A Comparison of Midrange Unified Storage Arrays from Enterprise Storage Providers

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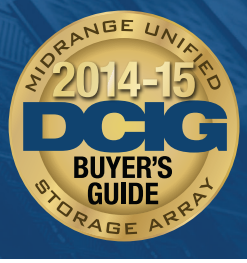
2014-15 MIDRANGE UNIFIED STORAGE ARRAY BUYER'S GUIDE



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Introduction

Whether or not you believe in Noah's global flood, we are in the midst of a new global deluge, a flood of data. According to a recent IBM study, 90% of the data in the world today has been created in the last two years alone,[1] and this data deluge affects more than just the Facebooks of the world. A January 2014 IDG Enterprise study[2] provides some insight into what is going on specifically in small and medium sized enterprises (SMEs). It found that the average enterprise expects its data to grow by over 75% in the next 12 to 18 months, with 31% of enterprises expecting to manage more than 1 petabyte by late 2014.

With storage volumes increasing and server virtualization becoming mainstream in even SMEs, they recognize it is time to move out of hot, dusty closets full of servers packed full of local disks and into what DCIG terms the "midrange array" class of storage solutions. The midrange array bridges the gap between the mid-teens of terabytes up to the low petabytes in a standalone appliance that can be accessed and shared by a number of devices.

The midrange array category is quite large and is usually broken down into several additional categories. The most basic breakdown is by how the storage is accessed: Storage Area Network (SAN), Network Attached Storage (NAS), or both. Solutions that can support both SAN and NAS are often referred to as "Unified Storage."

Midrange unified storage arrays are well-suited to SMEs because the arrays:

- Scale up storage capacity and performance through the addition of disks and/or nodes
- Scale up performance through the use of flash memory as a large shared cache and/or high-performance storage tier
- Support both NAS and SAN protocols thereby reducing duplication of resources, simplifying the IT infrastructure, and easing the transition of legacy systems from direct attached storage
- Leverage standard NAS and SAN protocols so most devices will be "plug and play" when connecting to the midrange unified storage array
- Reduce cost by eliminating redundant processing power and wasted storage capacity
- Ease storage management by centralizing storage into a single namespace and user interface
- Facilitate centralized security integrating into existing authentication schemes such as Active Directory, LDAP, NIS/NIS+, etc.

These and other reasons are why SMEs are turning with increasing frequency to midrange unified storage arrays to meet the general storage needs of their organizations. This is also why DCIG developed and released this Buyer's Guide to help them in their decision-making process.

The demand for unified storage arrays and the number of available products mirrors the expectations for how much data companies will need to store. While the 2013 edition of this Buyer's Guide included thirty arrays from ten vendors, the *2014-15 Midrange Unified Storage Array Buyer's Guide* swelled to forty arrays from fourteen vendors.

1. IBM. "Apply New Analytics Tools to Reveal New Opportunities." *IBM Analytics – IT Business Intelligence.* IBM, n.d. Web. 13 Aug. 2014. <http://www.ibm.com/smarterplanet/us/en/business_analytics/article/it_business_intelligence.html>.
2. IDG Enterprise "Big Data: Growing Trends and Emerging Opportunities." IDG Enterprise, Jan. 2014. Web. 13 Aug. 2014. <http://www.idgenterprise.com/report/big-data-2>.

Introduction (continued)

The actual growth in unified storage was even larger when vendors who entered the market with flash-first hybrid and all-flash arrays are considered. These new vendors and products are not included in this Buyer's Guide because we believe most businesses view those products as a distinct purchase decision. Businesses wishing to expand their research to include flash-first hybrid arrays and all-flash arrays should download either the *DCIG 2014 Hybrid Storage Array Buyer's Guide* or the *DCIG 2014-15 Flash Memory Storage Array Buyer's Guide* from the DCIG **website**.

Solutions in the unified storage market are diverse and can serve the needs of multiple application types. DCIG's goal in preparing this guide is to evaluate, score and rank each solution based upon a comprehensive list of features that reflects the needs of the widest range of organizations.

This Buyer's Guide should help any organization accelerate its evaluation process by educating them about what solutions are available and ideally even help them develop a short list as to which models to investigate further. The level of detail in this Buyer's Guide combined with DCIG's consistent scoring system helps organizations in two key ways.

First, it provides a powerful yet concise method to evaluate each midrange unified storage array model so organizations can understand the overall strengths and weaknesses of each solution. Using this information they can then understand how well designed each one is to meet specific needs in their environment.

Second, this Buyer's Guide provides a set of scores and rankings across the multiple features of each product as well as a data sheet for each midrange unified storage array. These data sheets drill down into the specifics of each product to provide information on each array's software, management tools, VMware integration, hardware and technical support features.

Please note that this Buyer's Guide is *not intended to be a substitute for internal testing.* DCIG encourages any organization that is considering the purchase of a midrange unified storage array to do its own in-house testing if at all possible.

We hope this Buyer's Guide meets its intended purposes in your environments and serves as a helpful aid in supplementing and accelerating your organization's normal decision making and product evaluation process.

Ben and Ken

Executive Summary

Scalability, flexibility and ease of management are key elements of the midrange unified storage value proposition. The *DCIG 2014-15 Midrange Unified Storage Array Buyer's Guide* seeks to expose the specific software and hardware features that relate to these key elements in a way that enables prospective storage system purchasers to compare these very capable storage systems and identify the systems that are most likely to be a good fit with their specific requirements.

Prior to consolidating storage onto a SAN or NAS appliance, storage management was simply one aspect of server management. As companies virtualize their server environments and move to a shared storage model, many prefer to have their server administrator(s) continue to manage storage rather than hire a full-time storage administrator. These companies desire to keep storage management overhead as low as possible.

Many midrange unified storage vendors address this dynamic by enabling routine storage management functions to be carried out from within VMware's vSphere management console and/or Microsoft's System Center Virtual Machine Manager (SCVMM), two of the most widely adopted virtual server management environments. This simplifies life for the server/storage administrator.

Another way some storage vendors are reducing storage management overhead is by offering remote monitoring and proactive remediation as part of their support offerings. Organizations that purchase remote monitoring benefit by having the vendor's technicians monitoring performance metrics and receiving trouble notifications. The result should be fewer outages and outages of shorter duration.

Organizations that purchase proactive remediation coverage gain the further benefit of having a vendor's technicians not only provide guidance in resolving issues, but actually resolving issues on behalf of the organization before a service outage occurs. For example, if a vendor sees a drive getting errors, they may ship a new drive or dispatch a tech to replace a drive before it fails. Proactive remediation can make storage pain go away, dramatically reducing the troubleshooting skills and heroics required of an organization's IT staff.

DCIG recognizes the value of these features by placing more weight on features such as the ability of an array to be managed from within VMware's vSphere management console and/or Microsoft's System Center Virtual Machine Manager as well as support for remote monitoring and proactive remediation.

Unified storage solutions are diverse. Some of these arrays scale to a maximum of 250 TB, while others scale to 34 PB; more than 100 times the storage. In fact, the diversity of uses each of these arrays may be put to make it difficult to establish a single definitive measure of excellence. But whatever a company's storage needs may be, there is almost certain to be a product featured in this guide that is well suited to address those needs.

What separates the *Best-in-Class* and *Recommended* products from the rest is that these highest-scoring products offer broad support for all capabilities across the board. The higher the score, the more likely that the array will be able to handle whatever storage challenges arise over the expected life of the array.

This *DCIG 2014-15 Midrange Unified Storage Array Buyer's Guide* achieves the following objectives:

- Provides an objective, third-party evaluation of currently available midrange unified storage arrays

Executive Summary (continued)

- Evaluates, scores and ranks midrange unified storage arrays from an end-user's perspective
- Includes recommendations on how to best utilize this Buyer's Guide
- Provides data sheets on 40 midrange unified storage arrays from 14 different providers so organizations may do a quick comparison of features while having sufficient detail at their fingertips to make an informed decision
- Provides insight into the management, application level, host support, hardware and support features which organizations may look for in a unified storage solution
- Provides a summary of common configurations of unified storage solutions

This Buyer's Guide cannot tell you the *"right"* vendor and solution to select for your particular requirements. Rather, it should be viewed as a handbook to help jumpstart your research and decision-making process. Used correctly, organizations can identify and prioritize features and capabilities in solutions that are shipping today; helping them move quickly to the next stage of choosing the right solution for their environment.

How to Use this Buyer's Guide

This *DCIG 2014-15 Midrange Unified Storage Array Buyer's Guide* functions as an important tool for any organization that intends to purchase a midrange unified storage array. The result of months of research, this Buyer's Guide does much of the heavy lifting for organizations in terms of helping them to vet what midrange unified storage arrays are currently available and what features they possess.

Solutions in the unified storage market are diverse and serve the needs of multiple application types. Therefore, in preparing this Buyer's Guide it was DCIG's goal was to evaluate, score and rank each solution based upon a comprehensive list of features that reflects the needs of the widest range of organizations.

DCIG's rankings of *Best-In-Class, Recommended, Excellent, Good,* and *Basic* are a measure of how well the features and capacities of each model compare to the other models evaluated in this particular Buyer's Guide. The higher the ranking, the greater the likelihood that the product contains the features an organization needs.

DCIG encourages good stewardship in all purchasing decisions and has attempted to pack as much detail as possible about each solution into each product's data sheet. Organizations can use DCIG's standardized data sheets to verify that the specific features they require are supported by the products they are considering.

Organizations should therefore use this Buyer's Guide as a handbook to understand who the unified storage players are, what products they offer, what features and functions are available on each, how these solutions scale, what networking and storage protocols they offer and how organizations might manage any solution they purchase.

DCIG recommends that organizations use this Buyer's Guide in the following seven ways:

1. ***Eliminate the painstaking research associated with coming up with a short list of products to explore in depth.*** This Buyer's Guide ranks, scores and contains data sheets for 40 products from 14 vendors. Each product is scored and then ranked as *Best-in-Class, Recommended, Excellent, Good,* and *Basic* based upon its score. In each product, over 200 different features were evaluated, weighted, scored and then ranked. All an organization has to do is look at the scores and features of each product in order to come up with a short list of products for consideration.

2. ***Gain perspective on the overall state of the unified storage market.*** Anyone involved with information technology knows about Dell, EMC, HP, IBM and NetApp, but some companies providing innovative products are less well known. This Buyer's Guide helps to remove some of the apprehension about buying from a less well known vendor. Using this Buyer's Guide, organizations can see how the products from lesser known vendors—and lesser known products from established vendors—stack up.

3. ***Quickly compare products.*** Data sheets provided by vendors vary widely in the data that is included and in the terminology used to describe various features--even for different products from the same vendor. This makes it difficult and time-consuming to do product comparisons. DCIG's standardized data sheets enable organizations to quickly compare models from the same or different vendors and see exactly which features are supported and, in some cases, how the features are implemented.

   The DCIG standardized data sheets attempt to normalize these different approaches for the purposes of evaluation while still exposing the differences. Using these standardized data sheets, organizations may now more easily identify which models are apples-to-apples comparisons and which ones are apples-to-oranges comparisons. A DCIG 2014-15 Midrange Unified Storage Array Buyer's Guide Data Sheet can also serve as an attractive cover sheet that supplements a company's own internal discussions and research.

4. ***Separate the apples from the oranges.*** Just as important as doing apples-to-apples comparisons is identifying when an orange is thrown into the mix. Sometimes it is very difficult for an organization to know if it is truly getting a good deal when bids come in from vendors that include different products. DCIG's standardized data sheets, in combination with the scores and rankings, enable organizations to know if the products they are comparing are apples-to-apples or apples and oranges.

5. ***Understand specialized terminology.*** Every technology tends to accumulate terminology that is specific to it and not readily understood by "outsiders." The storage industry is no exception. The glossary included as Appendix A of this Buyer's Guide explains the terminology used on the data sheets in this Buyer's Guide. Terms are presented in the same order they appear on the data sheets.

The glossary contains a list of 91 features that organizations look for when evaluating a midrange unified storage array. This list provides an excellent place to start when an organization creates its own list of features that it may need or want, enhancing the quality and productivity of the discussions around the technology.

6. ***Get competitive bids on comparable products from multiple vendors.*** In today's competitive market, it behooves organization to get bids from multiple vendors. After all, *when they compete, the buyer wins.* But that tactic only works well when organizations know that they are receiving bids on products that are roughly comparable. Using this Buyer's Guide, organizations can do a better job of accomplishing that objective.
7. ***Help justify technical buying recommendations to business folks.*** Nothing is easier for those on the business side to understand than a number. To help in this area, product scores and rankings are included on each data sheet so that those on the business side of the house can quickly see how a particular model and its features score and compare with others. The Buyer's Guide also includes summary sheets that provide the high-level scores and rankings for all of the products included in the Buyer's Guide.

Disclosures

Over the last few years the general trend in the US has been for both large analyst firms and boutique analyst firms to receive some or all of their revenue from storage vendors.

DCIG is no different in that respect as it also receives payment for services it performs for storage vendors. Those services include blogging, case studies, executive white papers, full-length white papers, product reviews and special reports. For more information on DCIG, visit www.dcig.com.

