

*The Insider's Guide to Evaluating Deduplicating Backup Appliances  
with a List Price of Less than \$100,000*

**DCIG**

2016-17



# SUB-\$100K DEDUPLICATING BACKUP APPLIANCE BUYER'S GUIDE

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## Table of Contents

<b>1</b>	<b>Introduction</b>	<b>16</b>	<b>Sub-\$100K Deduplicating Backup Appliance Products</b>
<b>4</b>	<b>Executive Summary</b>	17	ExaGrid EX40000E
<b>7</b>	How to Use this <i>DCIG 2016-17 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide</i>	18	ExaGrid EX32000E
<b>8</b>	Disclosures	19	HPE StoreOnce 5500
<b>8</b>	Inclusion and Exclusion Criteria	20	Quantum DXi6900
<b>8</b>	The Eight-Step Process Used to Score and Rank Products	21	ExaGrid EX21000E
<b>9</b>	DCIG Comments	22	HPE StoreOnce 5100
9	Vendors Revamping Product Lines to Match the Market	23	Dell DR6300
9	Fewer Appliance Models—Eliminating Confusion, Accelerating Purchase Decisions	24	ExaGrid EX13000E
9	Virtual Appliances and Replication—Protecting Remote/Branch Offices	25	ExaGrid EX10000E
10	Instant Recovery—Restoring Service Quickly	26	ExaGrid EX7000
10	Public Cloud Storage Connectivity—Enabling Disaster Recovery	27	ExaGrid EX5000
10	Architectural Considerations—Scale-up vs. Scale-out	28	ExaGrid EX3000
<b>11</b>	DCIG Observations and Recommendations for Each Ranking	29	HPE StoreOnce 3540
11	General Observations	30	NEC HYDRAsTOR HS3-510
11	<i>Recommended</i> Ranking	31	Quantum DXi6700
12	<i>Excellent</i> Ranking	32	Quantum DXi4700
13	<i>Good</i> Ranking		
<b>14</b>	<b>Sub-\$100K Deduplicating Backup Appliance Rankings</b>		

## Appendices

- A-1 Appendix A—Definitions, Explanations and Terminology
- B-1 Appendix B—Vendor Contact Information
- C-1 Appendix C—DCIG Contact Information

## Introduction

"There is nothing permanent except change." There are a few variations on the quote by Greek philosopher Heraclitus, but they all arrive at the same conclusion. Nothing stays static for long, and nowhere is that truer than in the data storage industry.

Ever-increasing data volumes, driven by the growth in both structured and unstructured data, strain corporate backup abilities and create a need for new solutions. While other backup and data optimization technologies offer some relief, purpose-built deduplicating backup appliances have become the go to solution.

Deduplicating backup appliances provide quick relief for backup pain through largely non-disruptive plug-and-play installations. Sometimes referred to as "Backup Target Appliances," their optimized deduplication technologies reduce backup storage consumption by up to 20x while accelerating the backup process. As a group, they have become a proven frontrunner in the ongoing battle to protect business data.

Organizations that have outgrown the capabilities of their legacy backup solutions will discover a large number of vendors and products vying to become their next generation solution. Thoroughly researching the many available products has become too time consuming and costly to be feasible for many organizations. The *DCIG 2016-17 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide* solves this problem.

DCIG's analysts have already done the heavy lifting for enterprise technology buyers by:

- Identifying a common technology need with many competing solutions but with little comparative data available to technology purchasers
- Scanning the environment to identify available products in the marketplace
- Gathering normalized data about the features each product supports
- Providing an objective, third-party evaluation of those features from an end-user perspective
- Describing key product considerations and important changes in the marketplace
- Presenting DCIG's opinions and product feature data in a way that facilitates rapid feature-based comparisons

**The purpose-built backup appliance (PBBA) market is growing.** Comparing worldwide Q1 revenues for the two years since DCIG published the *2014-15 Deduplicating Backup Appliance Buyer's Guide*, revenues grew 14.7% from Q1 2014 to Q1 2016.

Worldwide revenues for purpose-built backup appliances (PBBAs)

Q1 2014 \$664.5 Million <sup>1</sup>

Q1 2015 \$717.7 Million (8% increase)

Q1 2016 \$762.2 Million <sup>2</sup> (6.2% increase)

1. RTT Staff Writer. "IDC: Worldwide PBBA Market Revenue Drops 2.5% In Q1 - Quick Facts." Quick Facts. *RTT News*, 20 June 2014. Web. 3 Nov. 2014.

2. IDC. "Worldwide Purpose-Built Backup Appliance (PBBA) Market Starts Off 2016 with Solid Growth, According to IDC." *Businesswire*, 17 June 2016. Web. 03 Aug. 2016. <<http://www.businesswire.com/news/home/20160616006559/en/Worldwide-Purpose-Built-Backup-Appliance-PBBA-Market-Starts>>

## Introduction (continued)

**The PBBA market is dynamic.** All five vendors in this Buyer's Guide are represented by products that they released since the prior edition was published. Vendors have introduced new technologies and enhanced existing capabilities on top of new, more powerful hardware; shifting the deduplicating backup appliance landscape.

**Growth of inline deduplication.** With differing technology offered from one appliance and one vendor to the next, administrators and end users have choices to make. Understanding the underlying technology is important when making these decisions, and that technology has changed in significant ways. For example, recent hardware advancements have eliminated much of the lag associated with inline deduplication. As a result, more backup appliances now support inline deduplication than the post-process method. Quantum, for example, switched from a choice of inline or post process to inline deduplication.

**Focus on recovery.** Data backup is the daily process. Data recovery is the reason for the process. Many vendors are now focused on enhancing the recovery process, including time to application service restoration. Some appliances that use post-process deduplication hold a full copy of the original data on the appliance, and can use that copy for rapid VM boot and recovery. Inline deduplication appliance vendors take a different approach to restoring data, requiring rehydration from a deduplicated copy.

Deduplicating backup appliance purchasers will do well to pay attention to both backup and recovery capabilities. While these appliances certainly compete at deduplicating the backup stream, the largest differences may be in their approach to data and application recovery. Depending on the amount of data being protected, recovery time may become a significant factor in selecting and sizing a deduplicating backup appliance.

**Blurring the boundaries.** Target deduplication appliances do what they do best—deduplicating backup data—with deduplication ratios their software-only counterparts simply cannot match. Backup appliance vendors looking to stand out are going beyond deduplication by integrating new virtualization and cloud storage integration capabilities, blurring the boundaries between deduplicating target and hybrid cloud backup appliances.

### The Value This DCIG Buyer's Guide Creates for Buyers

It is in this context that DCIG presents its *2016-17 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide*. The level of detail in this Buyer's Guide, combined with DCIG's consistent ranking system, helps organizations in two key ways: First, it provides a powerful yet concise method to evaluate each deduplicating backup appliance so organizations can understand the overall strengths and weaknesses of each one. Using this information, they can better align the specific needs of their environment with the features available on each appliance.

Second, this Buyer's Guide provides a data sheet for each deduplicating backup appliance. The data sheets drill down into the specifics of each product to provide information on backup technology, management, restore and support features. They also examine supported features and implementation. These areas contribute to specific category scores as well as an overall score for each deduplicating backup appliance.

