StoneFly Data Storage

Product Catalog

Enterprise & Value-Tier Hardware, Software & Cloud Based Storage Solutions from the Original Innovator of the iSCSI Protocol

Purpose-Built NAS
Integrated & Cluster SAN Appliances
Unified (NAS + SAN) Appliances
Hyperconverged Infrastructure (HCI)
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About StoneFly, Inc.

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 then, 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-class data management solutions to SMBs, SMEs, and large organizations worldwide.

Diverse 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, Azure, Amazon, 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).
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

StoneFly shipped its first purpose-built IP SAN appliance in 2006. Ever since then, StoneFly has introduced several enterprise-grade and value-tier feature-rich storage solutions building a wide range of products. Our range of products now include hardware storage solutions, available with support for different hardware configurations, and cloud-based (or serverless) data storage solutions.

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 integrate 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

Network Attached Storage (NAS) Appliances
Highly scalable NAS solutions with storage capacities ranging from a few terabytes to petabytes. StoneFly NAS appliances are built to deliver a feature-rich, reliable, secure, and cost-effective data storage experience.

- SSO™ (Super Scale Out) NAS Appliances – Enterprise NAS
  o Integrated SSO NAS Appliances
  o Dual Node Shared Nothing NAS Storage Systems
  o Scale Out NAS Storage Systems
- VSO™ (Value Scale Out) NAS Appliances – Value-Tier NAS
Storage Area Network (SAN) Appliances
High performance SAN solutions with standard iSCSI configuration and (optional Fibre Channel) support serving small, medium and large enterprises as primary or secondary storage, main data center, remote offices and branch offices.

- ISCTM (Integrated Storage Concentrator) – Enterprise SAN
- Voyager SAN Cluster Appliances – Disaggregated Enterprise SAN Converged Storage Appliances
- Voyager Value Cluster SAN Appliances – Disaggregated Value SAN Cluster Appliances

Unified Storage Appliances
Hyperscale unified storage platform 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.

- USOTM (Unified Scale Out) SAN + NAS + Object Storage Appliances – Enterprise Unified Storage Platform
  - Integrated USO Appliances
  - Dual Node Shared Nothing USO Storage Systems
  - Scale Out USO Storage Systems
- USO-HATM Cluster Storage Appliances – Disaggregated Enterprise Unified Storage Platform
- USO-TDTM Totally Disaggregated Storage Appliances – Fully Disaggregated & Modular Enterprise Unified Storage Platform
- USO Value SAN + NAS + Object Storage Appliance – Value-Tier Unified Storage Platform
- USO-HA Value Cluster SAN + NAS + Object Storage Appliances – Value-Tier Disaggregated Unified Storage Platform

Hyperconverged Infrastructure (HCI) Appliances
StoneFly HCI appliances support VMware, Hyper-V, Citrix (formerly XenServer) and KVM hypervisors. Our HCI appliances are highly scalable and are built to facilitate a variety of enterprise and SMB use-cases.

- Unified Storage and Server (USSTM) Hyperconverged Infrastructure – Enterprise HCI Appliances
  - Integrated USS HCI Appliances
  - Dual Node Shared Nothing USS HCI Storage Systems
  - Scale Out USS HCI Storage Systems
- USS-HATM Disaggregated & Modular Cluster HCI Storage Appliances – Disaggregated Enterprise HCI Appliances
• USS-TD™ Totally Disaggregated HCI Storage Appliances – Fully Disaggregated & Modular Enterprise HCI Appliances
• USS Value HCI Appliance – Value-Tier HCI Appliance

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

- USC™ (Unified Storage Concentrator) SAN Gateway Appliance
  - Integrated USC Appliances
  - Dual Node Shared Nothing USC Gateway
- USC-HA™ Disaggregated High Availability SAN Gateway Appliance

**1.3. Integrated Appliance Expansion Units**
StoneFly integrated appliance expansion units support enterprise SAS hard drives and SSDs and facilitate scale up or vertical scaling. The single-node expansion units are compatible with all StoneFly integrated, dual node shared nothing, and scale out hardware configurations.

**1.4. High Availability (HA) RAID Arrays for Disaggregated HA Clusters**
HA RAID arrays are comprised of built-in dual active/active RAID controllers with support for up to 12, 16 or 24 enterprise SAS hard drives and SSDs. HA RAID array chassis are a part of StoneFly disaggregated and totally disaggregated storage hardware architectures (refer to Chapter 2: Storage Hardware Overview).

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

**1.6. Enterprise Cloud Storage Solutions**
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 pre-configured 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 setup 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

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

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)
2.1.5 Totally Disaggregated Storage System (TD)

Key Hardware Components of StoneFly Storage Appliances

Before exploring the aforementioned hardware architectures, it is important to know about the following 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 for disaggregated and totally disaggregated hardware architectures it is an independent hardware chassis that functions as the management layer for the storage system.

The StoneFly storage OS (StoneFusion) is configured on a dedicated SSD (1U) or NVMe SSD (2U or larger) which runs independent of the storage.

HCI Controller

Similar to the SC, the HCI controller is a hardware component, or for disaggregated and totally disaggregated hardware architectures it is an independent hardware chassis that functions as the management and virtualization layer for the storage system.
The StoneFly storage virtualization OS (SCVM) and the hypervisor (VMware, Hyper-V, Citrix or KVM) are deployed on a dedicated SSD (1U) or NVMe SSD (2U or larger) which runs independent of the storage.

The difference between the SC and the HCI controller is that in addition to the storage OS, the HCI controller also has the hypervisor installed on it.

**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 and totally disaggregated storage systems have dedicated hardware chassis for the SCs or HCI controllers.

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

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

**RAID Controller (Integrated Solutions)**

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

High-performance hardware RAID controllers with RAID cache battery backup are standard on all enterprise StoneFly SAN and hyperconverged solutions, and optional on enterprise NAS-only solutions. High-performance hardware RAID controllers are standard on value series StoneFly SAN and hyperconverged solutions, and optional on value series NAS-only solutions. RAID cache battery backup is optional for value series solutions with 8-bays and higher.

**HA RAID Array (Disaggregated Solutions)**

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

The HA RAID array supports RAID 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 SAS hard drives or and SSDs (flash) depending on the model.

The two types of StoneFly RAID arrays include a High IOPS 12Gb SAS Host Interface or a High IOPS 16Gb FC Host Interface.
Available Form Factors for StoneFly RAID Arrays

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

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

Note: The compatible 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 technical support.

Expandable Bunch of Drives (EBODs)

EBODs are storage expansion units compatible with all StoneFly storage solutions. With support for enterprise 12Gb SAS drives, StoneFly EBODs enable users to setup 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 ones used for disaggregated and totally disaggregated 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

EBODs for Integrated Hardware with support for 2.5” enterprise SAS drives and SSDs:

- 24-bay 2U 12Gb SAS Expansion Unit

HA EBODs for Disaggregated 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

HA EBODs for Disaggregated Hardware with support for 2.5” enterprise SAS hard drives and SSDs:

- 24-bay 2U 12Gb SAS HA Expansion Unit
2.1.1 Integrated Storage Appliances
The integrated storage appliance hardware architecture delivers the “storage in a box” experience. This hardware architecture comprises of a single hardware chassis with built-in SC or HCI controller, RAID Controller (if any), and storage drives.

StoneFly integrated appliance hardware supports enterprise SATA hard drives (4-bay and 6-bay value tier appliances only), enterprise SAS hard drives and SSDs with storage capacities ranging from a few terabytes to petabytes.

Available Integrated Appliance Form Factors
Integrated appliances that support 3.5” SATA hard drives:

- 4-bay Mini-Tower (value-tier only)
- 6-bay 2U Rackmount (value-tier only)

Integrated appliances that support 3.5” SAS hard 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” SAS hard drives & 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 technical support.

2.1.2 Dual Node Shared Nothing Storage Systems
The 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 complete hardware failure of an 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 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 a storage system without a single point-of-failure.
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 processor, SC, RAID controller (if any) and storage drives. The total workload is aggregated over the total number of appliance nodes in the storage system. This delivers a gradual increase in performance with the addition of each new node, 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 comprised of a single hardware chassis whereas the scale out storage system is comprised of at least three integrated appliances.
2.1.4. Disaggregated Storage Systems (High Availability)

Disaggregated storage systems are 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 3 or more hardware chassis:

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

With hardware independent SCs or HCI controllers, 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).

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. Instead of replacing the entire solution, 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 SC or HCI controller hardware failure, the business continues to operate without experiencing any downtime. The disaggregated high availability hardware architecture is thus best fit for enterprises and data centers that cannot tolerate downtime, while providing simpler 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 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.

2.1.5. Totally Disaggregated Storage Systems (TD)

Totally disaggregated hardware architecture is a high availability and modular storage hardware that comprises of the following hardware chassis:

- Two SCs or HCI Controllers (1U or 2U Chassis)
- Dual Active/Active RAID Controller (1U Chassis)
- One or More Expandable Bunch of Drives (EBODs)

StoneFly is the only storage vendor with a unique offering that completely disaggregates the key components of a storage system.

The fully disaggregated modular hardware makes it very simple to add or replace hardware components.

Redundant hardware delivers high availability and business continuity. Even if a SC or HCI controller fails, or if a RAID controller fails, then the end-user will experience no downtime as the secondary SC, HCI controller, or RAID controller continues to operate.
Available Form Factors for Totally Disaggregated Storage Systems
For information about the available form factors for the SC or HCI controller chassis, please refer to Storage Controller or HCI Controller section.

The RAID controller is available in a 1U chassis with dual active/active redundant RAID controllers.

For information about the available form factors for the EBODs, please refer to the Expandable Bunch of Drives (EBODs) section.

2.2 Supported Storage Drives
Following is a list of storage drives supported by StoneFly enterprise and value-tier storage appliances.