In the interest of transparency, a number of the storage providers included in this *Midrange Unified Storage Array Buyer's Guide* are or have been DCIG clients. No vendors, however, whether clients or not, have been afforded any preferential treatment in this Buyer's Guide.

Where a client relationship does exist, DCIG may have had more complete knowledge of specific vendor's products and features. However, DCIG sought to include all relevant products in this Buyer's Guide, and existing relationships played no part in inclusion or ranking.

In that vein, there are a number of important facts to keep in mind when considering the information contained in this *Midrange Unified Storage Array Buyer's Guide* and its merit.

- No storage vendor paid DCIG any fee to develop this Buyer's Guide or to have its products included in this Buyer's Guide.
- DCIG did not guarantee any storage provider that its unified storage solution would be included in this Buyer's Guide.
- Previous relationships did not influence the research, scoring or ranking of this Buyer's Guide.
- All research was based upon publicly available information as well as information provided by the storage vendors themselves as part of DCIG's standard Buyer's Guide process.
- Because of the number of features analyzed, how these features were weighted and how each unified storage solution was scored and ranked, there was no way for DCIG to predict at the outset how the product or product family would end up scoring or ranking at the end.
- DCIG would like to emphasize that no storage provider was privy to how DCIG did the scoring and ranking. In every case, the storage provider(s) only found out the scores and rankings of its respective unified storage solution after the analysis and research was complete and that all of the results reflect the opinion of DCIG.

Inclusion and Exclusion Criteria

As DCIG prepared this Buyer's Guide, it was necessary to develop a working definition of *"midrange unified storage."* The definition needed to be sufficiently broad so as to encompass what comes to mind when organizations hear the term *"midrange unified storage"* while still making the definition sufficiently narrow to keep it down to a manageable set of vendors and solutions.

To that end, the following definition of *"midrange unified storage"* was arrived at and was used as a means to determine whether or not a solution should be included in this Buyer's Guide.

Each unified storage solution must:

- Be available as an appliance that is available as a single SKU and includes its own hardware and software
- Support the presentation of storage as a single file system in a global namespace

- Support Ethernet connectivity
- Support both the CIFS/SMB and NFS NAS protocols
- Support one or more SAN protocols (iSCSI, Fibre Channel, FCoE)
- Primarily function using storage local to the device and/or its direct peers (more than a cloud gateway)
- Support scaling to at least two controllers
- Support scaling to a minimum of 60 TBs of raw capacity
- Provide sufficient information for DCIG to draw a meaningful conclusion
- Ship prior to June 15, 2014

Subsequent to the publication of the 2013 edition of this Buyer' Guide, DCIG published the *DCIG 2014 Hybrid Storage Array Buyer's Guide* and the *DCIG 2014-15 Flash Memory Storage Array Buyer's Guide* to cover a new generation of flash-first and all-flash storage systems. Many of those systems provide unified SAN and NAS storage, but were not added to this Buyer's Guide because DCIG believes prospective midrange unified storage purchasers are aware of hybrid and all-flash arrays, and are not looking for a solution from that space. For prospective purchasers who are interested in evaluating hybrid and all-flash arrays, the Buyer's Guides are available for download from the DCIG website.

The Seven-Step Process Used to Score and Rank Products

1. ***A long list of features supported by products that met the DCIG definition for "midrange unified storage" was created.*** Prior to selecting the features ultimately included in this Buyer's Guide a longer list of features was compiled. In cases where a feature could not objectively defined or understood, it was excluded from consideration.
2. ***A list of features to be included in the Buyer's Guide was established.*** Terms for those features were then "normalized" such that a common name for each feature included in the Buyer's Guide could be established.
3. ***Each feature had a weighting associated with it.*** The weightings were used to reflect if a feature was supported and potentially how useful and/or important the feature was. For example, based on experience from previous Buyer's Guides, allocate-on-write snapshot capabilities were given a higher weighting than other snapshot types based on space-efficiency and performance expectations. As such, products that included an allocate-on-write snapshot capability scored higher than those that supported other snapshot types.
4. ***The features were broken into four (4) general categories.*** The features included in this Buyer's Guide were broken down into four general categories: Management & Software, VMware Integration, Hardware, and Support. These categories reflect the general features that DCIG believes organizations are evaluating when seeking to purchase unified storage products.
5. ***DCIG completed a survey for each vendor's product(s) and then sent the survey(s) to each vendor for verification.*** Each vendor was invited to review their data and respond with any corrections or edits to the DCIG-completed survey(s).
6. ***All the features were scored based on the data captured in the surveys.*** Scoring was finalized after the updates received from vendors had been entered into the survey system.
7. ***Each product was ranked overall and in each category.*** One of the goals of this Buyer's Guide was to make clear, objective distinctions between different products. To accomplish this goal, the mean (or average) score and standard deviation were calculated for each scoring category based on the scores of all the included products. DCIG then developed an overall and per-category ranking for each product using the following ranges.
   - Those products that scored more than .5 standard deviations below the mean were given the rank of *Basic.*
   - Those products that scored less than .5 standard deviations above or .5 below the mean were assigned the rank of *Good.*
   - Those products that scored more than .5, but less than 1.5 standard deviations above the mean were ranked as *Excellent.*
   - Those products that scored more than 1.5 standard deviations above the mean were ranked as *Recommended.*
   - The products that had the top score in each category was given the designation *Best-in-Class.*

In every instance, all midrange unified storage array scores came within two (2) standard deviations of the mean. There were no outliers.

DCIG Comments and Thoughts

The Unified Storage Category

Like the *DCIG 2013 Midrange Unified Storage Array Buyer's Guide,* this updated edition attempts to strike a balance between pure hardware horsepower and management capabilities. One of the primary reasons behind this is DCIG's belief that end users see the *"unified storage"* solution category to be a *"jack-of-all-trades"* solution that combines both power and manageability in a single package.

DCIG recognizes that a single unified storage implementation may be used for as disparate applications as data retention, backups, VM storage, database storage, and end user file storage just to name a few. As such this Buyer's Guide focuses on areas that previous guides have not and in some case de-emphasizes areas emphasized in other Buyer's Guides.

For instance, because we expect the rate of growth in data storage requirements will continue to accelerate, we have given extra weight to data efficiency technologies that enable an array to store more data in less space. These data efficiency technologies include thin provisioning, automated storage reclamation, data compression and data deduplication.

A second area of focus is ease of management. Because many SME's do not employ full-time storage administrators, we gave extra weight to features that enable the array to be managed from within familiar virtual server management consoles and support options that include remote monitoring and proactive remediation provided by the vendor's own product experts.

Midrange Unified versus Enterprise Scale-Out

One of the difficulties during the development of this guide was drawing a line between unified storage solutions and what DCIG terms "*enterprise scale-out*" or "*private cloud storage*" solutions. In practice there is substantial crossover between the two categories because many, if not most, scale-out solutions combine NAS and SAN connectivity into the same device.

However the two terms currently have distinct connotations in the storage industry. DCIG understands the term *"unified storage"* to have a more *"midrange array"* connotation as well as an implied simplicity. On the other hand "scale-out storage" implies a focus on scalability and redundancy, often with a hefty price tag.

To avoid giving undue priority to scale-out storage solutions, we de-emphasized overall raw capacity beyond the 1.5 petabyte level and storage networking port counts beyond 16 ports. These limits fit with the focus on a more *"midrange"* definition of the unified storage category in comparison with the *"enterprise"* scale-out and private cloud storage categories.

Changes in the Midrange Unified Storage Category Since 2013

Much larger cache sizes

In 2013, the majority of Midrange Unified Storage Arrays supported a total cache of 96 GB or less, and 25% of arrays supported caches greater than 1 TB. Today, those cache numbers are 600 GB (6x) and 3 TB (3x) respectively. In nearly every case, caches larger than 1 TB are enabled through the use of flash memory as cache.

Large well-implemented caches reduce the average latency of reads and writes, increasing the overall performance of the array. Large caches can also be used to drive down the cost of an array by enabling the use of less expensive and higher-capacity 7.2K RPM hard disk drives in place of 10K or 15K hard disk drives. The benefit to a business is an increase in performance and greater storage capacity for less money, plus a smaller storage footprint in the data center.

Multiplied storage capacity

The majority of included arrays topped out at 720 GB in the 2013 Buyer's Guide. Today, the majority of these midrange unified storage arrays support at least 1.8 PB (2.5x) of storage capacity; and 25% of the arrays can scale to more than 4 PB. In only a short period of time, the capacity of midrange unified arrays has escalated by leaps and bounds.

This increase in storage capacity maps well to business requirements. According to a January 2014 IDG Enterprise study, the average organization expects its data to grow by 76% in the next 12 to 18 months, with 31% of enterprises expecting to manage more than 1 PB by late 2014.

Public cloud storage connectivity

More than half (58%) of the arrays in the new Buyer's Guide can connect to the cloud for storage tiering, particularly to Atmos and OpenStack-compatible cloud storage providers.

Although there is a thriving marketplace for purpose-built public cloud storage gateways, support for public cloud connectivity in the current crop of midrange unified storage arrays is a reflection of the *"jack of all trades"* expectations many businesses have for their unified storage solutions.

Support for Microsoft virtualization technologies gaining ground on VMware

A look at the midrange unified storage arrays provides further evidence that Microsoft Windows and Hyper-V are making steady inroads into small and midsized enterprise shops.

- 57% can now be managed from within Microsoft's System Center console, lagging vSphere/vCenter by just 7%.
- 48% support SMB 3.0, Microsoft's preferred storage networking protocol.
- 43% support Microsoft Windows Offloaded Data Transfer *(ODX)*, a Windows Server 2012 technology that reduces latency and enhances array throughput.

Support for VMware and its various capabilities also continues to grow, with SIOC and VASA making double-digit gains (now supported by 64% of arrays) since the 2013 edition of the Buyer's Guide. Nevertheless, Microsoft is clearly making its presence known in the small and midsized enterprise space.

Feature Areas Where DCIG Expects to See Improvement

DCIG expects end users to use midrange unified storage solutions to fill a wide range of needs within their infrastructures. This forces vendors to make tough decisions on how to balance providing a strong feature set and powerful hardware while also keeping costs down. DCIG recognizes this ongoing tension. That said DCIG continues to be surprised by the lack of certain feature sets across this category and in the storage industry at large.

Deduplication: The most glaring continues to be deduplication. One of the diverse tasks any unified storage implementation will be asked to perform will undoubtedly be archiving and backup. It may in fact be the *"gateway drug"* that many organizations use to get pulled into the unified storage category.

Deduplication provides both performance and cost savings by only storing one copy of identical data. As was true in the 2013 edition of this Buyer's Guide, less than half of the arrays in the 2014-15 edition support either in-line or post-process deduplication.

Flash-based Caching: DCIG expected to see more wide spread implementation of flash-based caching, but only 50% of the arrays do so—the same as in 2013. Although cache sizes increased substantially since the 2013 edition of this guide, half of these arrays still top out at a total cache of 600GB or less—generally the arrays that do not use flash as cache. We expect flash as cache, or flash as storage combined with dynamic storage tiering, will be a key to future competitiveness in the midrange unified storage marketplace.

Public Cloud Integration: Cloud storage integration made good progress, moving up from 31% in 2013 to 58% today. However, the best known public cloud storage providers were the least supported by these arrays. Current support levels are:

Amazon Glacier (0%)

Amazon S3 (7.5%)

Google Cloud Storage (0%)

Microsoft Azure (2.5%)

OpenStack-compatible (17.5%)

We continue to expect to see growth in support for these public cloud storage providers. This support will be most useful when combined with intelligent automated storage tiering.

Observations and Recommendations Regarding Each Unified Storage Solution Ranking

The storage marketplace is characterized by competition. No storage company or product can remain in the market for long unless it meets the requirements of at least some segment of the storage marketplace.

The following rankings reflect ranges of standard deviations in the overall scores achieved by the arrays when compared with one another. Like the bell curve that is sometimes used in competitive academic environments, some products must generally fall into each ranking category. An exception to this rule occurred in the VMware Integration category because most of the arrays that supported VMware integrations supported nearly all of the storage-related APIs we measured. As a result VMware Integration scores were clustered near the top or at zero.

Lower scoring products are not bad products. However, the higher scoring arrays support a broader range of features—and are therefore likely to fit a broader range of data center requirements—than the lower scoring arrays.

Best-in-Class and *Recommended* Rankings

The *Best-in-Class* NetApp FAS8040 and *Recommended* NetApp FAS8020 achieved *Excellent* or *Recommended* scores across all scoring categories. In particular, these two NetApp arrays were distinguished from the *Excellent* arrays by comprehensive Management and Software features. These data services are provided by NetApp's mature and full-featured Data ONTAP storage operating system.