The *DCIG 2016-17 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide* is based on a pool of more than 130 products in DCIG's Backup Appliance Body of Research. DCIG analysts ranked deduplicating backup appliances based on an evaluation of more than 100 different features. The sixteen (16) products that met the inclusion criteria and achieved a ranking of *Recommended*, *Excellent* or *Good* are included in this Buyer's Guide.



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*The Insider's Guide to Evaluating Deduplicating Backup Appliances with a List Price of Less than \$100,000*

## Introduction (continued)

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 deduplicating backup solution to do its own in-house testing if at all possible as it is impossible for DCIG to predict how well the appliance will perform in every environment.

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

As a supplement to the downloadable Buyer's Guide, end users registering to access this report via the DCIG Analysis Portal also gain access to the DCIG Interactive Buyer's Guide (IBG). The IBG enables organizations take the next step in the product selection process by generating custom reports, including comprehensive side-by-side feature comparisons of the products in which the organization is most interested. See [portal.dcig.com](http://portal.dcig.com) to learn more about the DCIG Analysis Portal.

*Charley and Ben*

## Executive Summary

πάντα χωρεῖ καὶ οὐδὲν μένει

Heraclitus of Ephesus, c. 535 BC – 475 BC

"Everything changes and nothing stands still." This ancient pithy saying rings truer in today's information technology industry than perhaps anywhere else. Change certainly continued apace in the two years since DCIG published the *DCIG 2014-15 Deduplicating Backup Appliance Buyer's Guide*. Vendors of deduplicating backup appliance have enhanced the performance, capacity and capabilities of these products to keep up with growing enterprise data protection requirements. In the process, the lines between the categories of purpose built backup appliances are blurring; because deduplicating backup appliances are gaining many features previously reserved for more generalized appliances.

Nevertheless, the core value proposition of the deduplicating backup appliance has remained the same since this product category burst onto the data protection scene. With some basic configuration, power, and network connectivity these dedicated, purpose-built deduplicating backup appliances dramatically reduce the size of backup data by applying powerful deduplication algorithms to the data. Deduplicating backup appliances also accelerate the overall backup and recovery processes, which translates into greater performance and availability of critical business applications.

Cost savings come in many forms including:

- Dedicating fewer hard drives to storing backup data
- Reducing the network bandwidth required for offsite replication
- Offloading backup processing from application servers, allowing those servers get more real work done
- Freeing up primary storage space and performance.
- Providing cost-effective data protection for ROBO environments
- Eliminating the costs and errors associated with managing tape-based backups

The *DCIG 2016-17 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide* provides insight into enhanced core features as well as innovative capabilities.

- **Virtualization.** The continued move towards virtualization, the cloud, and hyperconvergence has pushed vendors to improve the integration of their products with virtualization software. Better integration has improved deduplication rates and streamlined management.
- **Virtual appliances.** Some of these products are also available as software-only virtual machine images. Many organizations are using these virtual appliances to provide cost-effective, centrally-managed local protection of corporate data in remote or branch offices; and off-site protection by replicating unique changed blocks back to a central hardware appliance.
- **Replication.** One of the primary uses of deduplication appliances is to reduce the amount of data transmitted between remote locations. Some organizations ship data from remote locations back to a central location. Others ship data from a central location, such as a datacenter, off to a remote location for disaster recovery purposes. Whatever the scenario,

## Executive Summary (continued)

the costs of moving that data is usually a factor of the amount data transferred. By first deduplicating replication data organizations can save both cost and time.

However how replication software is implemented varies widely from appliance to appliance. Some charge extra for this software while others include it with the purchase price of the appliance. The number of replication configurations supported by each appliance also varies. While most support 1:1 and N:1 fan-in replication configurations, not all appliances support fan-out replication configurations which organizations may want to leverage to prepopulate remote sites with previously deduplicated data. Organizations should also verify how many remote sites that want to setup to replicate back to one central sites as the maximum "N" in the "N:1" part of the equation can vary by appliance.

Finally, organizations should verify how both the appliance and its replication software handles deduplicated data. In almost all cases, replication software can only replicate data after the data is deduplicated which may delay how quickly data can be replicated, especially if the appliance uses post-process deduplication. Also, organizations should verify if the replication software only transmits new, unique chunks of deduplicated data as opposed to all data. By only transmitting new, unique chunks of data, organizations can generally use lower bandwidth, lower cost WAN links to remote offices.

- **Public and private cloud integration.** With improved virtualization integration, virtual appliances, and replication vendors are able to better leverage public and private cloud services as well. Integration has gone beyond storage in the cloud. Some vendors in this guide can recover virtual machines directly to cloud providers.
- **Scale-out versus scale-up architectures.** In today's environment of rapid and unpredictable data growth, deduplicating backup appliances provide two architectures to add more storage capacity—scale-up and scale-out with some appliances supporting both options. Appliances that support scale-up architectures are largely self-contained and either offer room to add more shelves for more internal hard disk drives (HDDs) or, in some cases, they provide the flexibility to use either FC or SCSI connections to external HDDs.

Appliances that use a scale-out architecture grow by adding nodes that come preconfigured with fixed amounts of processor, memory and storage and are then collectively configured and managed as one logical appliance.

- **Metadata processing.** Another factor that separates many of the vendors in the *DCIG 2016-17 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide* is an appliance's knowledge of file formats and how to best treat duplicate data found within those formats. Most file formats share a great deal of common data, and knowing where data tends to be the same and where it tends to be different can make a big impact in properly storing the correct information.

This Buyer's Guide is the result of months of communication with 24 backup appliance providers to create a body of research on over 130 products. DCIG analysts completed surveys that captured data on over one hundred features associated with storage efficiency, virtualization, recovery, backup, replication, management, hardware, and support. DCIG then gave every vendor the opportunity to review the data before any material about its appliance(s) were published. In each case, every vendor had the opportunity to review and respond to the survey and then the data sheets included in this Buyer's Guide.

**Executive Summary (continued)**

The *DCIG 2016-17 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide* accomplishes the following objectives:

- Provides an objective, third-party evaluation of deduplicating backup appliances that evaluates and ranks their features from an end user's viewpoint
- Includes recommendations on how to best use this Buyer's Guide and the products contained in it
- Evaluates the features of each deduplicating backup appliance based upon criteria that matter most so end users can quickly know which appliance is most appropriate for them
- Provides a standardized data sheet for each deduplicating backup appliance so end users can do quick comparisons of the features supported and not supported on each appliance
- Give any organization the ability to request competitive bids from different providers of deduplicating backup appliances



## How to Use this DCIG 2016-17 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide

This Buyer's Guide is intended to help users accelerate their product research and selection process—driving cost out of the research process while simultaneously increasing confidence in the results. The purpose of this Buyer's Guide is NOT intended to tell users exactly which product(s) to purchase. Rather, it is to guide them in coming up with a list of competitive products that have comparable features that meet their specific needs.

Features, as displayed on each product data sheet, represent the opinion of DCIG. DCIG encourages and strongly recommends every organization verify the functionality of the features that are of particular interest to them before making a buying decision. To help in that decision, this Buyer's Guide gives organizations a sense of how products compare with each other, as well as giving additional insight into what other product offerings are available on the market and the specific features they offer.