<table>
<thead>
<tr>
<th>3.5” Enterprise Drives</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12Gb 7200RPM SAS</td>
<td>4TB, 6TB, 8TB, 10TB, 12TB, 14TB, 16TB</td>
</tr>
<tr>
<td>6Gb 7200RPM SATA (4 and 6-bay value-tier only)</td>
<td>2TB, 4TB, 6TB, 8TB, 10TB, 12TB, 14TB, 16TB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.5” Enterprise Drives*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12Gb 10k SAS</td>
<td>1.2TB, 1.8TB, 2.4TB</td>
</tr>
<tr>
<td>12Gb 15k SAS</td>
<td>600GB, 900GB</td>
</tr>
<tr>
<td>12Gb SAS SSD (1x DWPD)</td>
<td>960GB, 1.9TB, 3.8TB, 7.6TB</td>
</tr>
<tr>
<td>12Gb SAS SSD (3x DWPD)</td>
<td>800GB, 1.6TB, 3.2TB, 6.4TB</td>
</tr>
<tr>
<td>12Gb SAS SSD (10x DWPD)</td>
<td>Upon Request</td>
</tr>
</tbody>
</table>

* 2.5” Enterprise SAS drives are supported in most StoneFly appliances supporting 3.5” Enterprise SAS drives when combined with a special converter.
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, deduplication and compression features.

Furthermore, all StoneFly Enterprise-tier SAN and HCI integrated appliances are capable of scaling up to 256 drives (with expansion units) per appliance node. StoneFly NAS-only enterprise-tier appliances can also scale up to 256 drives if purchased with the optional hardware RAID controller upgrade option.

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

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

<table>
<thead>
<tr>
<th>Size</th>
<th>Storage Type</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Bay Mini Tower (3.5”)</td>
<td>6GB 7200RPM SATA</td>
<td>64TB</td>
</tr>
<tr>
<td>6-Bay 2U Rackmount (3.5”)</td>
<td>6GB 7200RPM SATA</td>
<td>96TB</td>
</tr>
<tr>
<td>8-Bay 2U Rackmount (3.5”)</td>
<td>12Gb 7200RPM SAS</td>
<td>128TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 10k SAS</td>
<td>19.2TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 15k SAS</td>
<td>7.2TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (1x DWPD)</td>
<td>60.8TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (3x DWPD)</td>
<td>51.2TB</td>
</tr>
<tr>
<td>12-Bay 2U Rackmount (3.5”)</td>
<td>12Gb 7200RPM SAS</td>
<td>192TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 10k SAS</td>
<td>28.8TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 15k SAS</td>
<td>10.8TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (1x DWPD)</td>
<td>91.2TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (3x DWPD)</td>
<td>76.8TB</td>
</tr>
<tr>
<td>16-Bay 3U Rackmount (3.5”)</td>
<td>12Gb 7200RPM SAS</td>
<td>256TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 10k SAS</td>
<td>38.4TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 15k SAS</td>
<td>14.4TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (1x DWPD)</td>
<td>121.6TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (3x DWPD)</td>
<td>102.4TB</td>
</tr>
<tr>
<td>Model</td>
<td>Drive Configuration</td>
<td>Raw Capacity</td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td><strong>24-Bay 4U Rackmount (3.5”)</strong></td>
<td>12Gb 7200RPM SAS</td>
<td>384TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 10k SAS</td>
<td>57.6TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 15k SAS</td>
<td>21.6TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (1x DWPD)</td>
<td>182.4TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (3x DWPD)</td>
<td>153.6TB</td>
</tr>
<tr>
<td><strong>36-Bay 4U Rackmount (3.5”)</strong></td>
<td>12Gb 7200RPM SAS</td>
<td>576TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 10k SAS</td>
<td>86.4TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 15k SAS</td>
<td>32.4TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (1x DWPD)</td>
<td>276.4TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (3x DWPD)</td>
<td>230.4TB</td>
</tr>
<tr>
<td><strong>60-Bay 4U Rackmount (3.5”) [HA EBOD only]</strong></td>
<td>12Gb 7200RPM SAS</td>
<td>960TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 10k SAS</td>
<td>144TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 15k SAS</td>
<td>54TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (1x DWPD)</td>
<td>456TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (3x DWPD)</td>
<td>384TB</td>
</tr>
<tr>
<td><strong>24-Bay 2U Rackmount (2.5”)</strong></td>
<td>12Gb 10k SAS</td>
<td>57.6TB</td>
</tr>
<tr>
<td></td>
<td>12Gb 15k SAS</td>
<td>21.6TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (1x DWPD)</td>
<td>182.4TB</td>
</tr>
<tr>
<td></td>
<td>12Gb SAS SSD (3x DWPD)</td>
<td>153.6TB</td>
</tr>
</tbody>
</table>

**Note:** The aforementioned raw storage capacities are for integrated appliances fully-populated with a single type of drive. StoneFly integrated appliances can be configured with combinations of different drive types and capacities resulting in variable raw storage capacities.

For more information about the raw capacity of a StoneFly storage appliance, please contact StoneFly technical support.
2.3 Network Ports

Enterprise-tier appliances come standard with at least two 10Gb RJ-45 ports per node. The standard ports on value-tier appliances vary depending on the appliance series and model.

Following is a list of the supported network port upgrade options for StoneFly integrated (including dual node shared nothing & scale out) storage hardware.

2.3.1 Network Port Upgrades for StoneFly Integrated Appliances

- Dual 1Gb Copper Ethernet Ports
- Quad 1Gb Copper Ethernet Ports
- Dual 10Gb RJ-45 Copper Ethernet Ports
- Quad 10Gb RJ-45 Copper Ethernet Ports
- Single 10Gb SR Optical Ethernet Ports
- Dual 10Gb SR Optical Ethernet Ports
- Single 10Gb LR Optical Ethernet Ports
- Dual 10Gb SFP+ Ports
- Quad 10Gb SFP+ Ports
- Dual 40Gb QSFP+ Ports

Note: Available network port upgrades vary depending on the appliance series, model and available PCI-E slots in the appliance. For more information, contact StoneFly technical support.

2.3.2 Network Port Upgrades for StoneFly Disaggregated (HA) Cluster Storage Systems

<table>
<thead>
<tr>
<th>Network Port Upgrade</th>
<th>Quantity per Node</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quad 1Gb Copper Ethernet Ports for HA Cluster</td>
<td>2 per Node</td>
</tr>
<tr>
<td>Eight 1GB Copper Ethernet Ports for HA Cluster</td>
<td>4 per Node</td>
</tr>
<tr>
<td>Quad 10Gb RJ-45 Copper Ethernet Ports for HA Cluster</td>
<td>2 per Node</td>
</tr>
<tr>
<td>Eight 10Gb RJ-45 Copper Ethernet Ports for HA Cluster</td>
<td>4 per Node</td>
</tr>
<tr>
<td>Quad 10Gb CX4 Copper Ethernet Ports for HA Cluster</td>
<td>2 per Node</td>
</tr>
<tr>
<td>Dual 10Gb SR Optical Ethernet Ports for HA Cluster</td>
<td>1 per Node</td>
</tr>
<tr>
<td>Quad 10Gb SR Optical Ethernet Ports for HA Cluster</td>
<td>2 per Node</td>
</tr>
<tr>
<td>Dual 10Gb LR Optical Ethernet Ports for HA Cluster</td>
<td>1 per Node</td>
</tr>
<tr>
<td>Quad 10Gb SFP+ Ports for HA Cluster</td>
<td>2 per Node</td>
</tr>
<tr>
<td>Eight 10Gb SFP+ Ports for HA Cluster</td>
<td>4 per Node</td>
</tr>
<tr>
<td>Quad 40Gb QSFP+ Ports for HA Cluster</td>
<td>2 per Node</td>
</tr>
</tbody>
</table>
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 relevant Hardware Specifications of the storage solution or contact StoneFly technical support for more information.

2.4.1 Processor Options

**Processor Options for StoneFly Enterprise Storage Appliances (Integrated, Dual Node Shared Nothing & Scale Out)**
- Single 10-Core Xeon Processor (ISC and USO only)
- Dual 10-Core Xeon Processors
- Dual 16-Core Xeon Processors
- Dual 18-Core Xeon Processors
- Dual 20-Core Xeon Processors
- Dual 24-Core Xeon Processors
- Dual 28-Core Xeon Processors

**Processor Options for StoneFly Enterprise Storage Appliances (Disaggregated HA Cluster)**
- Dual 10-Core Xeon Processors in Each Node
- Dual 12-Core Xeon Processors in Each Node
- Dual 16-Core Xeon Processors in Each Node
- Dual 18-Core Xeon Processors in Each Node
- Dual 20-Core Xeon Processors in Each Node
- Dual 24-Core Xeon Processors in Each Node
- Dual 28-Core Xeon Processors in Each Node

**Processor Options for StoneFly Value-Tier Storage Appliances (Integrated, Dual Node Shared Nothing & Scale Out)**
- Quad-Core 9th Generation Intel Core i3 Processor
- Hexa-Core 9th Generation Intel Core i5 Processor
- Octa-Core 9th Generation Intel Core i7 Processor

**Processor Options for StoneFly Value-Tier Storage Appliances (Disaggregated HA Cluster)**
- Quad-Core 9th Generation Intel Core i3 Processor in Each Node
- Hexa-Core 9th Generation Intel Core i5 Processor in Each Node
- Octa-Core 9th Generation Intel Core i7 Processor in Each Node
2.4.2 System Memory Options

Memory Options for StoneFly Enterprise Storage Appliances (Integrated, Dual Node Shared Nothing & Scale Out)
- 32GB System Memory (ISC and USO only)
- 64GB System Memory
- 128GB System Memory
- 256GB System Memory
- 384GB System Memory
- 512GB System Memory
- 768GB System Memory
- 1TB System Memory
- Up to 4TB System Memory (upon request)

Memory Options for StoneFly Enterprise Storage Appliances (Disaggregated HA Cluster)
- 64GB System Memory in Each Node
- 128GB System Memory in Each Node
- 256GB System Memory in Each Node
- 384GB System Memory in Each Node
- 512GB System Memory in Each Node
- 768GB System Memory in Each Node
- 1TB System Memory in Each Node
- Up to 6TB (Dual 1U) or Up to 4TB (Dual 2U) in Each Node (upon request)

Memory Options for StoneFly Value-Tier Storage Appliances (Integrated, Dual Node Shared Nothing & Scale Out)
- 8GB System Memory
- 16GB System Memory
- 32GB System Memory
- 64GB System Memory (8-bay and larger)

Memory Options for StoneFly Value-Tier Storage Appliances (Disaggregated HA Cluster)
- 8GB System Memory in Each Node
- 16GB System Memory in Each Node
- 32GB System Memory in Each Node
- 64GB System Memory in Each Node
2.5 SSD for OS

StoneFly storage solutions come standard with an SSD for OS. This section describes in detail the standard and available upgrade options for the SSD dedicated for the OS.