The NetApp arrays stood out in several ways from the rest:

- Support for NAS Virtualization and Virtual Domains. NAS Virtualization refers to the ability of an array to make itself appear as multiple NAS devices. Virtual Domains refers to the ability of a single storage system to be managed as multiple *"virtual private arrays"* that segregate users, hosts, and application data.
- Support for both compression and deduplication. Some types of data are more responsive to compression than deduplication, databases being a prime example. Other types of data are more responsive to deduplication, such as unstructured file data. By implementing both technologies, the FAS8040 and FAS8020 should achieve higher overall data efficiency, storing the most data in the least space.
- The use of flash memory for both read caching and write caching. These models provide large low-latency flash caches of up to 12 TB and 6 TB respectively.
- NetApp was one of just a few vendors offering both remote monitoring and proactive remediation. While it is important to be notified of problems, it is much better to be notified that a problem occurred *and was resolved by the vendor.* Proactive remediation adds value by minimizing the number and duration of service interruptions and by reducing the troubleshooting time and expertise required of business IT staff.

The difference between the FAS8040 and the FAS8020 is found in their hardware. The FAS8040 is more scalable by many measures, including a superior raw storage capacity of 2.88 petabytes per array and 34.56 petabytes per cluster. These capacities are 1.5x the FAS8020's 1.92 petabytes per array and 23 petabytes per cluster.

Excellent Ranking

Many of the overall *Excellent* arrays achieved a *Recommended* ranking in at least one scoring category, but were held back by a *Good* or even *Basic* ranking in at least one of the other scoring categories.

The *Excellent* arrays are generally distinguished from Recommended arrays by:

- Support for either compression or deduplication
- The use of flash memory for either read caching or write caching

Fujitsu Limited ETERNUS DX100 S3, ETERNUS DX200 S3, ETERNUS DX500 S3, and ETERNUS DX600 S3 were characterized by slightly lower Management & Software scores than other *Excellent* arrays. This was more than offset by stronger Hardware scores than all but the Oracle ZFS Storage Appliance.

The IBM Storwize V7000 Unified took the 5th place overall, achieving a *Recommended* ranking in both the Management & Software and Support categories. In fact, only the NetApp arrays outscored this IBM array in the Management & Software category.

Oracle ZFS Storage Appliance equaled or bettered the other *Excellent* arrays in every category except VMware Integration. The Oracle appliance does not currently support any of the VMware storage API's this Buyer's Guide measured. That is not to say the appliance cannot be used for VMware deployments, but it does not take advantage of VMware-specific optimizations. On the other hand, the Oracle ZFS Storage Appliance was the exception to the rule among *Excellent* arrays, supporting compression and deduplication, and the use of flash memory for both read caching and write caching.

Dell Compellent SAN + FS8600 also earned a spot among the *Excellent* arrays. The combination of Compellent SAN features and FS8600 NAS capabilities achieved Excellent rankings across all scoring categories.

The EMC VNX series of arrays captured the remaining *Excellent* spots. The VNX arrays are marked by comprehensive VMware integration. The VNX arrays also captured the third highest scores in Management & Software, bested only by the IBM Storwize V7000 Unified and the NetAPP FAS8000 series arrays.

Good Ranking

Most of the overall *Good* arrays achieved an *Excellent* ranking in at least one scoring category, most frequently in hypervisor integration and technical support.

The lower end of the EMC VNX and the VMAX 10K Block and File achieved some of the highest VMware Integration scores but, like the EMC Isilon arrays, were held back from the *Excellent* group by lower hardware scores.

Hitachi Data Systems Hitachi Unified Storage 100 Series (HUS 100) was *Best-in-Class* in VMware Integration and had one of the highest Hardware scores in this group. The HUS 100 missed an overall *Excellent* ranking by less than 2 points overall. This array also achieved the highest raw storage density of 67.2 TB per rack unit—more than double the storage density of most arrays in this guide.

Imation Nexsan NST6000 Unified Hybrid Storage System puts a unified storage controller in front of its high-density E-series SAN storage. Unlike the other arrays in this category, it achieved an *Excellent* ranking in Hardware, but was held back by a Management & Software score in the *Basic* range. The NST6000 and NST5000 came in just behind the HUS 100 in storage density, supporting 60TB per rack unit.

The Dell EqualLogic SAN + FS7600 Series and the HP StoreEasy 1000 round out the *Good* group. The Dell system combines the popular EqualLogic SAN array with an FS7600 to provide NAS services. The HP StoreEasy 1000 is built on HP Proliant servers and Windows Storage Server 2012 R2.

Basic Ranking

Basic arrays fell behind the other arrays featured in this Buyer's Guide across multiple scoring categories, especially in VMware Integration. Most of these arrays did not implement any VMware storage APIs; though the Imation Nexsan NST5000 and HP StoreVirtual 4000 do support at least the VAAI v4 primitives, and open source storage innovator iXsystems indicated its TrueNAS systems will support VAAI primitives in the second half of 2014. A lack of specialized VMware support does not mean an array cannot be used as storage for virtual machines, but that the array will be less efficient in that role than if it supported VMware's storage-related APIs.

Arrays with a *Basic* ranking may serve as the one multi-purpose shared storage target for all the applications in a smaller enterprise or for a limited set of applications within a larger enterprise. Businesses comfortable purchasing only from large IT providers will find solutions from HP and Dell especially attractive, while businesses that are open to a broader range of storage providers have 14 *Basic* storage systems and a total of seven providers from which to choose.

MIDRANGE UNIFIED STORAGE ARRAY SCORES AND RANKINGS

The scores and rankings for the midrange unified storage arrays contain the following information:

- A chart that includes the scores and rankings for all of the products
- The mean and the standard deviation that were used to establish how each midrange unified storage array was ranked
- A summary of the primary findings

OVERALL SCORES AND RANKINGS

	MIDRANGE UNIFIED STORAGE ARRAYS	SCORE	RANKING
1.	**NetApp FAS8040**	**92.44**	**Best-in-Class**
2.	NetApp FAS8020	91.67	Recommended
3.	FUJITSU Limited ETERNUS DX600 S3	79.18	Excellent
4.	FUJITSU Limited ETERNUS DX500 S3	75.89	Excellent
5.	IBM Storwize V7000 Unified	74.29	Excellent
6.	FUJITSU Limited ETERNUS DX200 S3	73.20	Excellent
7.	FUJITSU Limited ETERNUS DX100 S3	71.84	Excellent
8.	Oracle ZFS Storage Appliance	71.81	Excellent
9.	EMC VNX8000	71.76	Excellent
10.	Dell Compellent SAN + FS8600	71.54	Excellent
11.	EMC VNX7600	70.88	Excellent
12.	EMC VNX5800	69.72	Excellent
13.	EMC VNX5600	69.37	Excellent
14.	EMC VNX5400	66.77	Good
15.	EMC VMAX 10K Block and File	65.57	Good
16.	EMC VNX5200	65.31	Good
17.	Hitachi Data Systems Hitachi Unified Storage 100 Series	65.19	Good
18.	EMC Isilon X-Series	60.81	Good
19.	EMC VNXe3150	59.81	Good
20.	EMC VNXe3300	59.68	Good
21.	EMC Isilon NL-Series	58.41	Good
22.	EMC Isilon S-Series	58.30	Good
23.	Imation Nexsan NST6000 Unified Hybrid Storage System	55.54	Good
24.	Huawei OceanStor T Series	54.34	Good
25.	Dell EqualLogic SAN + FS7600 Series	53.17	Good
26.	HP StoreEasy 1000	52.79	Good
27.	Imation Nexsan NST5000 Unified Hybrid Storage System	52.38	Basic
28.	iXsystems TrueNAS Z35	51.29	Basic

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OVERALL SCORES AND RANKINGS (continued)

	MIDRANGE UNIFIED STORAGE ARRAYS	SCORE	RANKING
29.	iXsystems TrueNAS Z30	49.67	Basic
30.	IceWEB 7000 Series	49.59	Basic
31.	HP StoreVirtual 4000	48.89	Basic
32.	iXsystems TrueNAS Z20	48.49	Basic
33.	IceWEB 3000 Series	48.04	Basic
34.	IceWEB 6500 Series	47.37	Basic
35.	Dell PowerVault NX3300	41.92	Basic
36.	Aberdeen LLC AberSAN ZXP2 HA	41.83	Basic
37.	Aberdeen LLC AberNAS NW Series	39.82	Basic
38.	Aberdeen LLC AberNAS NL Series	37.47	Basic
39.	Aberdeen LLC Petarack	36.21	Basic
40.	Overland Storage SnapScale X4	34.64	Basic

Total Number of Products 40

		Rankings	
Highest Score	92.44	Recommended	80.99 – 92.44
Lowest Score	34.64	Excellent	66.78 – 80.98
Average (Mean)	59.67	Good	52.57 – 66.77
Standard Deviation	14.21	Basic	34.64 – 52.56

Management & Software Scores and Rankings

	MIDRANGE UNIFIED STORAGE ARRAYS	SCORE	RANKING
1.	**NetApp FAS8040**	**45.00**	**Best-in-Class**
2.	**NetApp FAS8020**	**45.00**	**Best-in-Class**
3.	IBM Storwize V7000 Unified	37.60	Recommended
4.	EMC VNX8000	32.00	Excellent
5.	EMC VNX7600	32.00	Excellent
6.	EMC VNX5800	32.00	Excellent
7.	EMC VNX5600	32.00	Excellent
8.	EMC VNX5400	32.00	Excellent
9.	EMC VNX5200	32.00	Excellent
10.	Oracle ZFS Storage Appliance	31.80	Excellent
11.	Dell Compellent SAN + FS8600	30.60	Excellent
12.	FUJITSU Limited ETERNUS DX600 S3	30.50	Excellent
13.	FUJITSU Limited ETERNUS DX500 S3	30.50	Excellent
14.	FUJITSU Limited ETERNUS DX200 S3	30.50	Excellent
15.	EMC VMAX 10K Block and File	30.00	Good
16.	FUJITSU Limited ETERNUS DX100 S3	29.50	Good
17.	EMC VNXe3150	28.50	Good
18.	EMC VNXe3300	28.50	Good
19.	Hitachi Data Systems Hitachi Unified Storage 100 Series	27.35	Good
20.	EMC Isilon X-Series	26.00	Good
21.	EMC Isilon NL-Series	26.00	Good
22.	EMC Isilon S-Series	26.00	Good
23.	Dell EqualLogic SAN + FS7600 Series	25.70	Good
24.	HP StoreEasy 1000	25.45	Good
25.	iXsystems TrueNAS Z35	24.15	Good
26.	iXsystems TrueNAS Z30	24.15	Good
27.	iXsystems TrueNAS Z20	24.15	Good
28.	IceWEB 7000 Series	23.45	Good

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Management & Software Scores and Rankings (continued)

	MIDRANGE UNIFIED STORAGE ARRAYS	SCORE	RANKING
29.	IceWEB 3000 Series	23.45	Good
30.	IceWEB 6500 Series	23.45	Good
31.	Huawei OceanStor T Series	21.10	Basic
32.	Aberdeen LLC AberNAS NW Series	21.00	Basic
33.	Imation Nexsan NST6000 Unified Hybrid Storage	20.80	Basic
34.	Imation Nexsan NST5000 Unified Hybrid Storage	20.80	Basic
35.	HP StoreVirtual 4000	20.75	Basic
36.	Aberdeen LLC AberNAS NL Series	18.75	Basic
37.	Dell PowerVault NX3300	18.50	Basic
38.	Aberdeen LLC AberSAN ZXP2 HA	15.35	Basic
39.	Aberdeen LLC Petarack	15.35	Basic
40.	Overland Storage SnapScale X4	13.00	Basic

Total Number of Products 40

		Rankings	
Highest Score	45.00	Recommended	37.25 – 45.00
Lowest Score	13.00	Excellent	30.33 – 37.24
Average (Mean)	26.87	Good	23.41 – 30.32
Standard Deviation	6.92	Basic	13.00 – 23.40

MIDRANGE UNIFIED STORAGE ARRAY MODELS

Aberdeen LLC AberNAS NL Series

Approximate Starting List Price: $4,261

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
37.47	18.75	0.00	14.72	4.00
BASIC	BASIC	BASIC	BASIC	BASIC

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	1
Application Aware Snapshots	✗
Thin Volume Snapshots	✗
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✓ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✓ / ✓
Sub-volume Tiering	Block, File, Directory
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	**2**
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	1
NDMP	✗
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✓ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	2
CPU Cores per Node	16
Cache: DRAM / All Forms	512 GB / 512 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	384 TB / 384 TB
Raw Capacity per Rack Unit	✗
Highest Capacity HDD: SAS / SATA	600 GB / 4 TB
Highest Capacity SSD	✗
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	**8**
Ethernet Ports 1/10/40 Gb	2 / 8 / ✗
FC Ports 8/16 Gb	6 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	Business Day
Contract Support Methods *TOTAL #*	**3**
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	5 Years

✓ Supported ✗ Unsupported

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Aberdeen LLC AberNAS NW Series

Approximate Starting List Price: $4,791

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
39.82	21.00	0.00	14.82	4.00
BASIC	BASIC	BASIC	BASIC	BASIC