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

1. ***Eliminate the painstaking research of coming up with a short list of products that meet their needs.***  
This Buyer's Guide includes sixteen (16) different deduplication appliances from five (5) different vendors. Each product product ranked *Recommended* or *Excellent* based on an evaluation of more than 100 different features. A glance at the resulting ranking sheet reveals how complete the features of each product are compared to the other products. A look at the corresponding data sheet reveals whether or not a product supports the features required to make it onto a particular organization's short list for further consideration.
2. ***Do apples-to-apples comparisons of products from different vendors.*** It behooves an organization to get competitive bids from multiple vendors. After all, when they compete, you win! But that tactic only works well when organizations know that they are receiving competitive bids on products that are roughly comparable. Using this Buyer's Guide, organizations can do a better job of accomplishing that objective.
3. ***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. Now organizations can refer to the rankings of each product on this guide so they know when they are getting a good deal, a great deal or just a "so-so" one.
4. ***Gain perspective on how products from less well-known vendors compare against established and better-known brands.*** There is a built-in level of comfort when buying products from well-known vendors. There is also a built-in resistance to buying products from vendors that are perceived as unknown quantities. This Buyer's Guide helps to remove some of that apprehension. Using this Buyer's Guide, organizations can see how these products stack up.
5. ***Normalize complex terminology.*** Industries have a proclivity to adopt acronyms and jargon that are specific to them, but the technology industry seems to go out of its way to use unfamiliar terms and refer to the same technology in different ways. This Buyer's Guide sifts through the acronyms, jargons, and terms and normalizes them. This minimizes or even eliminates the need for users to try to understand all of the different technology terms.
6. ***Take advantage of standardized data sheets to quickly compare products side-by-side.*** The product data sheets available from the different vendors are rarely laid out in the same way or contain the same information. Some vendors even have data sheet formats that vary from product to product within their own portfolio. This Buyer's Guide tackles this problem by creating a standard, easy-to-read data sheet for every product. In this way, product data sheets for individual products can be printed out and laid down side by side so that the features on them can be quickly compared.
7. ***Help justify buying recommendations to business teams.*** An overall ranking of *Recommended* or *Excellent* is included at the top of every product data sheet. This overall ranking summarizes in a single word how feature rich a product is compared to the other products in the Buyer's Guide.

## Disclosures

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

DCIG is no different in this respect as it also receives payment for the different services it performs for vendors. The services that DCIG provides include blogging, customer validations, product reviews, executive white papers, special reports and white papers.

In the interest of transparency, a number of the vendors included in this DCIG Buyer's Guide are or have been DCIG clients. This is not to imply that they were given preferential treatment in the Buyer's Guide. It simply means DCIG had more knowledge of their products so that DCIG could consider their product for inclusion in this Buyer's Guide.

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

- No vendor paid DCIG any fee to research this topic or arrive at pre-determined conclusions.
- DCIG did not guarantee any vendor that its product would be included in this Buyer's Guide.
- DCIG did not imply or guarantee that a specific product would receive a good score on this Buyer's Guide, before or after completion.
- All research was based upon one or more of the following: publicly-available information, information provided by the vendor and/or the expertise of those evaluating the information.
- No negative inferences can be drawn against any vendor not included in the Buyer's Guide.
- It is a misuse of the Buyer's Guide to make comparisons between any vendor not ranked in the Buyer's Guide versus any vendor ranked in the Buyer's Guide.
- Because of the number of features analyzed and weighed, there was no way for DCIG to accurately predict at the outset how individual products would end up ranking. DCIG wants to emphasize that no vendor was privy to how DCIG weighed individual features. In every case the vendor only found out the rankings of its product(s) after the analysis was complete.

## Inclusion and Exclusion Criteria

The DCIG 2016-17 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide is based on DCIG's Backup Appliance Body of Research that includes more than 130 products. DCIG analysts used the following criteria to determine whether or not to include a specific backup appliance in this Buyer's Guide:

- Be intended for the deduplication of backup data, primarily target-based deduplication
- Includes an NAS (network attached storage) interface
- Supports CIFS (Common Internet File System) or NFS (Network File System) protocols
- Supports a minimum of two (2) hard disk drives and/or a minimum raw capacity of eight terabytes
- Offered at a list price below \$100,000 US
- Be formally announced or generally available for purchase on July 1, 2016

*Ultimately, it is the professional judgment of the analysts working on each DCIG Buyer's Guide whether or not a particular model meets the inclusion criteria.*

## The Eight-Step Process Used to Score and Rank Products

To score and rank each product included in this Buyer's Guide, DCIG went through an eight-step process to come to the most objective conclusion possible.

1. DCIG established which features would be evaluated and which ones would not. Prior to selecting the features which would be evaluated, DCIG quantified, then "normalized" the list of available features such that a common name for each feature was established. In cases where a feature could not be objectively defined or understood, it was excluded from consideration.
2. The features were grouped into five (5) general categories. The features included in this Buyer's Guide broke down into a total of five broad categories that are reflected on each data sheet. These categories include Virtualization, Deduplication, Hardware, Management, and Support.
3. 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). In every case, every vendor had the opportunity to review and respond to any DCIG-completed survey.

4. *DCIG identified a list of products that met the DCIG definition for "Deduplicating Backup Appliance" based on the inclusion/exclusion criteria.*
5. *DCIG weighted each feature to establish a scoring rubric.*  
The weighting of each feature was done by a team of DCIG research analysts. The weightings were used to reflect if a feature was supported and potentially how useful and/or important the feature was to end users.
6. *Each product's features were scored based on the information gathered from the surveys.* Features were marked as either "supported" or "unsupported/undetermined" and then scored accordingly. In some cases, additional points were awarded for how the feature was supported or implemented. Rankings were finalized after any updates from vendors had been entered and the review period expired.
7. *Products were ranked using standard scoring techniques.*  
One of the goals of this Buyer's Guide is to establish clear lines of differentiation with conclusions that are arrived at objectively. To accomplish this goal, the mean or average score for all products was first determined and then the standard deviation. DCIG developed an overall ranking for each product based on where that product's overall score fit into standard deviation ranges.
8. *Product data sheets were created and sent to the vendors for review before publication.* Each data sheet included in this published version of the Buyer's Guide (minus the overall ranking) was sent to the vendors prior to publication for their review and feedback. In every case, each provider had a chance to review the content included on its respective data sheet.

Due to the large number of product features that DCIG evaluated, only a subset of the collected data could be included on the data sheets. Only the features deemed most important were included in the published version. The full set of product feature data may be accessed in the DCIG Analysis Portal available through DCIG's website: [www.d cig.com](http://www.d cig.com).

## DCIG Comments

### Vendors Revamping Product Lines to Match the Market

From one year to the next, vendors add capabilities to their product and revamp their lineup altogether. Typically, vendors introduce appliances with increased top end capacity, greater

throughput, and tighter integration with system management and storage arrays. Some introductions are geared for a specific category, such as the small business or midrange enterprise sectors.

Making changes to a product line requires careful consideration. For instance, overlap from one product to another may confuse the buyer. However, developing a product with a specific range, of say, the midmarket may make sense if the appliance is geared for a sub-group where the vendor sees growth. This year HPE and Quantum both decided to simplify their lineup.

### Fewer Appliance Models—Eliminating Confusion, Accelerating Purchase Decisions

In the new HPE StoreOnce lineup, each model has defined start and end capacities with minimal overlap. By reducing overlap HPE has simplified the purchasing decision for many organizations. Customers can now look at the lineup and quickly determine which model they should purchase based on their current and expected capacity needs.