**Note:** StoneFly storage solutions only use the SSD for OS and hypervisor (if HCI). StoneFly storage solutions do not support All-NVMe infrastructures.

**NVMe SSD Options for StoneFly Enterprise and Value-Tier Storage Appliances (Integrated, Dual Node Shared Nothing & Scale Out)**

- 256GB NVMe SSD for OS
- 512GB NVMe SSD for OS
- 1TB NVMe SSD for OS
- 2TB NVMe SSD for OS
- 3.8TB NVMe SSD for OS

**SSD Options for StoneFly Enterprise Storage Appliances (Disaggregated High Availability Dual 1U Cluster)**

- 240GB SSD for OS in Each Node
- 480GB SSD for OS in Each Node
- 960GB SSD for OS in Each Node
- 1.9TB SSD for OS in Each Node
- 3.8TB SSD for OS in Each Node

**NVMe SSD Options for StoneFly Enterprise and Value-Tier Storage Appliances (Disaggregated High Availability Dual 2U Cluster)**

- 256GB NVMe SSD for OS in Each Node
- 512GB NVMe SSD for OS in Each Node
- 1TB NVMe SSD for OS in Each Node
- 2TB NVMe SSD for OS in Each Node
- 3.8TB NVMe SSD for OS in Each Node
Chapter 3:

StoneFly Storage Operating System (OS)

The StoneFly storage OS is an 8th generation software 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, and Citrix (formerly XenServer) 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 talk about 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

- Support for iSCSI, Fibre Channel SAN Target, and NAS (CIFS/SMB & NFS)
- Delta-based Snapshots with Mountable 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)

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

StoneFly SCVM facilitates 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.

In other words, with SCVM data center owners can make the most of their data storage infrastructure.

StoneFly SCVM comes pre-configured on all StoneFly HCI appliances and it is also available as a standalone software.

3.3. StoneFusion for Bare-Metal

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 facilitates the creation of a 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 pre-configured on all StoneFly NAS, SAN, and unified storage (USO) 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.

3.4. StoneFusion MSP Edition

StoneFusion MSP Edition is an enterprise storage provisioning software that facilitates 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 or different 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 and KVM hypervisors and supports most mainstream storage appliances such as Nutanix, HPE Nimble, Dell EMC and several others.

3.5. StoneFusion OEM

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 StoneFly website to apply directly or contact StoneFly sales to initiate the process.
Chapter 4:

On-Premises Data Storage Solutions

In this chapter, we’ll explore the enterprise and value-tier hardware data storage solutions that StoneFly offers. For each data storage solution, we’ll take a look at the hardware and software features, supported hardware architectures and the hardware specifications of the available appliance models.

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

- NAS Storage Appliances (SSO and VSO)
- SAN Storage Appliances (ISC and Voyager)
- Unified Storage Platform (USO, USO-HA and USO-TD)
- Hyperconverged Storage Appliances (USS, USS-HA, and USS-TD)
- SAN Gateway Appliance (USC & USC-HA)

4.1 NAS Storage Appliances

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 (Enterprise NAS)
- Value Scale Out (VSO) NAS appliances (Value-Tier NAS)

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
- 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 Option on Enterprise SSO: Data Deduplication

Available Upgrade Options (SSO Only):
  • 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. StoneFly SSO NAS systems when purchased with the optional RAID controller can start small with support for a few terabytes of data and then scale up to petabyte of storage capacity.

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.
Hardware Specifications of Available Integrated NAS Appliance Models

**StoneFly SSO NAS Appliance Models**

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

<table>
<thead>
<tr>
<th></th>
<th>SSO-2405X</th>
<th>SSO-805</th>
<th>SSO-1205</th>
<th>SSO-1605</th>
<th>SSO-2405</th>
<th>SSO-3605</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Ports</strong></td>
<td>Dual Bonded 10Gb RJ-45 NAS Connections (Backwards Compatible with 1Gb)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Available Slots for Additional Network Ports** | Up to 3 PCI-E Slots Can Be Used For Optional Network Card Upgrades  
Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+ |
| **Drive Bays**       | 24 x 2.5”  
8 x 3.5”  
12 x 3.5”  
16 x 3.5”  
24 x 3.5”  
36 x 3.5” |
| **Supported Storage Drives** | 12Gb SAS drives:  
• 10,000 RPM  
• 15,000 RPM  
• SSD (1x/3x/10x DWPD)  
12Gb SAS drives:  
• 7200 RPM  
• 10,000 RPM  
• 15,000 RPM  
• SSD (1x/3x/10x DWPD) |
| **Processors**       | Dual 10-Core Xeon Processors |
| **System Memory**    | 64GB (Standard) / Up to 4TB (Optional) |
| **NVMe SSD for OS**  | 256GB (Standard) / Up to 3.8TB (Optional) |
| **Drive Configuration** | Erasure Coding (Standard) / High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup, Supports RAID 0, 1, 3, 5, 6, 10, 30, 50 and 60, Supports up to 256 Drives via EBODs (Optional) |
| **Form Factor**      | 24-bay 2U Rackmount  
8-bay 2U Rackmount  
12-bay 2U Rackmount  
16-bay 3U Rackmount  
24-bay 4U Rackmount  
36-bay 4U Rackmount |
| **Power Supplies**   | Redundant 80-PLUS® 920W Platinum Certified High Efficiency Hot-Swappable Power Supplies  
Redundant 80-PLUS® 1000W Titanium Certified High Efficiency Hot-Swappable Power Supplies  
Redundant 80-PLUS® 1200W Titanium Certified High Efficiency Hot-Swappable Power Supplies  
Redundant 80-PLUS® 1200W Titanium Certified Hot-Swappable Power Supplies  
Redundant 80-PLUS® 1200W Titanium Certified Hot-Swappable Power Supplies  
Redundant 80-PLUS® 1200W Titanium Certified Hot-Swappable Power Supplies |

For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, processor, system memory, and NVMe SSD for OS, and other upgrade, please refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively.
### StoneFly VSO NAS Appliance Models

<table>
<thead>
<tr>
<th></th>
<th>VSO-40T-V2</th>
<th>VSO-60R-V2</th>
<th>VSO-80R-V2</th>
<th>VSO-120R-V2</th>
<th>VSO-160R-V2</th>
<th>VSO-240R-V2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Ports</strong></td>
<td>Dual Bonded 1Gb RJ-45 NAS Connections</td>
<td>1Gb and 10Gb RJ-45 NAS Connections (Backwards Compatible with 1Gb)</td>
<td>1Gb and 10Gb RJ-45 NAS Connections (Backwards Compatible with 1Gb)</td>
<td>1Gb and 10Gb RJ-45 NAS Connections (Backwards Compatible with 1Gb)</td>
<td>1Gb and 10Gb RJ-45 NAS Connections (Backwards Compatible with 1Gb)</td>
<td>1Gb and 10Gb RJ-45 NAS Connections (Backwards Compatible with 1Gb)</td>
</tr>
<tr>
<td><strong>Available Slots</strong></td>
<td>1 Slot (can either be used for additional network port or hardware RAID controller)</td>
<td>3 Slots (can support optional hardware RAID controller, optional RAID cache battery backup, and additional network card)</td>
<td>3 Slots (can support optional hardware RAID controller, optional RAID cache battery backup, and additional network card)</td>
<td>3 Slots (can support optional hardware RAID controller, optional RAID cache battery backup, and additional network card)</td>
<td>3 Slots (can support optional hardware RAID controller, optional RAID cache battery backup, and additional network card)</td>
<td>3 Slots (can support optional hardware RAID controller, optional RAID cache battery backup, and additional network card)</td>
</tr>
<tr>
<td><strong>Drive Bays</strong></td>
<td>4 x 3.5&quot;</td>
<td>6 x 3.5&quot;</td>
<td>8 x 3.5&quot;</td>
<td>12 x 3.5&quot;</td>
<td>16 x 3.5&quot;</td>
<td>24 x 3.5&quot;</td>
</tr>
<tr>
<td><strong>Supported Storage Drives</strong></td>
<td>6Gb SATA drives: • 7200 RPM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td>4-Core 9th Gen Intel Core i3 (Standard) / Up to 8-Core 9th Gen Intel Core i7 (Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System Memory</strong></td>
<td>8GB (Standard) / Up to 32GB (Optional)</td>
<td>8GB (Standard) / Up to 64GB (Optional)</td>
<td>8GB (Standard) / Up to 64GB (Optional)</td>
<td>8GB (Standard) / Up to 64GB (Optional)</td>
<td>8GB (Standard) / Up to 64GB (Optional)</td>
<td>8GB (Standard) / Up to 64GB (Optional)</td>
</tr>
<tr>
<td><strong>NVMe SSD for OS</strong></td>
<td>Erasure Coding (Standard)</td>
<td>256GB (Standard) / Up to 3.8TB (Optional)</td>
<td>256GB (Standard) / Up to 3.8TB (Optional)</td>
<td>256GB (Standard) / Up to 3.8TB (Optional)</td>
<td>256GB (Standard) / Up to 3.8TB (Optional)</td>
<td>256GB (Standard) / Up to 3.8TB (Optional)</td>
</tr>
<tr>
<td><strong>RAID Controller (Upgrade Option)</strong></td>
<td>RAID Levels 0, 1, 5, 6, 10</td>
<td>RAID Levels 0, 1, 3, 5, 6, 10, 50</td>
<td>RAID Levels 0, 1, 3, 5, 6, 10, 50, 60</td>
<td>RAID Levels 0, 1, 5, 6, 10, 50, 60</td>
<td>RAID Levels 0, 1, 5, 6, 10, 50, 60</td>
<td>RAID Levels 0, 1, 5, 6, 10, 50, 60</td>
</tr>
<tr>
<td><strong>Form Factor</strong></td>
<td>4-bay Mini Tower</td>
<td>6-bay 2U Rackmount</td>
<td>8-bay 2U Rackmount</td>
<td>12-bay 2U Rackmount</td>
<td>16-bay 3U Rackmount</td>
<td>24-bay 4U Rackmount</td>
</tr>
</tbody>
</table>

For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, processor, system memory, and NVMe SSD for OS, and other upgrade, please refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively.

