12 or more internal drive bays can support up to 256 drives (including internal bays) by utilizing the following EBODs:

	24 x 2.5" 2U Expansion Unit	12 x 3.5" 2U Expansion Unit	16 x 3.5" 3U Expansion Unit	24 x 3.5" 4U Expansion Unit	44 x 3.5" 4U Expansion Unit	60 x 3.5" 4U Expansion Unit
<b>Host Interface &amp; Cascading Ports</b>	12Gbps SAS Host Port and 12Gbps SAS Port for Cascading Expansion					
<b>Drive Bays</b>	24 x 2.5"	12 x 3.5"	16 x 3.5"	24 x 3.5"	44 x 3.5"	60 x 3.5"
<b>Supported Storage Drives</b>	12Gb SAS drives: SSD	12Gb SAS drives: 7.2k, SSD				
<b>Power Supplies</b>	Redundant 80-PLUS Platinum Hot-Swappable PS		Redundant 80-PLUS Titanium Hot-Swappable PS		Redundant 80-PLUS Platinum Hot-Swappable PS	
<b>Power Output/Input</b>	920W (100-240Vac)		1000W (100 – 127Vac) / 1200W (200 – 240Vac)		1000W (100-140Vac) / 1280W (180-240Vac)	1000W (100-127Vac) / 1600W (200-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount		
<b>Dimensions (H x W x D)</b>	3.5" x 17.2" x 24.8"	3.5" x 17.2" x 25.5"	5.2" x 17.2" x 25.5"	7" x 17.2" x 26"	7" x 17.2" x 27.5"	7" x 17.2" x 30.2"

For more information about maximum supported storage capacities of StoneFly integrated appliances, [contact StoneFly pre-sales engineers](#).

## 4.9 Expansion Units for Disaggregated High-Availability Clusters (HA EBODs)

Similar in function to the integrated storage expansion units, the HA expansion units are used to add more storage capacity to disaggregated cluster storage appliances. Expansion units for StoneFly disaggregated HA clusters are capable of supporting 12Gb SAS hard drives and SSDs to increase storage capacities from a few terabytes to petabytes.

All StoneFly HA cluster appliances (I-Series, D-Series, XS-Series & XD-Series) are compatible with the storage expansion units described in this section. For more information about raw storage capacities of integrated and HA cluster appliance expansion units, refer to Chapter 2. [2.2.1](#)

	24 x 2.5" 2U HA Expansion Unit	12 x 3.5" 2U HA Expansion Unit	16 x 3.5" 3U HA Expansion Unit	60 x 3.5" 4U HA Expansion Unit (Single-Drawer)	60 x 3.5" 4U HA Expansion Unit (Three-Drawer)
<b>Host Interface &amp; Cascading Ports</b>	12Gbps SAS Host Port and 12Gbps SAS Port for Cascading Expansion on Each Controller				
<b>Drive Bays</b>	24 x 2.5"	12 x 3.5" (or 2.5")	16 x 3.5" (or 2.5")	60 x 3.5"	60 x 3.5"
<b>Supported Drives</b>	12Gb SAS drives: SSD	12Gb SAS drives: 7.2k, SSD			
<b>Controllers</b>	Dual Redundant EBOD Expander Controllers for Dual RAID Controller Configurations				
<b>Power Supplies</b>	Redundant 80-PLUS Certified Hot-Swappable Power Supplies				
<b>Power Output/Input</b>	530W (100-240Vac)	460W (100-240Vac)	530W (100-240Vac)	1200W (100-240Vac)	1600W (100-240Vac)
<b>Form Factor</b>	2U Rackmount		3U Rackmount	4U Rackmount	
<b>Dimensions (H x W x D)*</b>	3.5" x 17.7" x 19.7"	3.5" x 17.7" x 19.7"	5.2" x 17.7" x 19.7"	7" x 17.7" x 33.1"	7" x 17.7" x 34.8"

For more information about integrated storage expansion unit or HA cluster appliance expansion unit compatibility or upgrades, [contact StoneFly pre-sales engineers.](#)

## Chapter 5:

# Cloud Data Storage Solutions

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StoneFly offers cloud storage solutions for enterprise customers and SMBs. Our strong partnerships with Microsoft and Amazon enable us to offer secure, cost-effective, and easy-to-manage data storage to our customers in the data center of their choice.

StoneFly cloud storage solutions include:

- Cloud Storage in Microsoft Azure
- Cloud Storage in Amazon AWS
- Cloud Storage in StoneFly Private Cloud

## 5.1 Cloud Storage in Microsoft Azure

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StoneFly offers cloud storage in Microsoft Azure and Microsoft Azure Government. StoneFly cloud storage can be purchased directly from the marketplace in either of the Azure clouds\*.