HPE's moves compare with those of Quantum which has been reducing the number of products in its offering. The two new appliances each have a clear focus: the DXi4700 for midrange markets and the DXi6900 for the small to medium enterprise well into the enterprise market. The overlap that remains is appropriate to the markets the appliances are focusing on.

### Virtual Appliances and Replication—Protecting Remote/Branch Offices

Virtualization is continuing to leave its mark on the deduplicating appliance market. Two major capabilities seeing growth right now are virtual appliances and instant recovery.

Virtual deduplication appliances offer the same features as the hardware counterparts at a lower cost and with less capacity. A common use case would be to utilize virtual appliances in remote office/branch office (ROBO) locations linked back to a physical deduplicating backup appliances at a central location. Data is initially deduplicated at the small or remote office and then sent in deduplicated form to a central location for further deduplication. This spreads the deduplication workload and reduces overall network traffic compared to other approaches to protecting ROBO data, because redundant data is not transmitted across the network. Dell, HPE and Quantum all offer virtual appliances.

## Instant Recovery—Restoring Service Quickly

DCIG believes that instant recovery is an important feature for disaster recovery. Instant recovery allows an administrator to run a virtual machine directly from the storage provided by the backup appliance and in some cases run the VM itself on the appliance. This avoids the step of having to copy the virtual machine back from the appliance to primary storage. Skipping this step enables an organization to bring services back online much more quickly.

ExaGrid, for example, is leveraging its landing zone to enable administrators to access undeduplicated instances of VM data for instant recovery; and to even host applications on the appliance. Over the past year, ExaGrid and Zerto formed an agreement centered on long term backup and using the ExaGrid appliance for VM recoveries. The agreement combines Zerto for archiving with ExaGrid's landing zone for quick recoveries.

HPE's StoreOnce Recovery Manager Central (RMC) enables fast recovery via synthetic full backups and the ability to directly mount the snapshot on the host in order to meet short recovery-time objective (RTO) service level agreements.

As vendors add these capabilities to their deduplicating backup appliances, these once single-purpose appliances are beginning to function like integrated backup appliances. Nevertheless, what continues to distinguish a deduplicating backup appliance is its core deduplication technology. Happily, the new features add capability without losing the underlying benefits of deduplication.

## Public Cloud Storage Connectivity—Enabling Disaster Recovery

Careful observers will note that the lines between some of the target deduplicating backup appliances in this Buyer's Guide and hybrid cloud backup appliances are also getting blurred.

Historically, target deduplication appliances have been just that; a "target", or final storage, that reduces the consumed storage by eliminating redundancies in the data. Some vendors tout deduplication ratios between 20:1 and 30:1 depending on the data involved. This level of deduplication can have profound impact not just on storage but on network traffic as well.

Reducing network traffic is especially important when moving backup data across a WAN or to the public cloud. WAN links and Internet bandwidth are often a constrained resource, limited by either availability or cost. Reducing the amount of backup data sent across a WAN or Internet connection.

Several deduplication vendors are recognizing that cloud capabilities are important for their customers and are working to upgrade their appliances to meet these needs. One way that vendors are trying to make life easier for customers is by partnering with cloud providers.

This year ExaGrid and OffsiteDataSync formed a partnership. ExaGrid Disaster Recovery is a cloud service for offsite data recovery. The configuration uses virtualization technology for instant DR recovery either on the appliance or in the OffsiteDataSync datacenter and ensures failover and fallback with a choice of hypervisors.

Multiple vendors are integrating with the large public cloud services. HPE StoreOnce offers Microsoft Azure integration, while Quantum, is leveraging Amazon as a 3rd party target cloud provider. Quantum also offers its own Q-Cloud as a cost effective way for companies to set up a second site in the cloud with the benefits of not having to set up a separate onsite data recovery location.

Cloud integration is not ubiquitous. Vendors including Dell and EMC have not headed down the cloud integration path. This may, in part, be because several appliances in the *2016-17 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide* scale into the PB range. As mentioned before, offloading backups to the cloud is usually constrained by the network—specifically Internet bandwidth to the site(s). Even moving only changed data to the cloud may be problematic if the local deduplication data store is multiple petabytes in size.

Offloading or archiving to the cloud may be best for the small to mid-tier appliances where the data volumes involved are manageable over wide-area networks. Thus there is a marketplace for both cloud and non-cloud connected deduplicating backup appliances.

## Architectural Considerations—Scale-up vs. Scale-out

Two methods for adding storage capacity to a deduplicating backup appliance exist: scale-up and scale-out. Deduplicating backup appliances that offer a scale-up architecture have a wide range of usable capacity going from double-digits of terabytes of capacity to more than a petabyte. In a scale-up solution deduplication is automatically "global" because all storage is managed by a single node. While scale-up solutions enable organizations to add capacity relatively inexpensively, backup times may increase since the increased

deduplication processing requirements may surpass the processing resources of the appliance.

Using a scale-out architecture, organizations purchase nodes as they need either more capacity or performance. Each node added to the solution incrementally adds storage capacity, processing power and network interfaces. In a scale-out architecture nodes generally come with preconfigured amounts of storage capacity.

One benefit of using a scale-out architecture is that the nodes are viewed and treated as one single logical entity by the solution. However, just because they are all managed as a single, logical solution does not necessarily mean all scale-out implementations are equivalent. Some scale-out solutions offer “global deduplication” which deduplicates data across all of the nodes in a multi-node system. In other scale-out solutions, data is deduplicated on a per-node basis. As always, there are trade-offs, but global deduplication provides optimal overall deduplication rates.

Another potential drawback to using a scale-out architecture is the possibility of “node sprawl” as adding nodes is easy to do but it may not be the most optimal way to grow. Some providers offer capacity-optimized and processing-intensive nodes to enable customers to achieve an optimal balance of capacity vs. processing power for their environment.

ExaGrid and NEC are two notable providers that offer a scale-out architecture as part of their solution. ExaGrid recently increased the number of appliances available in a grid format from 14 to 25 with a maximum raw capacity of 2.4 petabytes. NEC, which sells its products in blocks under set SKUs depending on the market segment, uses hybrid and storage nodes in various configurations to scale from as little as 18 terabytes to 11.9 petabytes.

## DCIG Observations and Recommendations for Each Ranking

### General Observations

General observations on all products in the *DCIG 2016-17 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide*:

- All appliances support variable length block deduplication
- Most support other deduplication algorithms including hashing, delta differences and content aware deduplication

- All recognize file metadata to improve deduplication ratios
- All support backup acceleration software with Symantec OST the most prevalent (others include DD Boost, Accent, HPE StoreOnce, and Rapid RDA/NFS)
- All support the backup of incoming data while concurrently replicating to another system
- All support concurrent backup and restore
- All support bandwidth throttling from one appliance to another
- Nearly all support the ability to configure network ports for certain tasks
- Virtually all appliances have performance monitoring capabilities
- Nearly all support IPMI (Intelligent Platform Management Interface) for BIOS-level management
- Most models support an all-inclusive pricing model where deduplication, encryption, and backup acceleration is offered at the appliances base cost
- 50% of the appliances use inline deduplication with the other 50% using post process

### Recommended Ranking

ExaGrid placed in the *Recommended* ranking with 2 of the 4 products, the ExaGrid EX40000E and EX32000E, along with HPE's StoreOnce 5500 and Quantum's DXi6900. These products share the following features:

- All backup to the cloud at the *Recommended* and *Excellent* rankings (compares to 90% at the *Good* ranking)
- 75% appliances scale to 1PB or more, and 50% are above 500TB in raw capacity and scaling just under or over 2PB (compares to 50% at the *Excellent* ranking that scale with multiple 100s of TB scaling beyond 1PB)
- 66% of the vendors offer a virtual appliance edition
- Appliances have an even split between scale-up and scale-out architecture

The ExaGrid EX40000E and EX32000E have a scale-out architecture, with appliances raw capacity scaling well into the midrange and into the enterprise class raw capacity.