**Note:** StoneFly VSO NAS only supports scale out. Expansion units are not supported.
4.2 Storage Area Network (SAN) Appliances

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 (Enterprise SAN)
- Disaggregated HA Cluster SAN – Voyager DX & Voyager FC (Enterprise SAN)
- Voyager Value Cluster SAN Appliances (Value-Tier HA Cluster SAN)

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
## Hardware Specifications of Available Integrated SAN Appliance Models

### StoneFly ISC SAN Appliance Models

<table>
<thead>
<tr>
<th></th>
<th>ISC-2409X</th>
<th>ISC-809</th>
<th>ISC-1209</th>
<th>ISC-1609</th>
<th>ISC-2409</th>
<th>ISC-3609</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Ports</td>
<td>Dual Bonded 10Gb RJ-45 iSCSI Connections (Backwards Compatible with 1Gb)</td>
<td>Up to 3 PCI-E Slots Can Be Used For Optional Network Card Upgrades</td>
<td>Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available Slots for Additional Network Ports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive Bays</td>
<td>24 x 2.5&quot;</td>
<td>8 x 3.5&quot;</td>
<td>12 x 3.5&quot;</td>
<td>16 x 3.5&quot;</td>
<td>24 x 3.5&quot;</td>
<td>36 x 3.5&quot;</td>
</tr>
<tr>
<td>Supported Storage Drives</td>
<td>12Gb SAS drives:</td>
<td>12Gb SAS drives:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 10,000 RPM</td>
<td>• 7200 RPM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 15,000 RPM</td>
<td>• 10,000 RPM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td>• 15,000 RPM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processor(s)</td>
<td>Single 10-Core Xeon Processor (Standard) / Dual 10-Core Xeon Processors (Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Memory</td>
<td>32GB (Standard)</td>
<td>Up to 4TB (Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NVMe SSD for OS</td>
<td>256GB (Standard)</td>
<td>Up to 3.8TB (Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAID Controller</td>
<td>High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60; Supports up to 256 Drives (4PB) via EBODs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rackmount</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All StoneFly ISC appliances come standard with iSCSI, but can also support the following Fibre Channel (FC) SAN Target port upgrades: 2 x 8Gb, 4 x 8Gb, 2 x 16Gb, 4 x 16Gb, 2 x 32Gb, 4 x 32Gb FC Ports

For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, processor, system memory, and NVMe SSD for OS, and other upgrade, please refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively.
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.

StoneFly Voyager Disaggregated Cluster SAN Storage Controller Appliance Models

<table>
<thead>
<tr>
<th></th>
<th>i10004i-D</th>
<th>i10009i-D</th>
<th>i10104i-D</th>
<th>i10109i-D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Ports</strong></td>
<td>Six bonded 10Gb RJ-45 iSCSI Connections per Cluster (Backwards Compatible with 1Gb)</td>
<td></td>
<td>Four bonded 10Gb RJ-45 iSCSI Connections per Cluster (Backwards Compatible with 1Gb)</td>
<td></td>
</tr>
<tr>
<td><strong>Available Slots for Additional Cards</strong></td>
<td>Up to 1 PCI-E Slot per Node Can Be Used For Optional Network Card or HBA for HA Expansion Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC</td>
<td>Up to 4 PCI-E Slots per Node Can Be Used For Optional Network Card and/or HBA for HA Expansion Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Expansion Array Connections</strong></td>
<td>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</td>
<td>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</td>
<td>2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays Optional Upgrade to 10 x 12Gb SAS Ports on Each Node</td>
<td>2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays Optional Upgrade to 10 x 16Gb FC Ports on Each Node</td>
</tr>
<tr>
<td><strong>Maximum Supported Storage Drives</strong></td>
<td>Supports up to 1776 drives with EBOD expansion</td>
<td>Supports up to 1776 drives with EBOD expansion (or more when using FC switch)</td>
<td>Supports up to 4440 drives with EBOD expansion</td>
<td>Supports up to 4440 drives with EBOD expansion (or more when using FC switch)</td>
</tr>
<tr>
<td><strong>Processors</strong></td>
<td>Dual 10-Core Xeon Processors in Each Node</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System Memory</strong></td>
<td>64GB per Node (Standard) / Up to 6TB per Node (Optional)</td>
<td></td>
<td>64GB per Node (Standard) / Up to 4TB per Node (Optional)</td>
<td></td>
</tr>
<tr>
<td><strong>SSD for OS</strong></td>
<td>240GB SSD for OS in Each Node (Standard) / Up to 3.8TB SSD for OS in Each Node (Optional)</td>
<td></td>
<td>256GB NVMe SSD for OS in Each Node / Up to 3.8TB NVMe SSD for OS in Each Node (Optional)</td>
<td></td>
</tr>
</tbody>
</table>

For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, processor, system memory, and SSD for OS, and other upgrade, please refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively.
Disaggregated High-Availability RAID Array Models for StoneFly Voyager Cluster

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

<table>
<thead>
<tr>
<th></th>
<th>24 x 2.5” 2U HA RAID Array</th>
<th>12 x 3.5” 2U HA RAID Array</th>
<th>16 x 3.5” 3U HA RAID Array</th>
<th>24 x 3.5” 4U HA RAID Array</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Host Interface</strong></td>
<td></td>
<td>12Gb SAS for Voyager DX</td>
<td>16Gb FC for Voyager FC</td>
<td></td>
</tr>
<tr>
<td><strong>Drive Bays</strong></td>
<td>24 x 2.5”</td>
<td>12 x 3.5”</td>
<td>16 x 3.5”</td>
<td>24 x 3.5”</td>
</tr>
<tr>
<td><strong>Supported Storage Drives</strong></td>
<td>12Gb SAS drives:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 10,000 RPM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 15,000 RPM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Controllers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Supported RAID Levels</strong></td>
<td>0, 1, 0+1, 3, 5, 6, 10, 30, 50 and 60 and Global Spares with RAID Cache Backup Module on Each Controller</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Max. Number of Storage Drives</strong></td>
<td>Supports Maximum of 444 Drives with HA Expansion Units</td>
<td>Supports Maximum of 432 Drives with HA Expansion Units</td>
<td>Supports Maximum of 436 Drives with HA Expansion Units</td>
<td>Supports Maximum of 444 Drives with HA Expansion Units</td>
</tr>
<tr>
<td><strong>Form Factor</strong></td>
<td>24-bay 2U Rackmount</td>
<td>12-bay 2U Rackmount</td>
<td>16-bay 3U Rackmount</td>
<td>24-bay 4U Rackmount</td>
</tr>
<tr>
<td><strong>Power Supplies</strong></td>
<td>Redundant 80-PLUS® Certified High Efficiency Hot-Swappable Power Supplies</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Hardware Specifications of StoneFly Voyager Value Disaggregated Cluster SAN Appliance Model

The value-tier disaggregated cluster SAN appliances are available with support for iSCSI connections and 12Gb SAS host interface for HA RAID Arrays. Following are the hardware specifications of the storage controller and the HA RAID array for the value Voyager HA cluster SAN appliance.

StoneFly Voyager Value Disaggregated Cluster SAN Storage Controller Appliance Model

<table>
<thead>
<tr>
<th>C114i-D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Ports</strong></td>
</tr>
<tr>
<td><strong>Available Slots for Additional Cards</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Expansion Array Connections</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Maximum Supported Storage Drives</strong></td>
</tr>
<tr>
<td><strong>Processor</strong></td>
</tr>
<tr>
<td><strong>System Memory</strong></td>
</tr>
<tr>
<td><strong>NVMe SSD for OS</strong></td>
</tr>
</tbody>
</table>

For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, CPU, System Memory upgrades and NVMe SSD for OS, refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively.
Disaggregated High-Availability RAID Array Models for StoneFly Voyager Value Cluster

The Voyager value cluster SAN only supports 12Gb SAS attached HA RAID expansion arrays. Following are the hardware specifications of the supported 12Gb SAS attached HA RAID expansion arrays:

<table>
<thead>
<tr>
<th></th>
<th>24 x 2.5” 2U HA RAID Array</th>
<th>12 x 3.5” 2U HA RAID Array</th>
<th>16 x 3.5” 3U HA RAID Array</th>
<th>24 x 3.5” 4U HA RAID Array</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host Interface</td>
<td>12Gb SAS</td>
<td>12Gb SAS</td>
<td>12Gb SAS</td>
<td>12Gb SAS</td>
</tr>
<tr>
<td>Drive Bays</td>
<td>24 x 2.5”</td>
<td>12 x 3.5”</td>
<td>16 x 3.5”</td>
<td>24 x 3.5”</td>
</tr>
<tr>
<td>Supported Storage Drives</td>
<td>12Gb SAS drives:</td>
<td>12Gb SAS drives:</td>
<td>12Gb SAS drives:</td>
<td>12Gb SAS drives:</td>
</tr>
<tr>
<td></td>
<td>• 10,000 RPM</td>
<td>• 7200 RPM</td>
<td>• 10,000 RPM</td>
<td>• 15,000 RPM</td>
</tr>
<tr>
<td></td>
<td>• 15,000 RPM</td>
<td>• 10,000 RPM</td>
<td>• 15,000 RPM</td>
<td>• SSD (1x/3x/10x DWPD)</td>
</tr>
<tr>
<td></td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controllers</td>
<td>Built-in Dual Active/Active Hot-Swappable RAID Controller with Transparent Failover/Failback</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supported RAID Levels</td>
<td>0, 1, 0+1, 3, 5, 6, 10, 30, 50 and 60 and Global Spares with RAID Cache Backup Module on Each Controller</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Number of Storage Drives</td>
<td>Supports Maximum of 444 Drives with HA Expansion Units</td>
<td>Supports Maximum of 432 Drives with HA Expansion Units</td>
<td>Supports Maximum of 436 Drives with HA Expansion Units</td>
<td>Supports Maximum of 444 Drives with HA Expansion Units</td>
</tr>
<tr>
<td>Form Factor</td>
<td>24-bay 2U Rackmount</td>
<td>12-bay 2U Rackmount</td>
<td>16-bay 3U Rackmount</td>
<td>24-bay 4U Rackmount</td>
</tr>
<tr>
<td>Power Supplies</td>
<td>Redundant 80-PLUS® Certified High Efficiency Hot-Swappable Power Supplies</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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) storage in a single, easy-to-manage storage system.

Our storage OS enables USO 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:

**Enterprise Unified Storage Platform:**
- Integrated USO Appliances
- Dual Node Shared Nothing USO Storage Systems
- Scale Out USO Storage Systems
- USO Cluster SAN + NAS Appliances (USO-HA) – Disaggregated HA Unified Storage Platform
- USO Totally Disaggregated (USO-TD) Storage Systems – Fully Disaggregated Cluster Unified Storage Platform

**Value-Tier Unified Storage Platform:**
- USO Value Integrated Appliances
- USO-HA Value Cluster SAN + NAS Appliances – Value-tier Disaggregated Cluster Unified Storage Platform

**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: 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

The 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 the cloud-like experience 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. The optional NAS upgrade enables StoneFly USO users 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, this increases the performance in multiples. For enterprises and SMBs looking to facilitate a variety of workloads in a simple storage solution, the USO SAN + NAS appliances are the best choice to make.
Hardware Specifications of Available USO Enterprise SAN + NAS Appliance Models
The following appliance models can also be used to configure USO Dual Node Shared Nothing and Scale Out storage systems.

**StoneFly USO SAN + NAS Integrated Appliance Models**

<table>
<thead>
<tr>
<th>Model</th>
<th>Network Ports</th>
<th>Available Slots for Additional Network Ports</th>
<th>Drive Bays</th>
<th>Supported Storage Drives</th>
<th>Processor(s)</th>
<th>System Memory</th>
<th>NVMe SSD for OS</th>
<th>RAID Controller</th>
<th>Form Factor</th>
<th>Power Supplies</th>
</tr>
</thead>
<tbody>
<tr>
<td>USO-2405X</td>
<td>Dual Bonded 10Gb RJ-45 iSCSI + NAS Connections (Backwards Compatible with 1Gb)</td>
<td>Up to 3 PCI-E Slots Can Be Used For Optional Network Card Upgrades: Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+</td>
<td>24 x 2.5&quot;</td>
<td>12Gb SAS drives: • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td>Single 10-Core Xeon Processor (Standard) / Dual 10-Core Xeon Processors (Optional)</td>
<td>32GB (Standard) / Up to 4TB (Optional)</td>
<td>256GB (Standard) / Up to 3.8TB (Optional)</td>
<td>High-Performance 12Gb SAS Hardware RAID Controller with RAID Cache Battery Backup</td>
<td>24-bay 2U Rackmount</td>
<td>Redundant 80-PLUS® 920W Platinum Certified High Efficiency Hot-Swappable Power Supplies</td>
</tr>
<tr>
<td>USO-805</td>
<td></td>
<td></td>
<td>8 x 3.5&quot;</td>
<td>12Gb SAS drives: • 7200 RPM • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
<td></td>
<td>Supports RAID Levels 0, 1, 3, 5, 6, 10, 30, 50 and 60; Supports up to 256 Drives (4PB) via EBODs</td>
<td>8-bay 2U Rackmount</td>
<td>Redundant 80-PLUS® 1000W Titanium Certified High Efficiency Hot-Swappable Power Supplies</td>
</tr>
<tr>
<td>USO-1205</td>
<td></td>
<td></td>
<td>12 x 3.5&quot;</td>
<td>16Gb SAS drives: • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12-bay 2U Rackmount</td>
<td>Redundant 80-PLUS® 920W Titanium Certified High Efficiency Hot-Swappable Power Supplies</td>
</tr>
<tr>
<td>USO-1605</td>
<td></td>
<td></td>
<td>16 x 3.5&quot;</td>
<td>24Gb SAS drives: • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16-bay 3U Rackmount</td>
<td>Redundant 80-PLUS® 1200W Titanium Certified High Efficiency Hot-Swappable Power Supplies</td>
</tr>
<tr>
<td>USO-2405</td>
<td></td>
<td></td>
<td>24 x 3.5&quot;</td>
<td>36Gb SAS drives: • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24-bay 4U Rackmount</td>
<td>Redundant 80-PLUS® 1200W Titanium Certified High Efficiency Hot-Swappable Power Supplies</td>
</tr>
<tr>
<td>USO-3605</td>
<td></td>
<td></td>
<td>36 x 3.5&quot;</td>
<td>48Gb SAS drives: • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>36-bay 4U Rackmount</td>
<td>Redundant 80-PLUS® 1200W Titanium Certified High Efficiency Hot-Swappable Power Supplies</td>
</tr>
</tbody>
</table>

All StoneFly USO appliances come standard with NAS and iSCSI, but can also support the following Fibre Channel (FC) SAN Target port upgrades: 2 x 8Gb, 4 x 8Gb, 2 x 16Gb, 4 x 16Gb, 2 x 32Gb, 4 x 32Gb FC Ports.

For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, processor, system memory, and NVMe SSD for OS, and other upgrade, please refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively.
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.

StoneFly USO-HA & USO-FC Disaggregated Cluster SAN + NAS Storage Controller Appliance Models

<table>
<thead>
<tr>
<th></th>
<th>i10004n-D</th>
<th>i10009n-D</th>
<th>i10104n-D</th>
<th>i10109n-D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Ports</strong></td>
<td>Six bonded 10Gb RJ-45 iSCSI + NAS Connections per Cluster (Backwards Compatible with 1Gb)</td>
<td>Four bonded 10Gb RJ-45 iSCSI + NAS Connections per Cluster (Backwards Compatible with 1Gb)</td>
<td>Up to 4 PCI-E Slots per Node Can Be Used For Optional Network Card or HBA for HA Expansion Upgrades</td>
<td>Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC</td>
</tr>
<tr>
<td><strong>Available Slots for Additional Cards</strong></td>
<td>Up to 1 PCI-E Slot per Node Can Be Used For Optional Network Card or HBA for HA Expansion Upgrades</td>
<td>Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC</td>
<td>Optional Upgrade to 4 x 12Gb SAS Ports on Each Node</td>
<td>Optional Upgrade to 10 x 12Gb SAS Ports on Each Node</td>
</tr>
<tr>
<td><strong>Expansion Array Connections</strong></td>
<td>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</td>
<td>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</td>
<td>2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays Optional Upgrade to 10 x 12Gb SAS Ports on Each Node</td>
<td>Optional Upgrade to 10 x 16Gb FC Ports on Each Node</td>
</tr>
<tr>
<td><strong>Maximum Supported Storage Drives</strong></td>
<td>Supports up to 1776 drives with EBOD expansion</td>
<td>Supports up to 1776 drives with EBOD expansion (or more when using FC switch)</td>
<td>Supports up to 4440 drives with EBOD expansion</td>
<td>Supports up to 4440 drives with EBOD expansion (or more when using FC switch)</td>
</tr>
<tr>
<td><strong>Processors</strong></td>
<td>Dual 10-Core Xeon Processors in Each Node</td>
<td>Dual 10-Core Xeon Processors in Each Node</td>
<td>Dual 10-Core Xeon Processors in Each Node</td>
<td>Dual 10-Core Xeon Processors in Each Node</td>
</tr>
<tr>
<td><strong>System Memory</strong></td>
<td>64GB per Node (Standard) / Up to 6TB per Node (Optional)</td>
<td>64GB per Node (Standard) / Up to 4TB per Node (Optional)</td>
<td>64GB per Node (Standard) / Up to 4TB per Node (Optional)</td>
<td>64GB per Node (Standard) / Up to 4TB per Node (Optional)</td>
</tr>
<tr>
<td><strong>SSD for OS</strong></td>
<td>240GB SSD for OS in Each Node (Standard) / Up to 3.8TB SSD for OS in Each Node (Optional)</td>
<td>256GB NVMe SSD for OS in Each Node / Up to 3.8TB NVMe SSD for OS in Each Node (Optional)</td>
<td>256GB NVMe SSD for OS in Each Node / Up to 3.8TB NVMe SSD for OS in Each Node (Optional)</td>
<td>256GB NVMe SSD for OS in Each Node / Up to 3.8TB NVMe SSD for OS in Each Node (Optional)</td>
</tr>
</tbody>
</table>