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	1
Application Aware Snapshots	✗
Thin Volume Snapshots	✗
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✓ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✓ / ✓
Sub-volume Tiering	Block, File, Directory
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	3
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	1
NDMP	✗
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	2
CPU Cores per Node	24
Cache: DRAM / All Forms	512 GB / 512 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	384 TB / 384 TB
Raw Capacity per Rack Unit	✗
Highest Capacity HDD: SAS / SATA	600 GB / 4 TB
Highest Capacity SSD	✗
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	8
Ethernet Ports 1/10/40 Gb	2 / 8 / ✗
FC Ports 8/16 Gb	6 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	Business Day
Contract Support Methods *TOTAL #*	3
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	5 Years

✓ Supported ✗ Unsupported

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Aberdeen LLC AberSAN ZXP2 HA

Approximate Starting List Price: $56,590

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
41.83	15.35	0.00	22.48	4.00
BASIC	BASIC	BASIC	GOOD	BASIC

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	1
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✓ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	**2**
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✗
SNMP v2 / v3	✗ / ✗

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	1
NDMP	✗
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✓ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	✗

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	2
CPU Cores per Node	12
Cache: DRAM / All Forms	512 GB / 620 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	864 TB / 1,728 TB
Raw Capacity per Rack Unit	48 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	100 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	**16**
Ethernet Ports 1/10/40 Gb	8 / 8 / ✗
FC Ports 8/16 Gb	8 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	Business Day
Contract Support Methods *TOTAL #*	**3**
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	5 Years

✓ Supported ✗ Unsupported

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Aberdeen LLC Petarack

Approximate Starting List Price: $375,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
36.21	15.35	0.00	16.86	4.00
BASIC	BASIC	BASIC	BASIC	BASIC

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	1
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✓ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	**2**
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✗
SNMP v2 / v3	✗ / ✗

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	1
NDMP	✗
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✓ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	✗

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	2
CPU Cores per Node	16
Cache: DRAM / All Forms	512 GB / 620 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	1,008 TB / 1,008 TB
Raw Capacity per Rack Unit	✗
Highest Capacity HDD: SAS / SATA	✗ / 4 TB
Highest Capacity SSD	✗
Self-encrypting Drives	✗
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	**X**
Ethernet Ports 1/10/40 Gb	✗ / ✗ / ✗
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	Business Day
Contract Support Methods *TOTAL #*	**3**
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	5 Years

✓ Supported ✗ Unsupported

All information on this data sheet is based entirely on publicly available information and DCIG's own knowledge of the product. This information reflects DCIG's opinion about this product as no information was provided by the vendor.

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Dell Compellent SAN + FS8600

Approximate Starting List Price: $75,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
71.54	30.60	5.90	24.79	10.25
EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	4
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✓
Quotas *TOTAL #*	2
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✓ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✓
Sub-volume Tiering	Block, File
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✓
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	9
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	3
NDMP	✓
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✓ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	5

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✗
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✗
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✓
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✓
Controller Nodes	8
Storage Nodes	40
CPU Cores per Node	24
Cache: DRAM / All Forms	128 GB / 192 GB
Flash-Based Caching: Read / Write	✗ / ✓
Raw Capacity per Appliance / Cluster	1,500 TB / 4,500 TB
Raw Capacity per Rack Unit	45 TB
Highest Capacity HDD: SAS / SATA	2 TB / 2 TB
Highest Capacity SSD	200 GB
Self-encrypting Drives	✓
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	26
Ethernet Ports 1/10/40 Gb	10 / 10 / ✗
FC Ports 8/16 Gb	16 / 16
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	8
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

All information on this data sheet is based entirely on publicly available information and DCIG's own knowledge of the product. This information reflects DCIG's opinion about this product as no information was provided by the vendor.

✓ Supported ✗ Unsupported

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Dell EqualLogic SAN + FS7600

Approximate Starting List Price: $75,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
53.17	25.70	4.20	15.27	8.00
GOOD	GOOD	GOOD	BASIC	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	3
Application Aware Snapshots	✓
Thin Volume Snapshots	✗
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	2
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✓ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✓
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✓
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	10
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✓ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✓ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✓
Reserve Space	✗
Extended Statistics	✗
VASA	✓
SIOC	✓
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✗
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✓
Controller Nodes	38
Storage Nodes	16
CPU Cores per Node	16
Cache: DRAM / All Forms	32 GB / 48 GB
Flash-Based Caching: Read / Write	✗ / ✓
Raw Capacity per Appliance / Cluster	509 TB / 2,304 TB
Raw Capacity per Rack Unit	36 TB
Highest Capacity HDD: SAS / SATA	3 TB / 3 TB
Highest Capacity SSD	200 GB
Self-encrypting Drives	✓
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	4
Ethernet Ports 1/10/40 Gb	4 / 4 / ✗
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	7
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

All information on this data sheet is based entirely on publicly available information and DCIG's own knowledge of the product. This information reflects DCIG's opinion about this product as no information was provided by the vendor.

✓ Supported ✗ Unsupported

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Dell PowerVault NX3300

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
41.92	18.50	0.00	15.92	7.50
BASIC	BASIC	BASIC	BASIC	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	3
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	5
In-line Compression Block / File	✗ / ✓
Post-process Compression Block / File	✗ / ✓
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✓
Sub-volume Tiering	✗
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	3
vSphere / SCVMM	✗ / ✓
OpenStack / SMI-S	✗ / ✗
Federated Management	✓
SNMP v2 / v3	✓ / ✗

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	1
NDMP	✓
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✗ / ✗
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✗
Authentication Methods *TOTAL #*	1

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✓
Controller Nodes	2
Storage Nodes	1
CPU Cores per Node	12
Cache: DRAM / All Forms	32 GB / 32 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	48 TB / 2,048 TB
Raw Capacity per Rack Unit	24 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	✗
Self-encrypting Drives	✗
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	6
Ethernet Ports 1/10/40 Gb	6 / 6 / ✗
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	3
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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EMC Isilon NL-Series

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
58.41	26.00	5.30	18.36	8.75
GOOD	GOOD	EXCELLENT	GOOD	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	2
Application Aware Snapshots	✗
Thin Volume Snapshots	✗
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	5
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✓ / ✗
Sub-volume Tiering	Block, File, Directory
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	8
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✗
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	3
NDMP	✓
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✓
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	144
CPU Cores per Node	8
Cache: DRAM / All Forms	48 GB / 48 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	144 TB / 20,736 TB
Raw Capacity per Rack Unit	36 TB
Highest Capacity HDD: SAS / SATA	✗ / 4 TB
Highest Capacity SSD	✗
Self-encrypting Drives	✓
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	4
Ethernet Ports 1/10/40 Gb	4 / 2 / ✗
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	7
Remote Monitoring / Proactive Remediation	✓ / ✓
Hardware Warranty	1 Year

✓ Supported ✗ Unsupported

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EMC Isilon S-Series

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
58.30	26.00	5.30	18.25	8.75
GOOD	GOOD	EXCELLENT	GOOD	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	2
Application Aware Snapshots	✗
Thin Volume Snapshots	✗
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	5
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✓ / ✗
Sub-volume Tiering	Block, File, Directory
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	8
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✗
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	3
NDMP	✓
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✓
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	144
CPU Cores per Node	8
Cache: DRAM / All Forms	96 GB / 96 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	28.8 TB / 4,147 TB
Raw Capacity per Rack Unit	14.4 TB
Highest Capacity HDD: SAS / SATA	1.2 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✓
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	4
Ethernet Ports 1/10/40 Gb	4 / 2 / ✗
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	7
Remote Monitoring / Proactive Remediation	✓ / ✓
Hardware Warranty	1 Year

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✓ Supported ✗ Unsupported

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EMC Isilon X-Series

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
60.81	26.00	5.30	20.76	8.75
GOOD	GOOD	EXCELLENT	GOOD	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	2
Application Aware Snapshots	✗
Thin Volume Snapshots	✗
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	5
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✓ / ✗
Sub-volume Tiering	Block, File, Directory
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	8
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✗
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	3
NDMP	✓
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✓
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	144
CPU Cores per Node	8
Cache: DRAM / All Forms	192 GB / 192 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	36 TB / 20,736 TB
Raw Capacity per Rack Unit	36 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✓
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	4
Ethernet Ports 1/10/40 Gb	4 / 2 / ✗
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	7
Remote Monitoring / Proactive Remediation	✓ / ✓
Hardware Warranty	1 Year

✓ Supported ✗ Unsupported

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EMC VMAX 10K Block and File

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
65.57	30.00	6.50	19.57	9.50
GOOD	GOOD	EXCELLENT	GOOD	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	4
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	5
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	2
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✓
Controller Nodes	4
Storage Nodes	72
CPU Cores per Node	12
Cache: DRAM / All Forms	128 GB / 128 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	24 TB / 1,728 TB
Raw Capacity per Rack Unit	6.85 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	400 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	16
Ethernet Ports 1/10/40 Gb	8 / 8 / ✗
FC Ports 8/16 Gb	16 / 8
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	7
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

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✓ Supported ✗ Unsupported

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EMC VNX5200

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
65.31	32.00	6.50	17.31	9.50
GOOD	EXCELLENT	EXCELLENT	BASIC	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	4
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	**5**
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✓
Controller Nodes	1
Storage Nodes	1
CPU Cores per Node	8
Cache: DRAM / All Forms	32 GB / 600 GB
Flash-Based Caching: Read / Write	✗ / ✓
Raw Capacity per Appliance / Cluster	45 TB / 500 TB
Raw Capacity per Rack Unit	16.66 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	**28**
Ethernet Ports 1/10/40 Gb	16 / 12 / ✗
FC Ports 8/16 Gb	24 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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EMC VNX5400

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
66.77	32.00	6.50	18.77	9.50
GOOD	EXCELLENT	EXCELLENT	GOOD	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	4
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	5
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✓
Controller Nodes	1
Storage Nodes	1
CPU Cores per Node	8
Cache: DRAM / All Forms	32 GB / 1,000 GB
Flash-Based Caching: Read / Write	✗ / ✓
Raw Capacity per Appliance / Cluster	240 TB / 1,000 TB
Raw Capacity per Rack Unit	16.66 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	36
Ethernet Ports 1/10/40 Gb	16 / 16 / ✗
FC Ports 8/16 Gb	32 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	7
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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EMC VNX5600

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
69.37	32.00	6.50	21.37	9.50
EXCELLENT	EXCELLENT	EXCELLENT	GOOD	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	4
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	**5**
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✓
Controller Nodes	1
Storage Nodes	1
CPU Cores per Node	8
Cache: DRAM / All Forms	48 GB / 2,000 GB
Flash-Based Caching: Read / Write	✗ / ✓
Raw Capacity per Appliance / Cluster	240 TB / 2,000 TB
Raw Capacity per Rack Unit	51.28 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	**44**
Ethernet Ports 1/10/40 Gb	16 / 16 / ✗
FC Ports 8/16 Gb	16 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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EMC VNX5800

Approximate Starting List Price: $43,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
69.72	32.00	6.50	21.72	9.50
EXCELLENT	EXCELLENT	EXCELLENT	GOOD	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	4
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	5
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✓
Controller Nodes	1
Storage Nodes	1
CPU Cores per Node	12
Cache: DRAM / All Forms	64 GB / 3,000 GB
Flash-Based Caching: Read / Write	✗ / ✓
Raw Capacity per Appliance / Cluster	240 TB / 3,000 TB
Raw Capacity per Rack Unit	51.28 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	44
Ethernet Ports 1/10/40 Gb	16 / 16 / ✗
FC Ports 8/16 Gb	40 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	7
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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EMC VNX7600

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
70.88	32.00	6.50	22.88	9.50
EXCELLENT	EXCELLENT	EXCELLENT	GOOD	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	4
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	**5**
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✓
Controller Nodes	1
Storage Nodes	1
CPU Cores per Node	16
Cache: DRAM / All Forms	128 GB / 4,200 GB
Flash-Based Caching: Read / Write	✗ / ✓
Raw Capacity per Appliance / Cluster	240 TB / 4,000 TB
Raw Capacity per Rack Unit	56.34 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	**44**
Ethernet Ports 1/10/40 Gb	16 / 16 / ✗
FC Ports 8/16 Gb	40 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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EMC VNX8000

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
71.76	32.00	6.50	23.76	9.50
EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	4
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	**5**
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✓
Controller Nodes	1
Storage Nodes	1
CPU Cores per Node	32
Cache: DRAM / All Forms	256 GB / 4,200 GB
Flash-Based Caching: Read / Write	✗ / ✓
Raw Capacity per Appliance / Cluster	240 TB / 6,000 TB
Raw Capacity per Rack Unit	58.25 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	**88**
Ethernet Ports 1/10/40 Gb	16 / 16 / ✗
FC Ports 8/16 Gb	72 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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EMC VNXe3150

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
59.81	28.50	6.50	15.31	9.50
GOOD	GOOD	EXCELLENT	BASIC	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	4
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✓ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	**5**
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	2
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✓
Controller Nodes	1
Storage Nodes	1
CPU Cores per Node	4
Cache: DRAM / All Forms	4 GB / 4 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	36 TB / 288 TB
Raw Capacity per Rack Unit	16 TB
Highest Capacity HDD: SAS / SATA	3 TB / ✗
Highest Capacity SSD	200 GB
Self-encrypting Drives	✓
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	**4**
Ethernet Ports 1/10/40 Gb	4 / 2 / ✗
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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EMC VNXe3300