Each ExaGrid model is a fixed capacity self-contained node so customers' using ExaGrid's scale-out architecture can start with the needed capacity and then scale on an as needed basis. Individual nodes range from as low as 9TB to 96TB in raw capacity. With a GRID supporting as many as 25 nodes, a 96 TB EX40000E single node appliance can scale to 2.4 PB. ExaGrid continues to make advancements targeting the mid-range datacenter. Since DCIG's last deduplication guide, ExaGrid increased the size of its scale-out GRID from 14 nodes to 25. This alone greatly increases its scalability across its lineup. At the top end the difference between the EX40000E scaled with 14 nodes vs 25 nodes is nearly an 80% increase from 1.3 PB to 2.4 PB. The addition of its top-end appliances also helps it make gains in the enterprise space. Moving from the 72TB EX32000E to the 96TB EX40000E is a 33% capacity increase alone when comparing the two single node appliances.

HPE's revamped product line earned them dividends in this year's guide. The StoreOnce 5500 scales-up from 60 TB to over 1 PB in raw storage and is geared for midsize and enterprise data centers. The smaller appliances in the line retain the same software capabilities of the enterprise models. With a wide variety of available network topologies the StoreOnce line can fit in as stand-alone appliance, a multi-site disaster recovery replication point, or a central deduplication hub. Also helping to drive its ranking is HPE's offering of the StoreOnce VSA, a virtual edition of its deduplication appliance. The HPE StoreOnce VSA has the most scalability in the market ranging from 4 TB to 50 TB in raw capacity.

For organizations with HPE 3PAR arrays or HPE hyper-converged appliances, HPE StoreOnce Recovery Manager Central (RMC) allows for direct backup to StoreOnce without third party backup software for VMware vSphere environments. RMC enables low-overhead backups, fast recovery via synthetic full backups and the ability to directly mount the snapshot on the host in order to meet short recovery-time objective (RTO) service level agreements.

Virtual appliances find their niche in remote and small offices so that companies can roll out distributed deduplication throughout the network at a lower cost than their hardware counterparts. The ability to first deduplicate at the remote office and then send that data to hardware appliance at a central location only increases the deduplication ratio. Carrying out the deduplication at the remote site

also reduced the data that would have been sent to the central location.

Quantum has been undergoing a product realignment of its own, centering on the DXi6900 and DXi4700. It is phasing out the DXi6800, DXi6700, and DXi8500 models. By consolidating its lineup Quantum focuses on single appliances aimed at each market segment. The DXi6900 targets the enterprise and the DXi4700 targets the midrange. Quantum achieved this consolidation of models by extending the storage range of each model. The Quantum DXi6900 scales from 24 TB to 720 TB in raw capacity and the midrange DXi4700 scales from 12 TB to 190 TB. In fact, the Quantum DXi6900 has one of the more scalable ranges available that support scale-up architecture. Like HPE, Quantum offers a deduplication appliance virtual edition to target remote offices.

## Excellent Ranking

Two (2) deduplication backup appliances, ExaGrid's EX21000E and HPE's StoreOnce 5100 earned the *Excellent* ranking in this year's Sub-\$100K Buyer's Guide. These products share the following features:

- 100% of the appliances support limiting the number of concurrent backups (compares to 80% at the *Good* ranking)
- 100% of the appliances support WAN acceleration to the cloud storage provider (compares to 90% at the *Good* ranking)
- 100% of the models support 4TB drives or more
- All support raw capacity in the 100s of TBs with 50% scaling to more than 1PB
- All support for hundreds of concurrent backup streams.

The appliances earning the *Excellent* ranking retain the same features as their *Recommended* siblings while scaling to the multiple 100s of terabytes and even into the low 1 PB range. This should ensure that customers have options well into the enterprise market. Those choosing appliances in the *Excellent* grouping will find options for global deduplication, high availability combined with the management capabilities supporting as many as 500 concurrent backup streams.

## Good Ranking

Ten (10) backup appliances ranked the *Good* category in this Buyer's Guide. They include five ExaGrid models; the largest of which is the EX13000E followed by the EX10000E, EX7000, EX5000 and EX3000. Other products that achieve a Good ranking include the Dell DR6300, HPE StoreOnce 3540, NEC HYDRAsTOR HS3-510, Quantum DXi6700 and DXi4700 appliances. The *Good* products share the following common features:

- 90% of the appliances have reporting mechanisms showing forecasted capacity based on historical utilization
- 80% of the appliances have metering capabilities
- 80% scaling to more than 100TB
- 70% have starting capacities in the low and double digit TB range
- 60% of the vendors support a scale up architecture

Even at the *Good* level, 80% still scale to the 100s of TB. 40% of those in the *Good* category also offer a virtual edition which can be used as a deduplication target, managed centrally and in most cases can be used for instant recovery. Cloud options are also available at the *Good* level, with 90% of the products in this grouping supporting cloud which can be used as a second DR site for those not looking to pay the cost of a second data recovery site or location for additional backup hardware.

As deduplication target appliances are advancing they are including more features, with cloud and virtualization being two components. ExaGrid, for example signed two cloud agreements; one with cloud hosting company OffsiteDataSync and another with Zerto. Zerto offers Archiving while ExaGrid is leveraging its Landing Zone for VM recoveries. ExaGrid also partnered with backup software vendor StorageCraft to again use ExaGrid's Landing Zone for restores and VM boots.

Dell DR6300 is one of three new DR products Dell introduced in early 2016. The DR6300 can scale up to meet small enterprise needs with a maximum raw capacity of 480 TB. The DR4300, and DR4300e are geared for smaller environments. The DR6300 includes the needed software in the base cost and has a 3 year warranty. In addition to supporting OST backup acceleration software, Dell uses Rapid NFS/Rapid CIFS to accelerate the movement data over standard protocols. Dell also offers a virtual appliance counterpart for the DR series.

ExaGrid's EX13000E followed by the EX10000E, EX7000, EX5000 and EX3000 appliances all support 500 concurrent backup streams. They differ from one another in the amount of storage capacity and cache per appliance.

HPE StoreOnce 3540 shares the features of the higher ranking StoreOnce appliances, but offers fewer hardware resources. It supports a maximum of 200 concurrent backup streams.

The NEC HYDRAsTOR HS3-510 is designed for small environments scaling from 8TB to 24TB while providing the management capabilities of more expensive models from NEC. Featuring a scale-up architecture, the HYDRAsTOR HS3-510 includes cloud connectivity, WAN acceleration, bandwidth throttling, threshold alerts, and multi-tenancy.

Quantum DXi6700 and DXi4700 appliances offer the same features as the *Recommended* dual-controller DXi6900, but are single-controller products with fewer hardware resources. The DXi6700 and DXi4700 each support a maximum of 100 concurrent backup streams.