For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, processor, system memory, and SSD for OS, and other upgrade, please refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively.
Disaggregated High-Availability RAID Array Models for StoneFly USO-HA & USO-FC Cluster

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

<table>
<thead>
<tr>
<th>Model</th>
<th>24 x 2.5” 2U HA RAID Array</th>
<th>12 x 3.5” 2U HA RAID Array</th>
<th>16 x 3.5” 3U HA RAID Array</th>
<th>24 x 3.5” 4U HA RAID Array</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host Interface</td>
<td>24 x 2.5”</td>
<td>12 x 3.5”</td>
<td>16 x 3.5”</td>
<td>24 x 3.5”</td>
</tr>
<tr>
<td>Drive Bays</td>
<td>24 x 2.5”</td>
<td>12 x 3.5”</td>
<td>16 x 3.5”</td>
<td>24 x 3.5”</td>
</tr>
<tr>
<td>Supported Storage Drives</td>
<td>12Gb SAS drives:</td>
<td>12Gb SAS drives:</td>
<td>12Gb SAS drives:</td>
<td>12Gb SAS drives:</td>
</tr>
<tr>
<td></td>
<td>• 10,000 RPM</td>
<td>• 7200 RPM</td>
<td>• 10,000 RPM</td>
<td>• 7200 RPM</td>
</tr>
<tr>
<td></td>
<td>• 15,000 RPM</td>
<td>• 10,000 RPM</td>
<td>• 15,000 RPM</td>
<td>• 10,000 RPM</td>
</tr>
<tr>
<td></td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td>• SSD (1x/3x/10x DWPD)</td>
</tr>
<tr>
<td>Controllers</td>
<td>Built-in Dual Active/Active Hot-Swappable RAID Controller with Transparent Failover/Failback</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supported RAID Levels</td>
<td>0, 1, 0+1, 3, 5, 6, 10, 30, 50 and 60 and Global Spares with RAID Cache Backup Module on Each Controller</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Number of Storage Drives</td>
<td>Supports Maximum of 444 Drives with HA Expansion Units</td>
<td>Supports Maximum of 432 Drives with HA Expansion Units</td>
<td>Supports Maximum of 436 Drives with HA Expansion Units</td>
<td>Supports Maximum of 444 Drives with HA Expansion Units</td>
</tr>
<tr>
<td>Form Factor</td>
<td>24-bay 2U Rackmount</td>
<td>12-bay 2U Rackmount</td>
<td>16-bay 3U Rackmount</td>
<td>24-bay 4U Rackmount</td>
</tr>
<tr>
<td>Power Supplies</td>
<td>Redundant 80-PLUS® Certified High Efficiency Hot-Swappable Power Supplies</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Hardware Specifications of StoneFly USO Value SAN + NAS Appliance Models

#### StoneFly USO Value SAN + NAS Integrated Appliance Models

<table>
<thead>
<tr>
<th></th>
<th>USO-40T</th>
<th>USO-60</th>
<th>USO-80</th>
<th>USO-120</th>
<th>USO-160</th>
<th>USO-240</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Ports</strong></td>
<td>Dual Bonded 1Gb RJ-45 iSCSI + NAS Connections</td>
<td>1Gb and 10Gb RJ-45 iSCSI + NAS Connections (Backwards Compatible with 1Gb)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Available Slots</strong></td>
<td>0 Slots</td>
<td>2 Slots (can support optional RAID cache battery backup and additional network card)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Drive Bays</strong></td>
<td>4 x 3.5”</td>
<td>6 x 3.5”</td>
<td>8 x 3.5”</td>
<td>12 x 3.5”</td>
<td>16 x 3.5”</td>
<td>24 x 3.5”</td>
</tr>
<tr>
<td><strong>Supported Storage Drives</strong></td>
<td>6Gb SATA drives:  • 7200 RPM</td>
<td></td>
<td></td>
<td>12Gb SAS drives:  • 7200 RPM  • 10,000 RPM  • 15,000 RPM  • SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td>4-Core 9th Gen Intel Core i3 (Standard) / Up to 8-Core 9th Gen Intel Core i7 (Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System Memory</strong></td>
<td>8GB (Standard) / Up to 32GB (Optional)</td>
<td></td>
<td></td>
<td>8GB (Standard) / Up to 64GB (Optional)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NVMe SSD for OS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>256GB (Standard) / Up to 3.8TB (Optional)</td>
<td></td>
</tr>
<tr>
<td><strong>Drive Configuration</strong></td>
<td>RAID Levels 0, 1, 5, 6, 10</td>
<td>RAID Levels 0, 1, 3, 5, 6, 10, 50</td>
<td>RAID Levels 0, 1, 3, 5, 6, 10, 50, 60</td>
<td>RAID Levels 0, 1, 5, 6, 10, 50, 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Form Factor</strong></td>
<td>4-bay Mini Tower</td>
<td>6-bay 2U Rackmount</td>
<td>8-bay 2U Rackmount</td>
<td>12-bay 2U Rackmount</td>
<td>16-bay 3U Rackmount</td>
<td>24-bay 4U Rackmount</td>
</tr>
</tbody>
</table>

For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, processor, system memory, and NVMe SSD for OS, and other upgrade, please refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively.

**Note:** StoneFly USO Value appliances only supports scale out. Expansion units are not supported.
Hardware Specifications of StoneFly USO-HA Value Disaggregated Cluster SAN + NAS Appliance Model

The value-tier disaggregated cluster USO-HA appliances are available with support for iSCSI connections and 12Gb SAS host interface for HA RAID Arrays. Following are the hardware specifications of the storage controller and the HA RAID array for the value USO-HA cluster appliance.

### StoneFly USO-HA Value Disaggregated Cluster SAN + NAS Storage Controller Appliance Model

<table>
<thead>
<tr>
<th>C114n-D</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Ports</strong></td>
<td>Dual 10Gb RJ-45 iSCSI + NAS Connections per Cluster (Backwards Compatible with 1Gb)</td>
</tr>
</tbody>
</table>
| **Available Slots for Additional Cards** | Up to 2 PCI-E Slots per Node Can Be Used For Optional Network Card and/or HBA for HA Expansion Upgrades  
Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS |
| **Expansion Array Connections** | 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 |
| **Maximum Supported Storage Drives** | Supports up to 1776 drives with EBOD expansion |
| **Processor** | 4-Core 9th Gen Intel Core i3 (Standard) / Up to 8-Core 9th Gen Intel Core i7 (Optional) |
| **System Memory** | 8GB per Node (Standard) / Up to 64GB per Node (Optional) |
| **NVMe SSD for OS** | 256GB NVMe SSD for OS in Each Node / Up to 3.8TB NVMe SSD for OS in Each Node (Optional) |

For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, CPU, System Memory upgrades and NVMe SSD for OS, refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively.
### Disaggregated High-Availability RAID Array Models for StoneFly USO-HA Value Cluster

The USO-HA value cluster only supports 12Gb SAS-attached HA RAID expansion arrays. Following are the hardware specifications of the supported 12Gb SAS-attached HA RAID expansion arrays:

<table>
<thead>
<tr>
<th>Model</th>
<th>Host Interface</th>
<th>Drive Bays</th>
<th>Supported Storage Drives</th>
<th>Controllers</th>
<th>Supported RAID Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 x 2.5” 2U HA RAID Array</td>
<td>12Gb SAS</td>
<td>24 x 2.5”</td>
<td>12Gb SAS drives:</td>
<td>Built-in Dual Active/Active Hot-Swappable RAID Controller with Transparent Failover/Failback</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 10,000 RPM</td>
<td></td>
<td>0, 1, 0+1, 3, 5, 6, 10, 30, 50 and 60 and Global Spares with RAID Cache Backup Module on Each Controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 15,000 RPM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 x 3.5” 2U HA RAID Array</td>
<td>12Gb SAS</td>
<td>12 x 3.5”</td>
<td>12Gb SAS drives:</td>
<td></td>
<td>0, 1, 0+1, 3, 5, 6, 10, 30, 50 and 60 and Global Spares with RAID Cache Backup Module on Each Controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 7200 RPM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 10,000 RPM</td>
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<td></td>
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<td></td>
<td>• 15,000 RPM</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 x 3.5” 3U HA RAID Array</td>
<td>12Gb SAS</td>
<td>16 x 3.5”</td>
<td>12Gb SAS drives:</td>
<td></td>
<td>0, 1, 0+1, 3, 5, 6, 10, 30, 50 and 60 and Global Spares with RAID Cache Backup Module on Each Controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 10,000 RPM</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• 15,000 RPM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 x 3.5” 4U HA RAID Array</td>
<td>12Gb SAS</td>
<td>24 x 3.5”</td>
<td>12Gb SAS drives:</td>
<td></td>
<td>0, 1, 0+1, 3, 5, 6, 10, 30, 50 and 60 and Global Spares with RAID Cache Backup Module on Each Controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 10,000 RPM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• 15,000 RPM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Form Factor**: 24-bay 2U Rackmount, 12-bay 2U Rackmount, 16-bay 3U Rackmount, 24-bay 4U Rackmount
- **Power Supplies**: Redundant 80-PLUS® Certified High Efficiency Hot-Swappable Power Supplies
4.4 Hyperconverged Infrastructure (HCI) Appliances

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

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

Available in enterprise and value-tier solutions, the USS is offered with support for the following hardware architectures:

Enterprise HCI Appliances:

- Integrated HCI Appliance (USS)
- Dual Node Shared Nothing HCI Appliance
- Scale Out HCI Appliance
- Disaggregated Cluster HCI Appliance (USS-HA)
- Totally Disaggregated Cluster HCI Appliance (USS-HA)

Value-Tier HCI Appliances:

- Value HCI Appliance – Value-Tier Integrated HCI Appliance

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: 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
The 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 ability 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
The 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 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.
## Hardware Specifications of Available Enterprise USS Appliance Models