Our innovative technology allows users to provision SAN, NAS, or unified SAN + NAS workloads in Azure's secure and cost-effective cloud. With our patented storage OS, users can integrate Azure cloud with bare-metal, enterprise servers (Dell EMC, HPE, etc.), StoneFly appliances, or provision storage directly in Azure using our Storage as a Service (STaaS) offering.

StoneFly also empowers users to provision and spin up Virtual Machines (VMs) directly in the Azure cloud. Supported hypervisors include Hyper-V and VMware (KVM and Citrix VMs may also be ported to Azure but require additional steps).

\* Microsoft Azure Government Cloud is reserved exclusively for US federal, state, and local government customers and their partners. Contact StoneFly for qualification requirements.

**Supported Azure Blobs:** Hot Blob, Cold Blob, Page Blob (data disk only). Contact StoneFly technical support for implementation details.

For details, visit the StoneFly website: <https://stonefly.com/cloud/cloud-storage-for-microsoft-azure>

## 5.2 Cloud Storage in Amazon S3

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StoneFly also offers cloud storage in Amazon S3 and S3-IA for enterprises and SMBs looking to leverage the trusted cloud storage services of the AWS cloud.

The StoneFly storage OS can be leveraged to provision SAN, NAS, or unified (SAN + NAS) storage in the AWS cloud for data storage, data archiving or remote SAN storage and other

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similar use-cases. With the StoneFly storage OS, users can integrate AWS cloud with their bare-metal servers, enterprise systems (Dell EMC, HPE, etc.), StoneFly appliances, and HCI appliances (Nutanix, HPE Nimble etc.).

Our innovative storage solution also enables users to store snapshots and to migrate Hyper-V and VMware Virtual Machines to AWS EC2 (KVM and Citrix VMs may also be ported to AWS EC2 but require additional steps).

For details, visit the StoneFly website: <https://stonefly.com/cloud/cloud-storage-in-amazon-s3>

### 5.3 Cloud Storage in StoneFly Private Cloud

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StoneFly also offers enterprises and SMBs the ability to provision NAS, SAN or unified (NAS + SAN) storage volumes in StoneFly private cloud.

Our robust and battle-tested technology consistently delivers even for the most challenging of use-cases. With our innovative storage OS, we also offer users the ability to replicate data to our cloud and spin up VMs directly on our high end servers to facilitate cloud-based disaster recovery and business continuity for the most demanding of workloads.

For details, visit the StoneFly website: <https://stonefly.com/cloud/stonefly-private-cloud-storage>

### 5.4 Enterprise Features and License Options of StoneFly Cloud Storage

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#### Available Enterprise-Grade Features of StoneFly Cloud Storage

- Provision NFS, CIFS/SMB and iSCSI SAN Storage in Azure/AWS/StoneFly Cloud
- Centralized Management Interface with Real-Time Graphical Performance Monitoring with Tracking & Utilization Reporting
- Data Deduplication
- Synchronous & Asynchronous Replication
- Delta-Based Snapshots with Mountable Snapshot Volumes
- Advanced Encryption
- Scale Out NAS using a Single Name Space to Scale Capacity & Performance
- Automated NAS Tiering
- Multi-Cloud & Hybrid Cloud Support
- Thin Provisioning and Space Reclamation of iSCSI Volumes
- Antivirus with Malware & Ransomware Detection & Removal for NAS Volumes
- WORM (Write-Once, Read-Many) Compliant Policy-Based NAS Storage
- Automated Online Volume / Storage Expansion

#### Available Licensing Options

Users have the following licensing options for StoneFly cloud storage in Azure:

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- Bring Your Own License (BYOL)
- NAS License
- iSCSI License
- Unified (SAN + NAS) License

<b>License Features</b>	<b>Unified (SAN + NAS)</b>	<b>SAN (iSCSI)</b>	<b>NAS</b>
<b>iSCSI Storage</b>	Supported	Supported	
<b>NAS – NFS</b>	Supported		Supported
<b>NAS – CIFS/SMB</b>	Supported		Supported
<b>Delta-Based Snapshots</b>	Supported	Supported	Supported
<b>Thin Provisioning</b>	Supported	Supported	
<b>Synchronous Replication (Campus Mirroring)</b>	Supported	Supported	Supported
<b>Asynchronous Replication</b>	Supported	Supported	Supported
<b>Volume Encryption</b>	Supported	Supported	Supported
<b>Data Deduplication</b>	Supported	Supported	Supported
<b>Easy Active Directory Integration</b>	Supported		Supported
<b>Scale Out Storage</b>	Supported	Supported	Supported
<b>Unlimited Hosts</b>	Supported	Up to 200	Supported
<b>Storage Tiering</b>	Supported		Supported
<b>Storage Cache</b>	Supported	Supported	
<b>WORM Volumes</b>	Supported		Supported
<b>Antivirus / Anti- ransomware</b>	Supported		Supported

## 5.5 Cloud Storage Gateway Solutions

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Integrate preferred cloud storage repositories with your existing storage or backup infrastructure with StoneFly cloud storage gateway solutions. Leverage our patented storage OS and deploy it as a virtual storage machine to integrate Azure, AWS, or StoneFly private cloud with your bare-metal server, HCI infrastructure or enterprise iSCSI system (Dell EMC, HPE, etc.).