# SUB-\$100K DEDUPLICATING BACKUP APPLIANCE RANKINGS



## OVERALL RANKINGS

*Vendors Listed Alphabetically in Each Category*

<b>RECOMMENDED</b>	ExaGrid EX40000E
	ExaGrid EX32000E
	HPE StoreOnce 5500
	Quantum DXi6900
<b>EXCELLENT</b>	ExaGrid EX21000E
	HPE StoreOnce 5100
<b>GOOD</b>	Dell DR6300
	ExaGrid EX13000E
	ExaGrid EX10000E
	ExaGrid EX7000
	ExaGrid EX5000
	ExaGrid EX3000
	HPE StoreOnce 3540
	NEC HYDRAsTOR HS3-510
	Quantum DXi6700
	Quantum DXi4700

# SUB-\$100K DEDUPLICATING BACKUP APPLIANCE PRODUCTS

# ExaGrid EX40000E



OVERALL RANK **RECOMMENDED**

## VIRTUALIZATION

Virtual Appliance	●
VADP	4
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Adaptive Deduplication
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	31
Real-time Deduplication Ratio	✓
Global Deduplication	✓
Deduplication Ratios by Backup Job	●
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	96 TB
Raw Storage Capacity <b>MAX</b>	2.4 PB
Cache <b>MAX</b>	1,600 GB
Processor Cores <b>MAX #</b>	150
Ethernet Ports <b>MAX PER NODE</b>	6
FC Ports <b>MAX PER NODE</b>	●
IPMI – Remote Management	✓
Controllers <b>MAX</b>	25
Controller Configurations	Single, Scale-out
Storage Capacity Expansion	Scale-out
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	500
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	2
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest & In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	●
Deduplication HA	✓
Storage Networking Protocols	4
Notification Options	3
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	✓

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✓ SUPPORTED    ● UNSUPPORTED / UNDETERMINED

# ExaGrid EX32000E



OVERALL RANK **RECOMMENDED**

## VIRTUALIZATION

Virtual Appliance	●
VADP	4
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Adaptive Deduplication
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	31
Real-time Deduplication Ratio	✓
Global Deduplication	✓
Deduplication Ratios by Backup Job	●
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	72 TB
Raw Storage Capacity <b>MAX</b>	1.8 PB
Cache <b>MAX</b>	800 GB
Processor Cores <b>MAX #</b>	100
Ethernet Ports <b>MAX PER NODE</b>	6
FC Ports <b>MAX PER NODE</b>	●
IPMI – Remote Management	✓
Controllers <b>MAX</b>	25
Controller Configurations	Single, Scale-out
Storage Capacity Expansion	Scale-out
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	500
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	2
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest & In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	●
Deduplication HA	✓
Storage Networking Protocols	4
Notification Options	3
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	✓

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# HPE StoreOnce 5500



OVERALL RANK **RECOMMENDED**

## VIRTUALIZATION

Virtual Appliance	✓
VADP	2
Hypervisors	2
Instant VM recovery	●
VM Backup Policy	✓

## DEDUPLICATION

Deduplication Type	Inline
Deduplication Stream Automation	✓
Backup Software Streams Recognized <b>TOTAL #</b>	18
Real-time Deduplication Ratio	✓
Global Deduplication	●
Deduplication Ratios by Backup Job	●
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	60 TB
Raw Storage Capacity <b>MAX</b>	1,120 TB
Cache <b>MAX</b>	128 GB
Processor Cores <b>MAX #</b>	16
Ethernet Ports <b>MAX PER NODE</b>	12
FC Ports <b>MAX PER NODE</b>	8
IPMI – Remote Management	✓
Controllers <b>MAX</b>	1
Controller Configurations	Single
Storage Capacity Expansion	Scale-up
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	500
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	1
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	✓
Deduplication HA	●
Storage Networking Protocols	7
Notification Options	2
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	●

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# Quantum DXi6900



OVERALL RANK **RECOMMENDED**

## VIRTUALIZATION

Virtual Appliance	✓
VADP	●
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Inline
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	4
Real-time Deduplication Ratio	✓
Global Deduplication	●
Deduplication Ratios by Backup Job	✓
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	24 TB
Raw Storage Capacity <b>MAX</b>	720 TB
Cache <b>MAX</b>	256 GB
Processor Cores <b>MAX #</b>	12
Ethernet Ports <b>MAX PER NODE</b>	9
FC Ports <b>MAX PER NODE</b>	6
IPMI – Remote Management	✓
Controllers <b>MAX</b>	2
Controller Configurations	Dual-Active
Storage Capacity Expansion	Scale-up
Erasure Coding (Apart from RAID 6)	✓
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	512
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	1
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest, In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	✓
Deduplication HA	●
Storage Networking Protocols	3
Notification Options	2
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	●

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# ExaGrid EX21000E



OVERALL RANK **EXCELLENT**

## VIRTUALIZATION

Virtual Appliance	●
VADP	4
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Adaptive Deduplication
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	31
Real-time Deduplication Ratio	✓
Global Deduplication	✓
Deduplication Ratios by Backup Job	●
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	56 TB
Raw Storage Capacity <b>MAX</b>	1.4 PB
Cache <b>MAX</b>	800 GB
Processor Cores <b>MAX #</b>	100
Ethernet Ports <b>MAX PER NODE</b>	6
FC Ports <b>MAX PER NODE</b>	●
IPMI – Remote Management	✓
Controllers <b>MAX</b>	25
Controller Configurations	Single, Scale-out
Storage Capacity Expansion	Scale-out
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	500
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	2
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest & In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	●
Deduplication HA	✓
Storage Networking Protocols	4
Notification Options	3
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	✓

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✓ SUPPORTED ● UNSUPPORTED / UNDETERMINED

# HPE StoreOnce 5100



OVERALL RANK **EXCELLENT**

## VIRTUALIZATION

Virtual Appliance	✓
VADP	2
Hypervisors	2
Instant VM recovery	●
VM Backup Policy	✓

## DEDUPLICATION

Deduplication Type	Inline
Deduplication Stream Automation	✓
Backup Software Streams Recognized <b>TOTAL #</b>	18
Real-time Deduplication Ratio	✓
Global Deduplication	●
Deduplication Ratios by Backup Job	●
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	48 TB
Raw Storage Capacity <b>MAX</b>	288 TB
Cache <b>MAX</b>	128 GB
Processor Cores <b>MAX #</b>	16
Ethernet Ports <b>MAX PER NODE</b>	12
FC Ports <b>MAX PER NODE</b>	8
IPMI – Remote Management	✓
Controllers <b>MAX</b>	1
Controller Configurations	Single
Storage Capacity Expansion	Scale-up
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	500
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	1
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	✓
Deduplication HA	●
Storage Networking Protocols	7
Notification Options	2
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	●

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SUPPORTED



UNSUPPORTED / UNDETERMINED



# Dell DR6300



OVERALL RANK **GOOD**

## VIRTUALIZATION

Virtual Appliance	✓
VADP	●
Hypervisors	●
Instant VM recovery	●
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Inline
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	19
Real-time Deduplication Ratio	✓
Global Deduplication	●
Deduplication Ratios by Backup Job	●
Bypass Deduplication	●