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

### StoneFly USS Integrated Appliance Models

<table>
<thead>
<tr>
<th></th>
<th>USS-2405X</th>
<th>USS-805</th>
<th>USS-1205</th>
<th>USS-1605</th>
<th>USS-2405</th>
<th>USS-3605</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Ports</strong></td>
<td>Dual 10Gb RJ-45 Ethernet Connections (Backwards Compatible with 1Gb)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Available Slots for Additional Network Ports</strong></td>
<td>Up to 3 PCI-E Slots Can Be Used For Optional Network Card Upgrades Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Drive Bays</strong></td>
<td>24 x 2.5”</td>
<td>8 x 3.5”</td>
<td>12 x 3.5”</td>
<td>16 x 3.5”</td>
<td>24 x 3.5”</td>
<td>36 x 3.5”</td>
</tr>
<tr>
<td><strong>Supported Storage Drives</strong></td>
<td>12Gb SAS drives: • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td>12Gb SAS drives: • 7200 RPM • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Processors</strong></td>
<td>Dual 10-Core Xeon Processors (Standard) / Up to Dual 28-Core Xeon Processors (Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System Memory</strong></td>
<td>64GB (Standard) / Up to 4TB (Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NVMe SSD for OS</strong></td>
<td>256GB (Standard) / Up to 3.8TB (Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RAID Controller</strong></td>
<td>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; Supports up to 256 Drives (4PB) via EBODs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Form Factor</strong></td>
<td>24-bay 2U Rackmount</td>
<td>8-bay 2U Rackmount</td>
<td>12-bay 2U Rackmount</td>
<td>16-bay 3U Rackmount</td>
<td>24-bay 4U Rackmount</td>
<td>36-bay 4U Rackmount</td>
</tr>
</tbody>
</table>

All StoneFly USS appliances come standard with iSCSI, but can also support the following Fibre Channel (FC) SAN Target port upgrades: 2 x 8Gb, 4 x 8Gb, 2 x 16Gb, 4 x 16Gb, 2 x 32Gb, 4 x 32Gb FC Ports. For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, processor, system memory, and NVMe SSD for OS, and other upgrade, please refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively. Note: StoneFly USS customers can bring their own hypervisor license, or choose to purchase Hyper-V, VMware, Citrix or KVM licenses from StoneFly.
Hardware Specifications of StoneFly USS-HA Enterprise Disaggregated HCI Cluster Appliance Models

The USS-HA is 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.

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.

StoneFly USS-HA Disaggregated HCI Cluster Storage Controller Appliance Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Network Ports</th>
<th>Available Slots for Additional Cards</th>
<th>Expansion Array Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>i10004vu-D</td>
<td>Six bonded 10Gb RJ-45 Ethernet Connections per Cluster (Backwards Compatible with 1Gb)</td>
<td>Up to 1 PCI-E Slot per Node Can Be Used For Optional Network Card or HBA for HA Expansion Upgrades</td>
<td>2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC</td>
<td>Optional Upgrade to 4 x 12Gb SAS Ports on Each Node</td>
</tr>
<tr>
<td>i10009vu-D</td>
<td>Four bonded 10Gb RJ-45 Ethernet Connections per Cluster (Backwards Compatible with 1Gb)</td>
<td>Up to 4 PCI-E Slots per Node Can Be Used For Optional Network Card and/or HBA for HA Expansion Upgrades</td>
<td>2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC</td>
<td>Optional Upgrade to 4 x 16Gb FC Ports on Each Node</td>
</tr>
<tr>
<td>i10104vu-D</td>
<td></td>
<td>Up to 4 PCI-E Slots per Node Can Be Used For Optional Network Card and/or HBA for HA Expansion Upgrades</td>
<td>2 x 12Gb SAS Ports on Each Cluster Node for Connection to HA RAID Arrays</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC</td>
<td>Optional Upgrade to 10 x 12Gb SAS Ports on Each Node</td>
</tr>
<tr>
<td>i10109vu-D</td>
<td></td>
<td>Up to 4 PCI-E Slots per Node Can Be Used For Optional Network Card and/or HBA for HA Expansion Upgrades</td>
<td>2 x 16Gb FC Ports on Each Cluster Node for Connection to HA RAID Arrays</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Optional Support for 1Gb RJ-45, 10Gb RJ-45, SFP+, CX4, SR Optical, LR Optical, 40Gb QSFP+, 12Gb SAS, 16Gb FC</td>
<td>Optional Upgrade to 10 x 16Gb FC Ports on Each Node</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Maximum Supported Storage Drives</th>
<th>Processors</th>
<th>System Memory</th>
<th>SSD for OS</th>
</tr>
</thead>
<tbody>
<tr>
<td>i10004vu-D</td>
<td>Supports up to 1776 drives with EBOD expansion</td>
<td>Dual 10-Core Xeon Processors in Each Node (Standard) / Up to Dual 28-Core Xeon Processors in Each Node (Optional)</td>
<td>64GB per Node (Standard) / Up to 6TB per Node (Optional)</td>
<td>240GB SSD for OS in Each Node (Standard) / Up to 3.8TB SSD for OS in Each Node (Optional)</td>
</tr>
<tr>
<td>i10009vu-D</td>
<td>Supports up to 1776 drives with EBOD expansion</td>
<td></td>
<td>64GB per Node (Standard) / Up to 4TB per Node (Optional)</td>
<td>256GB NVMe SSD for OS in Each Node / Up to 3.8TB NVMe SSD for OS in Each Node (Optional)</td>
</tr>
<tr>
<td>i10104vu-D</td>
<td>Supports up to 4440 drives with EBOD expansion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i10109vu-D</td>
<td>Supports up to 4440 drives with EBOD expansion</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, processor, system memory, and SSD for OS, and other upgrade, please refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively. Note: StoneFly USS-HA customers can bring their own cluster-enabled hypervisor license, or choose to purchase Hyper-V, VMware, Citrix or KVM licenses from StoneFly.
Disaggregated High-Availability RAID Array Models for StoneFly USS-HA Cluster

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

<table>
<thead>
<tr>
<th>Host Interface</th>
<th>24 x 2.5” 2U HA RAID Array</th>
<th>12 x 3.5” 2U HA RAID Array</th>
<th>16 x 3.5” 3U HA RAID Array</th>
<th>24 x 3.5” 4U HA RAID Array</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Bays</td>
<td>24 x 2.5”</td>
<td>12 x 3.5”</td>
<td>16 x 3.5”</td>
<td>24 x 3.5”</td>
</tr>
<tr>
<td>Supported Storage Drives</td>
<td>12Gb SAS drives: • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td>12Gb SAS drives: • 7200 RPM • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td>12Gb SAS drives: • 7200 RPM • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td>12Gb SAS drives: • 7200 RPM • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
</tr>
<tr>
<td>Controllers</td>
<td>Built-in Dual Active/Active Hot-Swappable RAID Controller with Transparent Failover/Failback</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supported RAID Levels</td>
<td>0, 1, 0+1, 3, 5, 6, 10, 30, 50 and 60 and Global Spares with RAID Cache Backup Module on Each Controller</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Number of Storage Drives</td>
<td>Supports Maximum of 444 Drives with HA Expansion Units</td>
<td>Supports Maximum of 432 Drives with HA Expansion Units</td>
<td>Supports Maximum of 436 Drives with HA Expansion Units</td>
<td>Supports Maximum of 444 Drives with HA Expansion Units</td>
</tr>
<tr>
<td>Form Factor</td>
<td>24-bay 2U Rackmount</td>
<td>12-bay 2U Rackmount</td>
<td>16-bay 3U Rackmount</td>
<td>24-bay 4U Rackmount</td>
</tr>
<tr>
<td>Power Supplies</td>
<td>Redundant 80-PLUS® Certified High Efficiency Hot-Swappable Power Supplies</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Hardware Specifications of Available USS Value HCI Appliance Models

### StoneFly USS Value Integrated Appliance Models

<table>
<thead>
<tr>
<th></th>
<th>USS-40T</th>
<th>USS-60</th>
<th>USS-80</th>
<th>USS-120</th>
<th>USS-160</th>
<th>USS-240</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Ports</strong></td>
<td>Dual 1Gb RJ-45 Ethernet Connections</td>
<td>1Gb and 10Gb RJ-45 Ethernet Connections (Backwards Compatible with 1Gb)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Available Slots</strong></td>
<td>0 Slots</td>
<td>2 Slots (can support optional RAID cache battery backup and additional network card)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Drive Bays</strong></td>
<td>4 x 3.5”</td>
<td>6 x 3.5”</td>
<td>8 x 3.5”</td>
<td>12 x 3.5”</td>
<td>16 x 3.5”</td>
<td>24 x 3.5”</td>
</tr>
<tr>
<td><strong>Supported Storage Drives</strong></td>
<td>6Gb SATA drives: • 7200 RPM</td>
<td></td>
<td>12Gb SAS drives: • 7200 RPM • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td>4-Core 9th Gen Intel Core i3 (Standard) / Up to 8-Core 9th Gen Intel Core i7 (Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System Memory</strong></td>
<td>8GB (Standard) / Up to 32GB (Optional)</td>
<td></td>
<td></td>
<td>8GB (Standard) / Up to 64GB (Optional)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NVMe SSD for OS</strong></td>
<td>256GB (Standard) / Up to 3.8TB (Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Drive Configuration</strong></td>
<td>RAID Levels 0, 1, 5, 6, 10</td>
<td>RAID Levels 0, 1, 3, 5, 6, 10, 50</td>
<td>RAID Levels 0, 1, 3, 5, 6, 10, 50, 60</td>
<td>RAID Levels 0, 1, 5, 6, 10, 50, 60</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Form Factor</strong></td>
<td>4-bay Mini Tower</td>
<td>6-bay 2U Rackmount</td>
<td>8-bay 2U Rackmount</td>
<td>12-bay 2U Rackmount</td>
<td>16-bay 3U Rackmount</td>
<td>24-bay 4U Rackmount</td>
</tr>
</tbody>
</table>

For more information about available network port upgrades, supported storage drive capacities, raw storage capacities, processor, system memory, and NVMe SSD for OS, and other upgrade, please refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively.