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
59.68	28.50	6.50	15.18	9.50
GOOD	GOOD	EXCELLENT	BASIC	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	4
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✓ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	**5**
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✗ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	2
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✓
Controller Nodes	1
Storage Nodes	1
CPU Cores per Node	4
Cache: DRAM / All Forms	12 GB / 12 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	45 TB / 360 TB
Raw Capacity per Rack Unit	13.84 TB
Highest Capacity HDD: SAS / SATA	3 TB / ✗
Highest Capacity SSD	200 GB
Self-encrypting Drives	✓
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	**2**
Ethernet Ports 1/10/40 Gb	4 / 2 / ✗
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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Fujitsu Limited ETERNUS DX100 S3

Approximate Starting List Price: $8,500

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
71.84	29.50	6.25	27.09	9.00
EXCELLENT	GOOD	EXCELLENT	EXCELLENT	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	3
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✓
Quotas *TOTAL #*	1
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	**10**
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✓ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✗
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✓
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✓
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	2
CPU Cores per Node	2
Cache: DRAM / All Forms	16 GB / 16 GB
Flash-Based Caching: Read / Write	✓ / ✗
Raw Capacity per Appliance / Cluster	576 TB / 576 TB
Raw Capacity per Rack Unit	48 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✓
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	**16**
Ethernet Ports 1/10/40 Gb	16 / 8 / ✗
FC Ports 8/16 Gb	16 / 16
InfiniBand / Converged	✗ / 16

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

Fujitsu Limited ETERNUS DX200 S3

Approximate Starting List Price: $12,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
73.20	30.50	6.25	27.45	9.00
EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	3
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✓
Quotas *TOTAL #*	1
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	**10**
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✓ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✗
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✓
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✓
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	2
CPU Cores per Node	6
Cache: DRAM / All Forms	32 GB / 32 GB
Flash-Based Caching: Read / Write	✓ / ✗
Raw Capacity per Appliance / Cluster	1,056 TB / 1,056 TB
Raw Capacity per Rack Unit	52.8 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✓
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	**16**
Ethernet Ports 1/10/40 Gb	16 / 8 / ✗
FC Ports 8/16 Gb	16 / 16
InfiniBand / Converged	✗ / 16

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

Fujitsu Limited ETERNUS DX500 S3

Approximate Starting List Price: $70,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
75.89	30.50	6.25	30.14	9.00
EXCELLENT	EXCELLENT	EXCELLENT	RECOMMENDED	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	3
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✓
Quotas *TOTAL #*	1
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	**10**
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✓ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✗
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✓
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✓
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	2
CPU Cores per Node	6
Cache: DRAM / All Forms	96 GB / 5,696 GB
Flash-Based Caching: Read / Write	✓ / ✗
Raw Capacity per Appliance / Cluster	2,112 TB / 2,112 TB
Raw Capacity per Rack Unit	50.3 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✓
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	**16**
Ethernet Ports 1/10/40 Gb	16 / 8 / ✗
FC Ports 8/16 Gb	16 / 16
InfiniBand / Converged	✗ / 16

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

Fujitsu Limited ETERNUS DX600 S3

Approximate Starting List Price: $110,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
79.18	30.50	6.25	33.43	9.00
EXCELLENT	EXCELLENT	EXCELLENT	BEST-IN-CLASS	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	3
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✓
Quotas *TOTAL #*	1
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	**10**
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✓ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✗
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✓
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✓
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✓
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	2
CPU Cores per Node	10
Cache: DRAM / All Forms	192 GB / 5,792 GB
Flash-Based Caching: Read / Write	✓ / ✗
Raw Capacity per Appliance / Cluster	4,224 TB / 4,224 TB
Raw Capacity per Rack Unit	53.9 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✓
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	**32**
Ethernet Ports 1/10/40 Gb	32 / 16 / ✗
FC Ports 8/16 Gb	32/ 32
InfiniBand / Converged	✗ / 32

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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Hitachi Data Systems
Hitachi Unified Storage 100 Series

Approximate Starting List Price: < $25,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
65.19	27.35	7.00	22.59	8.25
GOOD	GOOD	BEST-IN-CLASS	GOOD	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	4
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✓
Quotas *TOTAL #*	4
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✓
Sub-volume Tiering	Block, File
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✓
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	12
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✓ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✓ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✗
Authentication Methods *TOTAL #*	7

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✓
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✓
Controller Nodes	5
Storage Nodes	1
CPU Cores per Node	4
Cache: DRAM / All Forms	46 GB / 192 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	3,840 TB / 3,840 TB
Raw Capacity per Rack Unit	67.2 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	1.6 TB
Self-encrypting Drives	✓
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	32
Ethernet Ports 1/10/40 Gb	8 / 8 / ✗
FC Ports 8/16 Gb	16 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	8
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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HP StoreEasy 1000

Approximate Starting List Price: $3,766

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
52.79	25.45	0.00	17.09	10.25
GOOD	GOOD	BASIC	BASIC	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	2
Application Aware Snapshots	✓
Thin Volume Snapshots	✗
Thin Provisioning / Eager-Zeroed-Thick	✗ / ✗
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✓
Quotas *TOTAL #*	4
In-line Compression Block / File	✗ / ✓
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✓ / ✗
Sub-volume Tiering	✗
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	4
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✗

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✗
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✓ / ✗
Storage Templates	✓
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✗
Authentication Methods *TOTAL #*	1

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	8
CPU Cores per Node	4
Cache: DRAM / All Forms	368 GB / 368 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	48 TB / 2,327 TB
Raw Capacity per Rack Unit	23.27 TB
Highest Capacity HDD: SAS / SATA	4 TB / 4 TB
Highest Capacity SSD	800 GB
Self-encrypting Drives	✗
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✓
Concurrent FC/iSCSI	✗
Storage Networking Ports	24
Ethernet Ports 1/10/40 Gb	4 / 2 / 2
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	2 / 10

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	7
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

HP StoreVirtual 4000

Approximate Starting List Price: $24,396

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
48.89	20.75	4.00	13.39	10.75
BASIC	BASIC	GOOD	BASIC	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	1
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✓
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	5
vSphere / SCVMM	✓ / ✗
OpenStack / SMI-S	✓ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✗

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	3
NDMP	✓
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✗ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	✗

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✓
SIOC	✓
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✓
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	32
CPU Cores per Node	6
Cache: DRAM / All Forms	64 GB / 464 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	48 TB / 1,536 TB
Raw Capacity per Rack Unit	24 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	400 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	8
Ethernet Ports 1/10/40 Gb	4 / 2 / ✗
FC Ports 8/16 Gb	2 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	9
Remote Monitoring / Proactive Remediation	✓ / ✓
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

Huawei OceanStor T Series

Approximate Starting List Price: N/A

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
54.34	21.10	4.00	21.74	7.50
GOOD	BASIC	GOOD	GOOD	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	3
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	✗
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	3
vSphere / SCVMM	✓ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✓
SNMP v2 / v3	✓ / ✗

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✗
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✓ / ✓
Storage Templates	✗
NFS v4 / v4.1	✗ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	✗

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✓
SIOC	✓
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✓
Controller Nodes	2
Storage Nodes	30
CPU Cores per Node	8
Cache: DRAM / All Forms	192 GB / 192 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	192 TB / 5,760 TB
Raw Capacity per Rack Unit	45 TB
Highest Capacity HDD: SAS / SATA	4 TB / 3 TB
Highest Capacity SSD	200 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	24
Ethernet Ports 1/10/40 Gb	16 / 20 / ✗
FC Ports 8/16 Gb	20 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	2
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

All information on this data sheet is based entirely on publicly available information and DCIG's own knowledge of the product. This information reflects DCIG's opinion about this product as no information was provided by the vendor.

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

IBM Storwize V7000 Unified

Approximate Starting List Price: $90,056

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
74.29	37.60	4.50	20.69	11.50
EXCELLENT	RECOMMENDED	GOOD	GOOD	BEST-IN-CLASS

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	3
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	4
In-line Compression Block / File	✓ / ✓
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block, File, Directory
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✗
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	9
vSphere / SCVMM	✓ / ✗
OpenStack / SMI-S	✓ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✓
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✓ / ✓
Storage Templates	✓
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✓ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	2

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✗
Independent Controller Nodes	✓
Controller Nodes	2
Storage Nodes	84
CPU Cores per Node	16
Cache: DRAM / All Forms	160 GB / 160 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	988.8 TB / 3,955 TB
Raw Capacity per Rack Unit	23 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	800 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	34
Ethernet Ports 1/10/40 Gb	18 / 12 / ✗
FC Ports 8/16 Gb	12 / ✗
InfiniBand / Converged	✗ / 12

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	8
Remote Monitoring / Proactive Remediation	✓ / ✓
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

IceWEB 3000 Series

Approximate Starting List Price: $11,495

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
48.04	23.45	0.00	17.59	7.00
BASIC	GOOD	BASIC	BASIC	BASIC

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	2
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	5
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✓ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✓
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	3
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✓
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✓ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	3

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	21
CPU Cores per Node	✗
Cache: DRAM / All Forms	✗ / 1,024 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	48 TB / 1,000 TB
Raw Capacity per Rack Unit	22.22 TB
Highest Capacity HDD: SAS / SATA	3 TB / ✗
Highest Capacity SSD	200 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	8
Ethernet Ports 1/10/40 Gb	6 / 2 / ✗
FC Ports 8/16 Gb	2 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	2
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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IceWEB 6500 Series

Approximate Starting List Price: $27,381

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
47.37	23.45	0.00	16.92	7.00
BASIC	GOOD	BASIC	BASIC	BASIC

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	2
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	5
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✓ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✓
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	3
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✓
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✓ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	3

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✓
Controller Nodes	2
Storage Nodes	21
CPU Cores per Node	✗
Cache: DRAM / All Forms	64 GB / 1,024 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	48 TB / 1,000 TB
Raw Capacity per Rack Unit	22.22 TB
Highest Capacity HDD: SAS / SATA	3 TB / ✗
Highest Capacity SSD	200 GB
Self-encrypting Drives	✗
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	8
Ethernet Ports 1/10/40 Gb	8 / 2 / ✗
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	2
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

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✓ Supported ✗ Unsupported

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IceWEB 7000 Series

Approximate Starting List Price: $34,995

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
49.59	23.45	0.00	19.14	7.00
BASIC	GOOD	BASIC	GOOD	BASIC

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	2
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	5
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✓ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✓
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	3
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✓
Cloud Storage Support *TOTAL #*	1
NAS Virtualization / Virtual Domains	✓ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	3

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✓
Controller Nodes	2
Storage Nodes	✗
CPU Cores per Node	4
Cache: DRAM / All Forms	96 GB / 1,024 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	900 TB / 1,800 TB
Raw Capacity per Rack Unit	✗
Highest Capacity HDD: SAS / SATA	3 TB / ✗
Highest Capacity SSD	200 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	14
Ethernet Ports 1/10/40 Gb	12 / 8 / ✗
FC Ports 8/16 Gb	2 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	2
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

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Imation Nexsan NST5000 Unified Hybrid Storage System

Approximate Starting List Price: $24,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
52.38	20.80	3.50	20.33	7.75
BASIC	BASIC	GOOD	GOOD	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	1
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	2
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	✗
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	**6**
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✗
SNMP v2 / v3	✗ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✓
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	1

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✓
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✓
Controller Nodes	1
Storage Nodes	2
CPU Cores per Node	16
Cache: DRAM / All Forms	192 GB / 4,400 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	240 TB / 1,440 TB
Raw Capacity per Rack Unit	60 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	400 GB
Self-encrypting Drives	✗
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	**16**
Ethernet Ports 1/10/40 Gb	12 / 4 / ✗
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

Imation Nexsan NST6000 Unified Hybrid Storage System

Approximate Starting List Price: $100,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
55.54	20.80	3.50	23.49	7.75
GOOD	BASIC	GOOD	EXCELLENT	GOOD

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	1
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✓
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	2
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	✗
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	**6**
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✗
SNMP v2 / v3	✗ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✓
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	1

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✓
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✓
Controller Nodes	2
Storage Nodes	7
CPU Cores per Node	24
Cache: DRAM / All Forms	384 GB / 9,648 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	✗ / 5,040 TB
Raw Capacity per Rack Unit	60 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	400 GB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	**16**
Ethernet Ports 1/10/40 Gb	10 / 6 / ✗
FC Ports 8/16 Gb	8 / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✓ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

iXsystems TrueNAS Z20

Approximate Starting List Price: $15,280

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
48.49	24.15	0.00	17.59	6.75
BASIC	GOOD	BASIC	BASIC	BASIC

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	3
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	5
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✓ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	✗
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	4
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✗
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✗
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✗ / ✗
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✗
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	1
CPU Cores per Node	8
Cache: DRAM / All Forms	64 GB / 2,000 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	96 TB / 240 TB
Raw Capacity per Rack Unit	34.28 TB
Highest Capacity HDD: SAS / SATA	6 TB / ✗
Highest Capacity SSD	2 TB
Self-encrypting Drives	✗
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	10
Ethernet Ports 1/10/40 Gb	10 / 8 / 4
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	5
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

iXsystems TrueNAS Z30

Approximate Starting List Price: $24,200

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
49.67	24.15	0.00	18.77	6.75
BASIC	GOOD	BASIC	GOOD	BASIC