## HARDWARE

Raw Storage Capacity <b>MIN</b>	24 TB
Raw Storage Capacity <b>MAX</b>	480 TB
Cache <b>MAX</b>	128 GB
Processor Cores <b>MAX #</b>	14
Ethernet Ports <b>MAX PER NODE</b>	8
FC Ports <b>MAX PER NODE</b>	●
IPMI – Remote Management	✓
Controllers <b>MAX</b>	1
Controller Configurations	Single
Storage Capacity Expansion	Scale-up
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	512
Limiting # of Concurrent Backups	●
NDMP	✓
Replication Supported	✓
Cloud Providers	●
WAN Acceleration to Cloud	●
Concurrent Backup & Replication	✓
Encryption type	At rest & In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	✓
Deduplication HA	●
Storage Networking Protocols	4
Notification Options	3
Forecasted Capacity Reporting	●
Performance Monitoring	●
Report Types	3
Threshold Alerts	●
Multi-tenancy	●

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✓ SUPPORTED ● UNSUPPORTED / UNDETERMINED

# ExaGrid EX13000E



OVERALL RANK **GOOD**

## VIRTUALIZATION

Virtual Appliance	●
VADP	4
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Adaptive Deduplication
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	31
Real-time Deduplication Ratio	✓
Global Deduplication	✓
Deduplication Ratios by Backup Job	●
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	32 TB
Raw Storage Capacity <b>MAX</b>	800 TB
Cache <b>MAX</b>	400 GB
Processor Cores <b>MAX #</b>	100
Ethernet Ports <b>MAX PER NODE</b>	6
FC Ports <b>MAX PER NODE</b>	●
IPMI – Remote Management	✓
Controllers <b>MAX</b>	25
Controller Configurations	Single, Scale-out
Storage Capacity Expansion	Scale-out
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	500
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	2
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest & In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	●
Deduplication HA	✓
Storage Networking Protocols	4
Notification Options	3
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	✓

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✓ SUPPORTED    ● UNSUPPORTED / UNDETERMINED

# ExaGrid EX10000E



OVERALL RANK **GOOD**

## VIRTUALIZATION

Virtual Appliance	●
VADP	4
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Adaptive Deduplication
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	31
Real-time Deduplication Ratio	✓
Global Deduplication	✓
Deduplication Ratios by Backup Job	●
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	26 TB
Raw Storage Capacity <b>MAX</b>	650 TB
Cache <b>MAX</b>	400 GB
Processor Cores <b>MAX #</b>	100
Ethernet Ports <b>MAX PER NODE</b>	6
FC Ports <b>MAX PER NODE</b>	●
IPMI – Remote Management	✓
Controllers <b>MAX</b>	25
Controller Configurations	Single, Scale-out
Storage Capacity Expansion	Scale-out
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	500
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	2
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest & In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	●
Deduplication HA	✓
Storage Networking Protocols	4
Notification Options	3
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	✓

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✓ SUPPORTED ● UNSUPPORTED / UNDETERMINED

# ExaGrid EX7000



OVERALL RANK **GOOD**

## VIRTUALIZATION

Virtual Appliance	●
VADP	4
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Adaptive Deduplication
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	31
Real-time Deduplication Ratio	✓
Global Deduplication	✓
Deduplication Ratios by Backup Job	●
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	20 TB
Raw Storage Capacity <b>MAX</b>	500 TB
Cache <b>MAX</b>	200 GB
Processor Cores <b>MAX #</b>	100
Ethernet Ports <b>MAX PER NODE</b>	6
FC Ports <b>MAX PER NODE</b>	●
IPMI – Remote Management	✓
Controllers <b>MAX</b>	25
Controller Configurations	Single, Scale-out
Storage Capacity Expansion	Scale-out
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	500
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	2
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest & In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	●
Deduplication HA	✓
Storage Networking Protocols	4
Notification Options	3
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	✓

The DCIG Interactive Buyers Guide contains additional data elements that are reflected in the overall ranking, but which are not shown on this data sheet.



SUPPORTED



UNSUPPORTED / UNDETERMINED

# ExaGrid EX5000



OVERALL RANK **GOOD**

## VIRTUALIZATION

Virtual Appliance	●
VADP	4
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Adaptive Deduplication
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	31
Real-time Deduplication Ratio	✓
Global Deduplication	✓
Deduplication Ratios by Backup Job	●
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	16 TB
Raw Storage Capacity <b>MAX</b>	400 TB
Cache <b>MAX</b>	200 GB
Processor Cores <b>MAX #</b>	100
Ethernet Ports <b>MAX PER NODE</b>	6
FC Ports <b>MAX PER NODE</b>	●
IPMI – Remote Management	✓
Controllers <b>MAX</b>	25
Controller Configurations	Single, Scale-out
Storage Capacity Expansion	Scale-out
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	500
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	2
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest & In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	●
Deduplication HA	✓
Storage Networking Protocols	4
Notification Options	3
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	✓

The DCIG Interactive Buyers Guide contains additional data elements that are reflected in the overall ranking, but which are not shown on this data sheet.

✓ SUPPORTED    ● UNSUPPORTED / UNDETERMINED

# ExaGrid EX3000



OVERALL RANK **GOOD**

## VIRTUALIZATION

Virtual Appliance	●
VADP	4
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Adaptive Deduplication
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	31
Real-time Deduplication Ratio	✓
Global Deduplication	✓
Deduplication Ratios by Backup Job	●
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	9 TB
Raw Storage Capacity <b>MAX</b>	225 TB
Cache <b>MAX</b>	200 GB
Processor Cores <b>MAX #</b>	100
Ethernet Ports <b>MAX PER NODE</b>	6
FC Ports <b>MAX PER NODE</b>	●
IPMI – Remote Management	✓
Controllers <b>MAX</b>	25
Controller Configurations	Single, Scale-out
Storage Capacity Expansion	Scale-out
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	500
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	2
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest & In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	●
Deduplication HA	✓
Storage Networking Protocols	4
Notification Options	3
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	✓

The DCIG Interactive Buyers Guide contains additional data elements that are reflected in the overall ranking, but which are not shown on this data sheet.

✓ SUPPORTED ● UNSUPPORTED / UNDETERMINED

# HPE StoreOnce 3540



OVERALL RANK **GOOD**

## VIRTUALIZATION

Virtual Appliance	✓
VADP	2
Hypervisors	2
Instant VM recovery	●
VM Backup Policy	✓

## DEDUPLICATION

Deduplication Type	Inline
Deduplication Stream Automation	✓
Backup Software Streams Recognized <b>TOTAL #</b>	18
Real-time Deduplication Ratio	✓
Global Deduplication	●
Deduplication Ratios by Backup Job	●
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	24 TB
Raw Storage Capacity <b>MAX</b>	48 TB
Cache <b>MAX</b>	64 GB
Processor Cores <b>MAX #</b>	12
Ethernet Ports <b>MAX PER NODE</b>	8
FC Ports <b>MAX PER NODE</b>	8
IPMI – Remote Management	✓
Controllers <b>MAX</b>	1
Controller Configurations	Single
Storage Capacity Expansion	Scale-up
Erasure Coding (Apart from RAID 6)	●
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	200
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	1
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	✓
Deduplication HA	●
Storage Networking Protocols	7
Notification Options	2
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	●

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✓ SUPPORTED    ● UNSUPPORTED / UNDETERMINED