Note: StoneFly USO Value appliances only supports scale out. Expansion units are not supported.
4.5 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
- USC-HA High Availability Disaggregated Gateway Appliance

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: 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
# Hardware Specifications of Available USC SAN Gateway Appliance Models

## StoneFly USC Integrated Appliance Models

<table>
<thead>
<tr>
<th></th>
<th>i10000vu</th>
<th>i10100vu</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Ports</strong></td>
<td>Four 10Gb RJ-45 Ports (Backwards Compatible with 1Gb)</td>
<td>Dual 10Gb RJ-45 Ports (Backwards Compatible with 1Gb)</td>
</tr>
<tr>
<td><strong>Available Slots</strong></td>
<td>Supports up to Two Network Cards or SAN/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage</td>
<td>Supports up to Six Network Cards or SAN/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage</td>
</tr>
<tr>
<td><strong>Processors</strong></td>
<td>Dual 10-Core Xeon Processors (Standard) / Up to Dual 28-Core Xeon Processors (Optional)</td>
<td></td>
</tr>
<tr>
<td><strong>System Memory</strong></td>
<td>64GB (Standard) / Up to 6TB (Optional)</td>
<td>64GB (Standard) / Up to 4TB (Optional)</td>
</tr>
<tr>
<td><strong>SSD for OS</strong></td>
<td>240GB SSD for OS (Standard) / Up to 3.8TB SSD for OS (Optional)</td>
<td>256GB NVMe SSD for OS / Up to 3.8TB NVMe SSD for OS (Optional)</td>
</tr>
<tr>
<td><strong>Form Factor</strong></td>
<td>1U Rackmount</td>
<td>2U Rackmount</td>
</tr>
</tbody>
</table>

## StoneFly USC-HA Disaggregated Cluster SAN Gateway Appliance Models

<table>
<thead>
<tr>
<th></th>
<th>i10000vu-D</th>
<th>i10100vu-D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Network Ports</strong></td>
<td>Eight 10Gb RJ-45 Ports (Backwards Compatible with 1Gb)</td>
<td>Four 10Gb RJ-45 Ports (Backwards Compatible with 1Gb)</td>
</tr>
<tr>
<td><strong>Available Slots</strong></td>
<td>Supports up to Two Network Cards or SAN/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage (per Node)</td>
<td>Supports up to Six Network Cards or SAN/FC Storage Expansion Kits to Easily Convert Your Existing Storage Appliances into Advanced iSCSI Storage (per Node)</td>
</tr>
<tr>
<td><strong>Processors</strong></td>
<td>Dual 10-Core Xeon Processors in Each Node (Standard) / Up to Dual 28-Core Xeon Processors in Each Node (Optional)</td>
<td></td>
</tr>
<tr>
<td><strong>System Memory</strong></td>
<td>64GB per Node (Standard) / Up to 6TB per Node (Optional)</td>
<td>64GB per Node (Standard) / Up to 4TB per Node (Optional)</td>
</tr>
<tr>
<td><strong>SSD for OS</strong></td>
<td>240GB SSD for OS in Each Node (Standard) / Up to 3.8TB SSD for OS in Each Node (Optional)</td>
<td>256GB NVMe SSD for OS in Each Node / Up to 3.8TB NVMe SSD for OS in Each Node (Optional)</td>
</tr>
<tr>
<td><strong>Form Factor</strong></td>
<td>2 x 1U Rackmount</td>
<td>2 x 2U Rackmount</td>
</tr>
</tbody>
</table>

For more information about available network port upgrades, processor, system memory, and SSD for OS, and other upgrade, please refer to Chapter 2, section 2.3, 2.2, 2.2.1, and 2.4 respectively.
4.6 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 enterprise integrated appliances 12-bays and larger (excludes SSO unless purchased with RAID controller upgrade) are compatible with the storage expansion units described in this section.

<table>
<thead>
<tr>
<th></th>
<th>SFY-24EJCX Expansion Unit</th>
<th>SFY-12EJC Expansion Unit</th>
<th>SFY-16EJC Expansion Unit</th>
<th>SFY-24EJC Expansion Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Host Port</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12Gbps SAS Host Port</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Expansion Port</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12Gbps SAS Port for Cascading Expansion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Drive Bays</strong></td>
<td>24 x 2.5”</td>
<td>12 x 3.5”</td>
<td>16 x 3.5”</td>
<td>24 x 3.5”</td>
</tr>
<tr>
<td><strong>Supported Storage Drives</strong></td>
<td>12Gb SAS drives:</td>
<td></td>
<td>12Gb SAS drives:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 10,000 RPM</td>
<td>• 7200 RPM</td>
<td>• 10,000 RPM</td>
<td>• SSD (1x/3x/10x DWPD)</td>
</tr>
<tr>
<td></td>
<td>• 15,000 RPM</td>
<td>• 15,000 RPM</td>
<td>• SSD (1x/3x/10x DWPD)</td>
<td></td>
</tr>
<tr>
<td><strong>Drive Configuration</strong></td>
<td>Capable of Supporting RAID Levels 0, 1, 3, 5, 6, 10, 30, 50, 60 from StoneFly ISC, USO, USS, DR365 Series Appliances with 12Gb SAS RAID Controllers (12-Bays and Larger)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Form Factor</strong></td>
<td>24-bay 2U Rackmount</td>
<td>12-bay 2U Rackmount</td>
<td>16-bay 3U Rackmount</td>
<td>24-bay 4U Rackmount</td>
</tr>
<tr>
<td><strong>Power Supply</strong></td>
<td>Redundant 80-PLUS® Platinum Certified High-Efficiency Hot-Swappable Power Supplies</td>
<td>Redundant 80-PLUS® Titanium Certified High-Efficiency Hot-Swappable Power Supplies</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.7 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 enterprise and value-tier HA cluster appliances 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.

<table>
<thead>
<tr>
<th>Host Ports</th>
<th>12Gbps SAS Host Port on Each Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion Ports</td>
<td>12Gbps SAS Port for Cascading Expansion on Each Controller</td>
</tr>
<tr>
<td>Drive Bays</td>
<td>24 x 2.5”, 12 x 3.5”, 16 x 3.5”, 60 x 3.5”</td>
</tr>
<tr>
<td>Supported Storage Drives</td>
<td>12Gb SAS drives: • 10,000 RPM • 15,000 RPM • SSD (1x/3x/10x DWPD)</td>
</tr>
<tr>
<td>Controllers</td>
<td>Redundant JBOD Expander Controllers for Dual RAID Controller Configurations</td>
</tr>
<tr>
<td>Drive Configuration</td>
<td>Capable of Supporting RAID Levels 0, 1, 0+1, 3, 5, 6, 10, 30, 50, 60, and Global Spares from StoneFly Disaggregated High-Availability RAID Expansion Arrays</td>
</tr>
<tr>
<td>Form Factor</td>
<td>24-bay 2U Rackmount</td>
</tr>
<tr>
<td>Power Supply</td>
<td>Redundant 80-PLUS® Certified High Efficiency Hot-Swappable Power Supplies</td>
</tr>
</tbody>
</table>

For more information about integrated storage expansion unit or HA cluster appliance expansion unit compatibility or upgrades, contact StoneFly technical support.
Chapter 5:

Cloud Data Storage Solutions

StoneFly offers cloud storage solutions for enterprise customers and SMBs. Our 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

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 enables 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 enables 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.

5.2 Cloud Storage in Amazon S3

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 similar use-cases. With the StoneFly storage OS, users can integrate the 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 allows migration of Hyper-V and VMware Virtual Machines to AWS EC2 (KVM and Citrix VMs may also be ported to AWS EC2 but require additional steps).

5.3 Cloud Storage in StoneFly Private Cloud
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 enables us to deliver 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.

5.4 Enterprise Features and License Options of StoneFly Cloud Storage

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:
- Bring Your Own License (BYOL)
- NAS License
- iSCSI License
- Unified (SAN + NAS) License
<table>
<thead>
<tr>
<th>License Features</th>
<th>Unified (SAN + NAS)</th>
<th>SAN (iSCSI)</th>
<th>NAS</th>
</tr>
</thead>
<tbody>
<tr>
<td>iSCSI Storage</td>
<td>Supported</td>
<td>Supported</td>
<td></td>
</tr>
<tr>
<td>NAS – NFS</td>
<td>Supported</td>
<td></td>
<td>Supported</td>
</tr>
<tr>
<td>NAS – CIFS/SMB</td>
<td>Supported</td>
<td></td>
<td>Supported</td>
</tr>
<tr>
<td>Delta-Based Snapshots</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>Thin Provisioning</td>
<td>Supported</td>
<td>Supported</td>
<td></td>
</tr>
<tr>
<td>Synchronous Replication</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>(Campus Mirroring)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asynchronous Replication</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>Volume Encryption</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>Data Deduplication</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>Easy Active Directory</td>
<td>Supported</td>
<td></td>
<td>Supported</td>
</tr>
<tr>
<td>Integration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scale Out Storage</td>
<td>Supported</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>Unlimited Hosts</td>
<td>Supported</td>
<td>Up to 200</td>
<td>Supported</td>
</tr>
<tr>
<td>Storage Tiering</td>
<td>Supported</td>
<td></td>
<td>Supported</td>
</tr>
<tr>
<td>Storage Cache</td>
<td>Supported</td>
<td></td>
<td>Supported</td>
</tr>
</tbody>
</table>
5.5 Cloud Storage Gateway Solutions

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

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

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.
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 integrates 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.

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 business looking to set up cloud-first, hybrid, or multi-cloud environments.

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

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The Original Innovator of the iSCSI Protocol