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	3
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	5
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✓ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	✗
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	4
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✗
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✗
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✗ / ✗
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✗
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	1
CPU Cores per Node	12
Cache: DRAM / All Forms	128 GB / 2,000 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	90 TB / 665 TB
Raw Capacity per Rack Unit	35.05 TB
Highest Capacity HDD: SAS / SATA	6 TB / ✗
Highest Capacity SSD	2 TB
Self-encrypting Drives	✗
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	10
Ethernet Ports 1/10/40 Gb	10 / 8 / 4
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	5
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

iXsystems TrueNAS Z35

Approximate Starting List Price: $35,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
51.29	24.15	0.00	20.39	6.75
BASIC	GOOD	BASIC	GOOD	BASIC

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	3
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	5
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✓ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	✗
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	4
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✗
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✗
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✗ / ✗
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✗
Authentication Methods *TOTAL #*	4

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✓
Controller Nodes	2
Storage Nodes	2
CPU Cores per Node	16
Cache: DRAM / All Forms	256 GB / 2,000 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	576 TB / 1,152 TB
Raw Capacity per Rack Unit	32.91 TB
Highest Capacity HDD: SAS / SATA	6 TB / ✗
Highest Capacity SSD	2 TB
Self-encrypting Drives	✗
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	10
Ethernet Ports 1/10/40 Gb	10 / 8 / 4
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	5
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

NetApp FAS8020

Approximate Starting List Price: $43,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
91.67	45.00	6.40	29.77	10.50
RECOMMENDED	BEST-IN-CLASS	EXCELLENT	RECOMMENDED	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	2
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✓
Quotas *TOTAL #*	5
In-line Compression Block / File	✓ / ✓
Post-process Compression Block / File	✓ / ✓
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✓ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✓
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	9
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✓ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	2
NAS Virtualization / Virtual Domains	✓ / ✓
Storage Templates	✓
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	7

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✗
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✓
Controller Nodes	24 (12 HA pairs)
Storage Nodes	24
CPU Cores per Node	6
Cache: DRAM / All Forms	48 GB / 6,000 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	1,920 TB / 23,000 TB
Raw Capacity per Rack Unit	22.32 TB
Highest Capacity HDD: SAS / SATA	1.2 TB / 4 TB
Highest Capacity SSD	1.6 TB
Self-encrypting Drives	✓
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	28
Ethernet Ports 1/10/40 Gb	20 / 16 / ✗
FC Ports 8/16 Gb	20 / 12
InfiniBand / Converged	✗ / 4

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	8
Remote Monitoring / Proactive Remediation	✓ / ✓
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

NetApp FAS8040

Approximate Starting List Price: $57,000

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
92.44	45.00	6.40	30.54	10.50
BEST-IN-CLASS	BEST-IN-CLASS	EXCELLENT	RECOMMENDED	EXCELLENT

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	2
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✓
Symantec Zero Reclamation API	✓
Quotas *TOTAL #*	5
In-line Compression Block / File	✓ / ✓
Post-process Compression Block / File	✓ / ✓
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✓ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✓ / ✓
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	9
vSphere / SCVMM	✓ / ✓
OpenStack / SMI-S	✓ / ✓
Federated Management	✓
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	2
NAS Virtualization / Virtual Domains	✓ / ✓
Storage Templates	✓
NFS v4 / v4.1	✓ / ✓
SMB 2.1 / 3.0	✓ / ✓
Microsoft ODX	✓
Authentication Methods *TOTAL #*	7

VMWARE INTEGRATION

VAAI	
Full Copy	✓
Hardware Assisted Locking	✓
Block Zeroing	✓
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✓
Full File Clone	✓
Fast File Clone	✓
Out-of-Space Conditions	✓
Reserve Space	✓
Extended Statistics	✗
VASA	✓
SIOC	✓
VADP	✓

HARDWARE

Controller Config: Active-Active / Dual Active	✓ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✓
Controller Nodes	24 (12 HA pairs)
Storage Nodes	24
CPU Cores per Node	8
Cache: DRAM / All Forms	64 GB / 12,288 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	2,880 TB / 34,560 TB
Raw Capacity per Rack Unit	21.81 TB
Highest Capacity HDD: SAS / SATA	1.2 TB / 4 TB
Highest Capacity SSD	1.6 TB
Self-encrypting Drives	✓
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✓ / ✗
Concurrent FC/iSCSI	✓
Storage Networking Ports	46
Ethernet Ports 1/10/40 Gb	20 / 32 / ✗
FC Ports 8/16 Gb	20 / 12
InfiniBand / Converged	✗ / 8

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	8
Remote Monitoring / Proactive Remediation	✓ / ✓
Hardware Warranty	3 Years

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

Oracle ZFS Storage Appliance

Approximate Starting List Price: $34,380

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
71.81	31.80	0.00	28.51	11.50
EXCELLENT	EXCELLENT	BASIC	RECOMMENDED	BEST-IN-CLASS

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✓
Synchronous Replication	✗
Snapshot Methods *TOTAL #*	1
Application Aware Snapshots	✓
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	3
In-line Compression Block / File	✓ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✓ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	Block
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✓
Workload Prioritization (QoS)	✓
Management Interface *TOTAL #*	9
vSphere / SCVMM	✓ / ✗
OpenStack / SMI-S	✓ / ✗
Federated Management	✗
SNMP v2 / v3	✓ / ✓

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	4
NDMP	✓
Cloud Storage Support *TOTAL #*	2
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✓
NFS v4 / v4.1	✓ / ✗
SMB 2.1 / 3.0	✗ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	5

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✓
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	2
CPU Cores per Node	40
Cache: DRAM / All Forms	1,024 GB / 7,424 GB
Flash-Based Caching: Read / Write	✓ / ✓
Raw Capacity per Appliance / Cluster	3,456 TB / 3,456 TB
Raw Capacity per Rack Unit	24 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	1.6 TB
Self-encrypting Drives	✗
FC/iSCSI	✓ / ✓
FCoE/InfiniBand	✗ / ✓
Concurrent FC/iSCSI	✓
Storage Networking Ports	40
Ethernet Ports 1/10/40 Gb	40 / 24 / ✗
FC Ports 8/16 Gb	16 / 16
InfiniBand / Converged	16 / ✗

SUPPORT

Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	10
Remote Monitoring / Proactive Remediation	✓ / ✓
Hardware Warranty	1 Year

✓ Supported ✗ Unsupported

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

Overland Storage SnapScale X4

Approximate Starting List Price: $13,221

DCIG Scores and Rankings

OVERALL SCORE	Management & Software*	VMware Integration*	Hardware*	Support
34.64	13.00	0.00	14.64	7.00
BASIC	BASIC	BASIC	BASIC	BASIC

MANAGEMENT & SOFTWARE

Asynchronous Replication *PERIODIC / CONTINUOUS*	✓ / ✗
Synchronous Replication	✓
Snapshot Methods *TOTAL #*	✗
Application Aware Snapshots	✗
Thin Volume Snapshots	✓
Thin Provisioning / Eager-Zeroed-Thick	✓ / ✗
Automated Storage Reclamation	✗
Symantec Zero Reclamation API	✗
Quotas *TOTAL #*	2
In-line Compression Block / File	✗ / ✗
Post-process Compression Block / File	✗ / ✗
In-line Deduplication Block / File	✗ / ✗
Post-process Deduplication Block / File	✗ / ✗
Sub-volume Tiering	✗
Automated Data Tiering *SCHEDULED / DYNAMIC*	✗ / ✗
Workload Prioritization (QoS)	✗
Management Interface *TOTAL #*	**2**
vSphere / SCVMM	✗ / ✗
OpenStack / SMI-S	✗ / ✗
Federated Management	✓
SNMP v2 / v3	✓ / ✗

MANAGEMENT & SOFTWARE (CONT'D)

Notification & Logging *TOTAL #*	2
NDMP	✗
Cloud Storage Support *TOTAL #*	✗
NAS Virtualization / Virtual Domains	✗ / ✗
Storage Templates	✗
NFS v4 / v4.1	✗ / ✗
SMB 2.1 / 3.0	✓ / ✗
Microsoft ODX	✗
Authentication Methods *TOTAL #*	2

VMWARE INTEGRATION

VAAI	
Full Copy	✗
Hardware Assisted Locking	✗
Block Zeroing	✗
Thin Provisioning Dead Space Reclamation (SCSI UNMAP)	✗
Full File Clone	✗
Fast File Clone	✗
Out-of-Space Conditions	✗
Reserve Space	✗
Extended Statistics	✗
VASA	✗
SIOC	✗
VADP	✗

HARDWARE

Controller Config: Active-Active / Dual Active	✗ / ✗
SAN and NAS without separate filer head	✓
Independent Controller Nodes	✗
Controller Nodes	✗
Storage Nodes	1,000
CPU Cores per Node	12
Cache: DRAM / All Forms	64 GB / 64 GB
Flash-Based Caching: Read / Write	✗ / ✗
Raw Capacity per Appliance / Cluster	144 TB / ✗
Raw Capacity per Rack Unit	36 TB
Highest Capacity HDD: SAS / SATA	4 TB / ✗
Highest Capacity SSD	✗
Self-encrypting Drives	✗
FC/iSCSI	✗ / ✓
FCoE/InfiniBand	✗ / ✗
Concurrent FC/iSCSI	✗
Storage Networking Ports	**4**
Ethernet Ports 1/10/40 Gb	4 / 4 / ✗
FC Ports 8/16 Gb	✗ / ✗
InfiniBand / Converged	✗ / ✗

SUPPORT

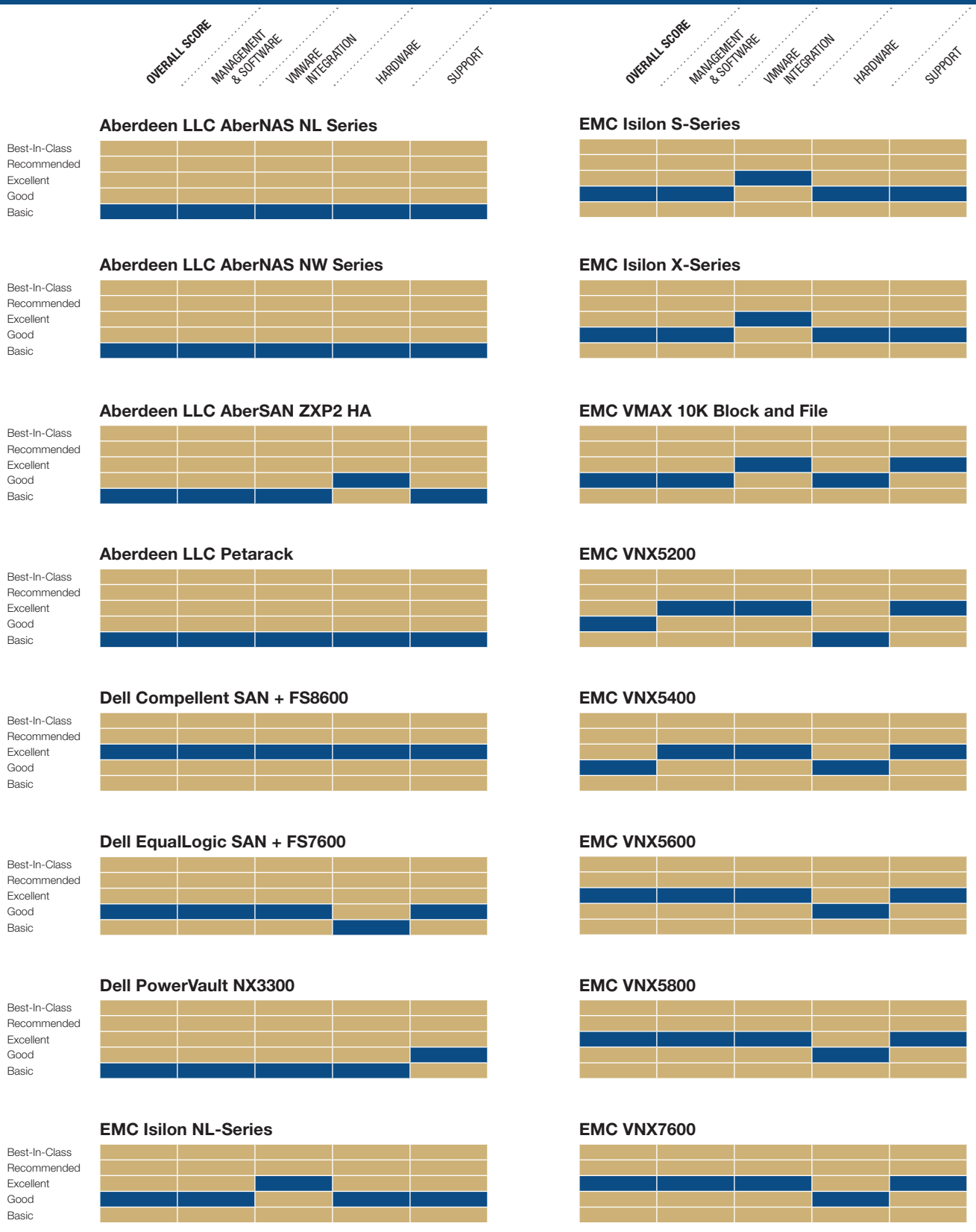
Contract Support Availability	24x7x365
Contract Support Methods *TOTAL #*	**7**
Remote Monitoring / Proactive Remediation	✗ / ✗
Hardware Warranty	1 Year

✓ Supported ✗ Unsupported

All information on this data sheet is based entirely on publicly available information and DCIG's own knowledge of the product. This information reflects DCIG's opinion about this product as no information was provided by the vendor.