Our storage OS delivers a secure cloud storage gateway that enables users to create copies of their backup data, store snapshots in the cloud, or setup cloud disaster recovery for mission critical workloads.

StoneFly cloud gateway solutions are:

- Azure Cloud Storage Gateway for Veeam
- AWS Cloud Storage Gateway for Veeam
- Smart Cloud Gateway

### 5.5.1 Enterprise-Grade Features of SCVM Virtual Storage Appliance as a Cloud Storage Gateway

- Provision NFS, CIFS/SMB, and iSCSI SAN storage in Azure/AWS/StoneFly Cloud
- Centralized Management Interface with Real-Time Graphical Performance Monitoring with Tracking & Utilization Reporting
- Data Deduplication
- Synchronous & Asynchronous Replication
- Delta-based Snapshots with Mountable Snapshot Volumes
- Advanced Encryption
- Automated NAS Tiering
- Multi-Cloud & Hybrid Cloud Support
- Antivirus with Malware & Ransomware Detection & Removal for NAS Volumes
- WORM Volumes

### 5.5.2 Azure Cloud Storage Gateway for Veeam

Integrate Azure hot blob (for tier 1 or mission-critical data) or cool blob (for tier 3 or less frequently used data) with your Veeam backup software using StoneFly SCVM as a storage gateway.

Veeam does not directly integrate with Azure cloud so users need a cloud storage gateway that can connect Veeam's software with Azure to set up cloud backup and disaster recovery. Our patented storage OS can be configured as the gateway between Veeam's software and the Azure cloud.

This innovative software facilitates simplified management and easier Azure cloud integration.

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### 5.5.3 AWS Cloud Storage Gateway for Veeam

Leverage the market leading AWS cloud to secure your Veeam backups by integrating AWS cloud with your Veeam backup software using StoneFly SCVM storage OS as a cloud storage gateway.

StoneFly SCVM delivers several enterprise-grade features, easily integrates with your Veeam software and helps you store backup copies, snapshots, or replicate to AWS S3 or S3-IA.

Transfers are protected and can also be automated using StoneFly automated tiering features. Users can define tiers and then set policies that automatically transfer data between tiers. This feature simplifies the storage management experience for IT administrators and improves the cost-effectiveness of the overall system.

### 5.5.4 Smart Cloud Storage Gateway

StoneFly smart cloud storage gateway is a policy-based smart cloud storage gateway solution. It's available as a virtual storage appliance and it is also available as a hardware appliance that facilitates front-end caching and on-premises storage.

With the smart cloud storage gateway, users can integrate Azure, AWS, or any other S3 compatible cloud and/or StoneFly private cloud with their existing infrastructure. Users can migrate SAN, NAS, and unified (SAN + NAS) workloads to the cloud of their choice.

The Smart cloud storage gateway is the economical choice for businesses looking to set up cloud-first, hybrid, or multi-cloud environments.

For more information about StoneFly cloud storage gateway solutions, contact StoneFly sales.

For details, visit the StoneFly website: <https://stonefly.com/smart-cloud-gateway>

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## Chapter 6:

# Contacting StoneFly

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We'd love to hear from you about your projects and your data storage needs. You can contact us via email, call us, or schedule a demo directly on the StoneFly website.

### **Corporate Office - USA**

**Address:** 26250 Eden Landing Rd, Hayward, CA 94545 USA.

**Phone:** +1.510.265.1616

**Email:** [sales@stonefly.com](mailto:sales@stonefly.com) (sales) or [support@stonefly.com](mailto:support@stonefly.com) (technical support)

**Website:** [www.stonefly.com](http://www.stonefly.com) | [www.iscsi.com](http://www.iscsi.com)

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### **Branch Office – United Kingdom (UK)**

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**Branch Office – Korea**

**StoneFly Korea, Inc.**

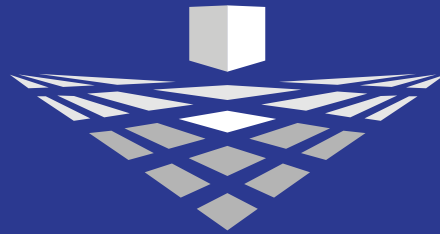
**Address:** #706, 31, Ttukseom-ro 1-gil, Seongdong-gu, Seoul, Korea

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**Email:** [sales@stonefly.co.kr](mailto:sales@stonefly.co.kr) (sales) or [support@stonefly.com](mailto:support@stonefly.com) (technical support)

**Website:** [www.stonefly.co.kr](http://www.stonefly.co.kr)

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# STONEFLY

The Original Innovator of the iSCSI Protocol



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