* The DCIG Interactive Buyers Guide contains additional data elements for this category that are reflected in the scores assigned to each array, but which were not able to be included in this one-page data sheet.

Product Rankings Dashboard



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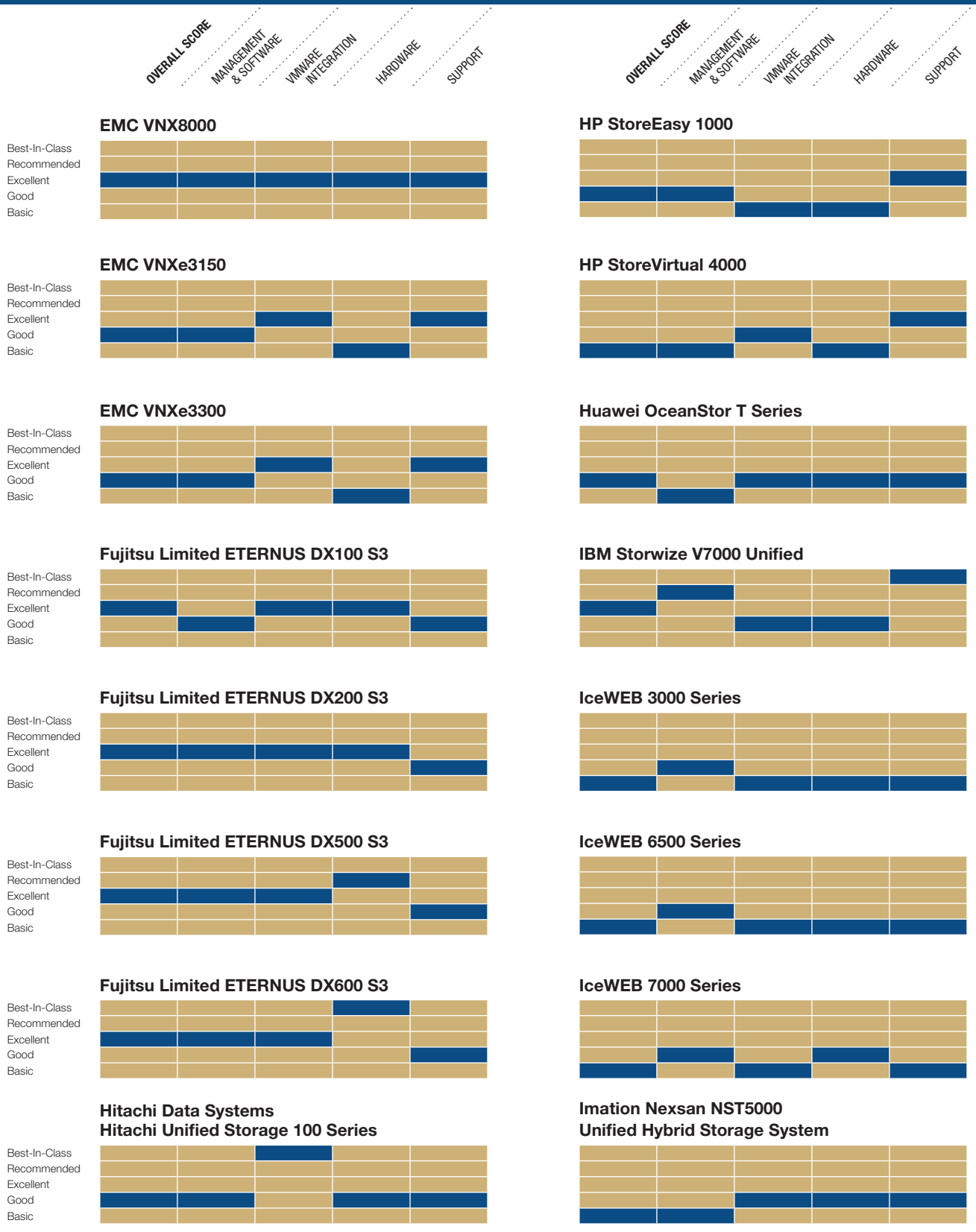
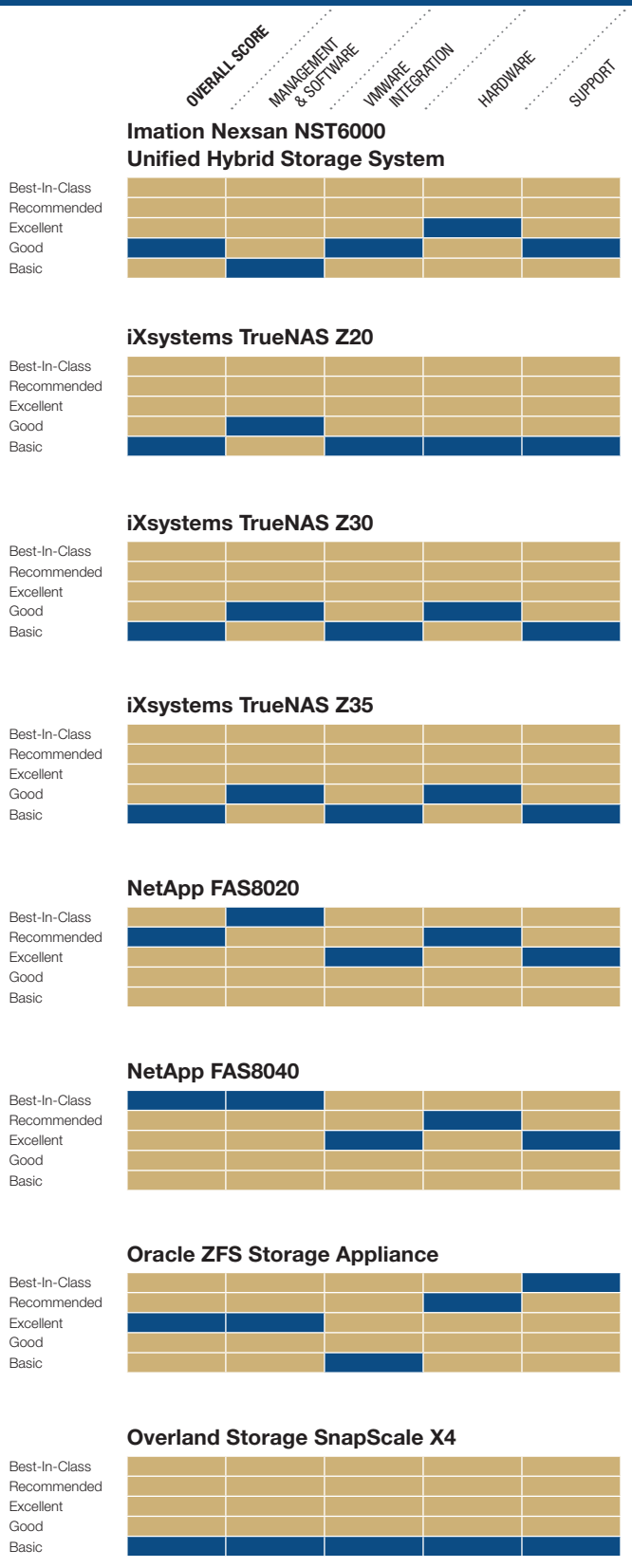
Product Rankings Dashboard (continued)



Product Rankings Dashboard (continued)



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APPENDICES

Definitions, Explanations and Terminology

This section contains brief definitions and/or explanations of the terms used when developing the data sheets found in the *DCIG 2014-15 Midrange Unified Storage Array Buyer's Guide.*

MANAGEMENT & SOFTWARE

Asynchronous Replication ***PERIODIC / CONTINUOUS***

A form of replication where data is only replicated after the data is written on the first storage array. Asynchronous replication comes in two forms: periodic and continuous.

Periodic: A snapshot of one or more volumes is periodically taken with that snapshot and then replicated to a secondary array.

Continuous: Every write I/O is copied, stored in a local disk cache and then replicated as soon as possible to a secondary array.

Synchronous Replication

Indicates if the array can synchronously replicate data to another array from the same storage provider. Write I/Os need to be confirmed as complete by both arrays before processing can continue.

Snapshot Methods ***TOTAL #***

A snapshot creates a copy of the file system or volume as if it were frozen at a specific point in time. Snapshots provide an effective way to do backups by temporarily quiescing (e.g., suspending all write activity), taking a snapshot, and then resuming live operations. At this point the snapshot can be backed up through normal methods. The specific elements supported for each product are available by accessing the DCIG Interactive Buyer's Guide *(IBG)*. The different types of snapshots are:

Allocate-on-Write: *(AoW)* A copy of all the pointers to blocks of data on a file system or volume is first made. As new data is written or existing data on the file system or volume is changed, the data is written to blocks at a new location. Blocks of data from the original file system or volume remain unchanged.

Copy-on-Write: *(CoW)* A copy of all the pointers to blocks of data on a file system or volume is first made. New data is written to blocks at a new location. If existing data is changed, the former copy is relocated and the changed data takes its previous place. This is also known as a differential snapshot because new storage space is only consumed when new data (net new or changed) is written.

Split-Mirror: Data is concurrently written, or mirrored, to file systems or volumes. When a split-mirror snapshot occurs, the two file systems are logically separated with all changes and/or net new data going to the file system that remains in production. The second file system contains a full copy of the data.

Full Copy: References all the data on a volume and, every time a snapshot is created, a snapshot is created of all of the data on the volume by copying all of the data on the volume to another volume

Application Aware Snapshots

A snapshot in which the storage array has detailed knowledge of the underlying data which allows it to ensure that applications like Microsoft Exchange or Microsoft SQL Server are in a consistent state at the time of the snapshot.

Thin Volume Snapshots

The array is able to perform snapshots on thin provisioned volumes.

Thin Provisioning/Eager-Zeroed-Thick

Thin Provisioning is an optimization method where storage resources are allocated to a volume by a storage array only when data is written to the volume by an application.

Eager-Zeroed-Thick is a thin provisioning optimization method used primarily in virtualized environments where volume resources are pre-allocated on the disk and the space then filled with zeroes. This is done to indicate the space is unused and may be reclaimed as well as a method to overwrite data on storage space that was previously used by a virtual machine, returned to the storage pool and then reallocated to another VM.

Automated Storage Reclamation

A storage optimization strategy related to thin provisioning. Blocks that were allocated to a volume but are no longer used or needed are returned to an array's pool of unallocated storage capacity.

Appendix A—Definitions, Explanations and Terminology (continued)

Symantec Zero Reclamation API

Indicates support for Symantec's Zero Reclamation API which allows reuse of areas of storage that have been filled with zeroes in thin provisioning scenarios.

Quotas *TOTAL #*

The ability to manage and enforce resource limits on users, groups, directories, and individual files. The number indicates whether models may support quotas on the file system, directory, file, user or group. The specific elements supported for each product are available by accessing the DCIG Interactive Buyer's Guide *(IBG).*

In-line Compression Block / File

Compression refers to a technique for improving space efficiency by replacing repetitive strings of data within a block or file with a shorter referent from a dictionary of such data strings. In-line means that data is compressed before it is stored either at the block level, file level, or both.

Post-process Compression Block / File

Data is first stored in its native or raw format and subsequently compressed, generally during off-peak hours, either at the block level, file level, or both.

In-line Deduplication Block / File

Deduplication saves space by storing a pointer to an existing identical block or file rather than storing a second instance of the data. In-line means that data is deduplicated before it is stored.

Post-process Deduplication Block / File

Deduplication saves space by storing a pointer to an existing identical block or file rather than storing a second instance of the data. Post-process means that data is first stored in its native or raw format and subsequently deduplicated, generally during off-peak hours, either at the block level, file level, or both.

Sub-volume Tiering

Indicates the granularity at which sub-volume tiering activities operate: block, file and/or directory.

Automated Data Tiering *SCHEDULED / DYNAMIC*

Automated data tiering places data on the appropriate tier of storage within the array based upon policies that are either built into the storage array, set by the storage administrator or some combination of both. Moving data between tiers may occur at pre-scheduled times or dynamically. See the DCIG Interactive Buyer's Guide *(IBG)* for a detailed list of supported options for any particular array.

Workload Prioritization (QoS)

Indicates whether a model supports different performance levels based on a Quality of Service (QoS) value or policy.

Management Interface *TOTAL #*

How the storage array may be managed, whether by command-line, API, OpenStack, web-based management interface, etc. The specific elements supported for each product are available by accessing the DCIG Interactive Buyer's Guide *(IBG).*

vSphere/SCVMM: Indicates whether the array can be managed from within the vSphere and/or System Center Virtual Machine Manager (SCVMM) management consoles.

OpenStack/SMI-S: Indicates whether the array can be managed via OpenStack and/or Storage Management Initiative Specification (SMI-S).

Federated Management

The ability to manage similar arrays from a central management interface as opposed to having to log into each array individually.

SNMP v2 / v3

Uses the Simple Network Management Protocol *(SNMP)* to monitor the performance and settings of the storage array. Indicates support for version 2 and/or 3.

Notification & Logging *TOTAL #*

A count of the available methods and protocols available for sending and receiving logs and system notifications. The specific elements supported for each product are available by accessing the DCIG Interactive Buyer's Guide *(IBG).*

NDMP

Network Data Management Protocol (NDMP) is a protocol for moving data to a backup appliance without going through the backup server, in turn providing a direct path to backup. NDMP expedites the backup process.

Cloud Storage Support *TOTAL #*

The ability to natively attach, integrate, and/or migrate data to public or private cloud storage providers. The specific elements supported for each product are available by accessing the DCIG Interactive Buyer's Guide *(IBG).*

NAS Virtualization/Virtual Domains

NAS Virtualization refers to the ability of an array to make itself appear as multiple NAS devices. Virtual Domains refers to the ability of a single storage system to be managed as multiple *"virtual private arrays"* that segregate users, hosts, and application data.

Appendix A—Definitions, Explanations and Terminology (continued)

Storage Templates

Templates that contain sets of storage needs and configurations.

NFS v4 / v4.1

Network File System (NFS) is to the Unix world what CIFS is to the Windows world. It is a protocol that allows the "mounting" of devices/file systems on other systems over a network. Indicates support for version 4 and/or 4.1.

SMB 2.1 / 3.0

Server Message Block (SMB) is the underlying protocol of Windows file sharing and is supported by all major desktop and server operating systems. Indicates support for version 2.1 and/or 3.0.

Microsoft ODX

Microsoft Windows Offloaded Data Transfer *(ODX)* enables direct data transfers within or between storage devices, avoiding the need to send data back and forth to a host.

Authentication Methods *TOTAL #*

Indicates the total number of authentication methods supported by the array. The specific elements supported for each product are available by accessing the DCIG Interactive Buyer's Guide *(IBG).*

VMWARE INTEGRATION

VAAI

VAAI *(vStorage Application Programming Interface for Array Integration)* is a group of proprietary application programming interfaces *(APIs)* that accelerates hardware performance by offloading certain storage tasks to the array.

Full Copy: This primitive enables virtual disks to be cloned by a NAS device, avoiding the need to send data back and forth to a host.

Hardware Assisted Locking: Allows vCenter to offload small computer system interface commands from the ESX server to the storage array so it can control the locking mechanism while the storage array does data updates.

Block Zeroing: Enables the storage array to zero out a large number of data blocks to speed the provisioning of virtual machines and reduce input/output overhead.

Thin Provisioning Dead Space Reclamation (SCSI UNMAP): Using the SCSI UNMAP command, this command informs a storage array that space may be reclaimed that previously had been occupied by a VM that has been migrated to another datastore or deleted.

Full File Clone: This command instructs the storage array to clone a virtual disk. This is a NAS hardware acceleration primitive.

Fast File Clone: Offloads the creation of virtual machine snapshots to the array. This command is a NAS hardware acceleration primitive.

Out-of-Space Conditions: This command is part of VAAI 5.0 and was introduced to mitigate the impact on VMs when thin-provisioned datastores reach 100 percent of capacity. The array alerts the VMware vSphere ESXi host and/or vCenter when specified thresholds are reached. Should a datastore reach 100 percent of capacity, only those VMs requiring additional capacity are paused while VMs needing no additional capacity continue to run.

Reserve Space: Enables the creation of thick virtual machine disk *(VMDK)* files on network-attached storage *(NAS)* datastores, allowing administrators to reserve the space required even when the datastore is network-attached storage.

Extended Statistics: Extended Statistics enables vSphere functionality to display actual space usage statistics on NAS datastores without the use of third-party tools. Before the introduction of Extended Statistics, it would have been necessary to use array-based tools to monitor the space being used on a thinly provisioned Virtual Disk Machine *(VMDK)* on a back-end data store.

VASA

VASA *(vSphere Application Programming Interface for Storage Awareness)* is a group of proprietary application programming interfaces provided by VMware's vSphere platform, which gives vCenter visibility into the capabilities of the underlying storage hardware. This allows the administrator to build storage profiles based on capabilities.

SIOC

SIOC (Storage I/O Control) for VMware is a dynamic control mechanism for proportional allocation of shared storage resources to VMs running on multiple hosts.

VADP

VADP *(vStorage Application Programming Interface for Data Protection)* is a data protection framework introduced in vSphere 4.0. VADP which enables centralized, off-host LAN free backup of vSphere virtual machines, reduces ESX host resources to do backup processing, and enables flexible backup windows.

Appendix A—Definitions, Explanations and Terminology (continued)

HARDWARE

Controller Config: Active-Active / Dual Active

Active-Active: Two controllers are configured with multipathing software and have concurrent access to the disk drives that are then presented as LUNs to attached hosts. In the event a controller fails or is taken offline, attached host(s) may detect little or no interruption in service as the other controller takes over for the failed unit, though a drop in performance may occur. This is considered an enterprise class feature.

Dual Active: Half of the LUNs are assigned to one controller and the other half are assigned to the other; trespass needs to occur during a failover. The difference from Active-Active is that half of the storage array's LUNs are assigned to and controlled by one controller and the other half of the LUNs to the other so a LUN can only be accessed down one path through one controller at a time. If a controller should be taken offline or fail, the other controller assumes control for its LUNs.

SAN and NAS without separate filer head

The ability for the storage array to communicate with applications using both storage area network *(SAN)* and network-attached storage *(NAS)* protocols without requiring a separate NAS filer head.

Independent Controller Nodes

Indicates whether the model has controller nodes that are independent of its storage nodes.

Controller Nodes

The maximum number of controller nodes supported by the array. A controller node is a rack-mountable enclosure that provides storage networking ports to connect the storage system to hosts or to a dedicated storage network. A controller node generally provides cache, processor and data services along with back-end connectivity to storage nodes. In many storage system designs, a controller node will house dual block and/or file controllers. A controller node may include some storage (e.g. flash cache, metadata) but does not house the primary target storage media.

Storage Nodes

The maximum number of storage nodes supported by the array. A storage node is a rack-mountable enclosure that houses the primary target storage media. Depending on the design of the storage system, a storage node may also include block and/or file controller(s).

CPU Cores per Node

The maximum number of CPU processor cores available per rack-mountable enclosure (aka node). If the enclosure includes dual controllers, as is common in many designs, the CPU cores of both controllers are added together to calculate the total CPU cores for the node.

Cache: DRAM / All Forms

The maximum number of gigabytes of cache that controller or storage nodes can support. The first number is DRAM cache. The second number is all forms of cache, including DRAM, NVRAM and flash memory.

Flash-Based Caching: Read / Write

The ability to use flash memory as a large read cache and/or write cache to reduce latency in storage operations.

Raw Capacity per Appliance / Cluster

Lists the maximum amount of raw capacity natively supported by the model per appliance and per cluster.

Raw Capacity per Rack Unit

Lists the maximum amount of raw capacity natively supported by the array per rack unit. This is a measure of storage density.

Highest Capacity HDD: SAS / SATA

Indicates the highest capacity hard disk drive available for Serial Attached Small Computer System Interface *(SAS)* and Serial Advanced Technology Attachment *(SATA)* interfaces.

Highest Capacity SSD

Indicates the highest capacity solid state drive supported in this model.

Self-encrypting Drives

A method for achieving data encryption at-rest. This feature is especially important in some regulated industries.

FC/iSCSI

Indicates whether the array supports Fibre Channel *(FC)* and/or Internet Small Computer Interface *(iSCSI)* to connect the array to hosts or to a dedicated storage network.

FCoE/InfiniBand

Indicates whether the array supports Fibre Channel over Ethernet (FCoE) and/or InfiniBand to connect the array to hosts or to a dedicated storage network.

Concurrent FC/iSCSI

The ability to communicate over Fibre Channel *(FC)* and Internet Small Computer Interface *(iSCSI)* at the same time.

Storage Networking Ports

The maximum number of ports available in any configuration to connect the array to hosts or to a dedicated storage network.

Ethernet Ports 1/10/40 Gb: Indicates the maximum number of 1 gigabit, 10 gigabit and 40 gigabit Ethernet storage networking ports supported by the array in any configuration.

FC Ports 8/16 Gb: Lists the maximum number of 8 gigabit and 16 gigabit Fibre Channel ports supported by the array in any configuration.

InfiniBand / Converged: Indicates the maximum number of InfiniBand and Converged storage networking ports supported by the array in any configuration.

SUPPORT

Contract Support Availability

Specifies the hours support is available when under service contract.

Contract Support Methods TOTAL #

A count of the methods of support offered by the vendor. The specific elements supported for each product are available by accessing the DCIG Interactive Buyer's Guide *(IBG).*

Remote Monitoring / Proactive Remediation

Indicates whether the vendor offers remote monitoring of the storage system and/or proactive remediation of problems discovered through remote monitoring and/or performance and fault data that has been automatically uploaded to the vendor.

Hardware Warranty

Indicates the length of standard warranty that is included with the array at no extra cost.

Appendix B—Vendor Contact Information

Vendor Contact Information

Aberdeen LLC
- AberNAS NL Series
- AberNAS NW Series
- AberSAN ZXP2 HA
- Petarack

10420 Pioneer Blvd.
Santa Fe Springs, CA 90670
Phone: +1.562.903.1500
Website: **www.aberdeeninc.com**

Dell
- Compellent SAN + FS8600
- EqualLogic SAN + FS7600
- PowerVault NX3300

1 Dell Way
Round Rock, TX 78682
Phone: +1.800.671.3355
Website: **www.dell.com**

EMC Corporation
- Isilon NL-Series
- Isilon S-Series
- Isilon X-Series
- VMAX 10K Block and File
- VNX5200
- VNX5400
- VNX5600
- VNX5800
- VNX7600
- VNX8000
- VNXe3150
- VNXe3300

176 South Street
Hopkinton, MA 01748
Phone: +1.866.438.3622
Email: **info@isilon.com**
Website: **www.emc.com**

Fujitsu Limited
- ETERNUS DX100 S3
- ETERNUS DX200 S3
- ETERNUS DX500 S3
- ETERNUS DX600 S3

1250 E. Arques Avenue,
Sunnyvale, CA 94085
Phone: +1.800.831.3183
Fax: +1.408.764.5060
Website: **www.fujitsu.com/us**

Hitachi Data Systems Corporation
- Hitachi Unified Storage 100 Series

2845 Lafayette Street
Santa Clara, California 95050-2639
Phone: +1.408.970.1000
Website: **www.hds.com**

Hewlett-Packard Corporation
- StoreEasy 1000
- StoreVirtual 4000

3000 Hanover Street
Palo Alto, CA 94304
Phone: +1.866.625.0242
Website: **www.hp.com**

Huawei
- OceanStor T Series

5700 Tennyson Pkwy., Ste. 500
Plano, TX 75024
Phone: +1.214-919-6000
Website: **www.huawei.com/us**

IBM Corporation
- Storwize V7000 Unified

1 New Orchard Rd
Armonk, NY 10504-1722
Phone: +1.800.426.4968
Email: **callserv@ca.ibm.com**
Website: **www.ibm.com/storage**

IceWEB
- 3000 Series
- 6500 Series
- 7000 Series

22900 Shaw Road, Suite 111
Sterling, Virginia 20166-9279
Phone: +1.816.522.1324
Email: **info@IceWEB.com**
Website: **www.iceweb.com**

Imation
- Nexsan NST5000 Unified Hybrid Storage System
- Nexsan NST6000 Unified Hybrid Storage System

1 Imation Way
Oakdale, MN 55128-3414
Phone: +1.888.466.3456
Website: **www.imation.com**

Appendix B—Vendor Contact Information (continued)

iXsystems
- TrueNAS Z20
- TrueNAS Z30
- TrueNAS Z35

2490 Kruse Dr
San Jose, CA 95131
Phone: +1.408.943.4100
Email: info@ixsystems.com
Website: www.ixsystems.com

NetApp
- FAS8020
- FAS8040

495 East Java Drive
Sunnyvale, CA 94089
Phone: +1.877.263.8277
Website: www.netapp.com

Oracle Corporation
- ZFS Storage Appliance

500 Oracle Parkway
Redwood Shores, CA 94065
Phone: +1.650.506.7000
Phone: +1.800.392.2999
Website: www.oracle.com

Overland Storage
- SnapScale X4

4820 Overland Avenue
San Diego, CA 92123
Phone: +1.888.343.7627
Email: ossquote@overlandstorage.com
Website: www.overlandstorage.com

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