# NEC HYDRastor HS3-510



OVERALL RANK **GOOD**

## VIRTUALIZATION

Virtual Appliance	●
VADP	●
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Inline
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	7
Real-time Deduplication Ratio	✓
Global Deduplication	●
Deduplication Ratios by Backup Job	✓
Bypass Deduplication	●

## HARDWARE

Raw Storage Capacity <b>MIN</b>	8 TB
Raw Storage Capacity <b>MAX</b>	24 TB
Cache <b>MAX</b>	48 GB
Processor Cores <b>MAX #</b>	12
Ethernet Ports <b>MAX PER NODE</b>	6
FC Ports <b>MAX PER NODE</b>	●
IPMI – Remote Management	✓
Controllers <b>MAX</b>	1
Controller Configurations	Single
Storage Capacity Expansion	Scale-up
Erasure Coding (Apart from RAID 6)	✓
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	Unlimited
Limiting # of Concurrent Backups	●
NDMP	●
Replication Supported	✓
Cloud Providers	1
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest, In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	●
Deduplication HA	●
Storage Networking Protocols	5
Notification Options	3
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	✓

The DCIG Interactive Buyers Guide contains additional data elements that are reflected in the overall ranking, but which are not shown on this data sheet.



SUPPORTED



UNSUPPORTED / UNDETERMINED



# Quantum DXi6700



OVERALL RANK **GOOD**

## VIRTUALIZATION

Virtual Appliance	✓
VADP	●
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Inline
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	4
Real-time Deduplication Ratio	✓
Global Deduplication	●
Deduplication Ratios by Backup Job	✓
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	10 TB
Raw Storage Capacity <b>MAX</b>	96 TB
Cache <b>MAX</b>	64 GB
Processor Cores <b>MAX #</b>	8
Ethernet Ports <b>MAX PER NODE</b>	4
FC Ports <b>MAX PER NODE</b>	●
IPMI – Remote Management	✓
Controllers <b>MAX</b>	1
Controller Configurations	Single
Storage Capacity Expansion	Scale-up
Erasure Coding (Apart from RAID 6)	✓
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	100
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	1
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest, In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	✓
Deduplication HA	●
Storage Networking Protocols	3
Notification Options	2
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	●

No feedback was received from the provider. All information was solely sourced by DCIG.

The DCIG Interactive Buyers Guide contains additional data elements that are reflected in the overall ranking, but which are not shown on this data sheet.

✓ SUPPORTED ● UNSUPPORTED / UNDETERMINED

# Quantum DXi4700



OVERALL RANK **GOOD**

## VIRTUALIZATION

Virtual Appliance	✓
VADP	●
Hypervisors	●
Instant VM recovery	✓
VM Backup Policy	●

## DEDUPLICATION

Deduplication Type	Inline
Deduplication Stream Automation	●
Backup Software Streams Recognized <b>TOTAL #</b>	4
Real-time Deduplication Ratio	✓
Global Deduplication	●
Deduplication Ratios by Backup Job	✓
Bypass Deduplication	✓

## HARDWARE

Raw Storage Capacity <b>MIN</b>	12 TB
Raw Storage Capacity <b>MAX</b>	190 TB
Cache <b>MAX</b>	96 GB
Processor Cores <b>MAX #</b>	12
Ethernet Ports <b>MAX PER NODE</b>	5
FC Ports <b>MAX PER NODE</b>	4
IPMI – Remote Management	✓
Controllers <b>MAX</b>	2
Controller Configurations	Single
Storage Capacity Expansion	Scale-up
Erasure Coding (Apart from RAID 6)	✓
Retrieval from Tape	●

## MANAGEMENT

Max Concurrent Backup Streams	100
Limiting # of Concurrent Backups	✓
NDMP	✓
Replication Supported	✓
Cloud Providers	1
WAN Acceleration to Cloud	✓
Concurrent Backup & Replication	✓
Encryption type	At rest, In flight
Encryption Algorithm	AES-256
Bandwidth Throttling	✓
Differing Retention Periods	✓
Backup Software	●
Network Port Configuration	✓
VTL Interface	✓
Deduplication HA	●
Storage Networking Protocols	3
Notification Options	2
Forecasted Capacity Reporting	✓
Performance Monitoring	✓
Report Types	3
Threshold Alerts	✓
Multi-tenancy	●

The DCIG Interactive Buyers Guide contains additional data elements that are reflected in the overall ranking, but which are not shown on this data sheet.

✓ SUPPORTED    ● UNSUPPORTED / UNDETERMINED

# APPENDICES

Appendix A: Definitions, Explanations and Terminology

Appendix B: Vendor Contact Information

Appendix C: DCIG Contact Information

## Appendix A—Definitions, Explanations and Terminology

### 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 2015-16 Sub-\$100K Deduplicating Backup Appliance Buyer's Guide*.

#### VIRTUALIZATION

##### Virtual Appliance

Indicates whether the appliance is available as a virtual appliance.

##### VADP TOTAL #

VMware developed the vStorage Application processing interface for Data Protection (VADP) to help it better manage and expedite the protection of virtual machines. Indicates the versions supported. For a detailed list, please access the DCIG Analysis Portal at [portal.dcig.com](http://portal.dcig.com).

##### VA Hypervisors TOTAL #

Indicates the total number of hypervisors and/or virtual operating systems which may be installed on the deduplicating virtual appliance. For a detailed list of exactly which hypervisors the backup appliance supports, please access the DCIG Analysis Portal.

##### Instant VM Recovery

If supported, indicates the speed at which virtual machine recovery is possible.

##### VM Backup Policy

Indicates if a VM can be automatically detected and placed into a backup policy so that it can be scheduled for the next run.

#### DEDUPLICATION

##### Deduplication Type

Indicates the deduplication used such as Inline, Post Process, or Adaptive. Adaptive Deduplication starts the deduplication as it is first stored on disk or the landing zone with not all the data having to be transferred to the appliance before deduplication begins.

##### Deduplication Stream Automation

Indicates if the appliance allows automation of the deduplication stream as data is being written. For example, it may recognize the data type and adjust the deduplication block size based on data type.

##### Backup Software Streams Recognized TOTAL #

Deduplicating backup appliances integrate with various backup software products. The number of backup streams recognized

indicates how many backup streams the appliance recognizes from the backup software; a higher number means it can duplicate its backup stream in a more optimal manner. For a detailed list of exactly which backup software streams the appliance recognizes, please access the DCIG Analysis Portal.

##### Display Real Time Deduplication Ratio

Indicates if the appliance displays the deduplication ratio it is achieving in real time.

##### Global Deduplication

Indicates if the architecture allows grouping of multiple nodes and/or controllers together to achieve shared or "global" deduplication.

##### Deduplication Ratios by Backup Job

If supported, administrators may see the deduplication ratios by backup job.

##### Bypass Deduplication

Some data does not deduplicate well (videos, images, etc.). If this feature is supported and turned on, such data will bypass the deduplication process and be stored in its native format.

#### MANAGEMENT

##### Max Concurrent Backup Streams

Indicates the maximum number of backup streams a target-based appliance can ingest at one time.

##### Limiting # of Concurrent Backups

Indicates whether or not the backup appliance can restrict the number of backup streams so as to improve the performance of backup jobs already running.

##### 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 and expediting the backup process.

##### Replication Supported

Indicates if the appliance is capable of replication from one appliance to another and/or from an appliance to the cloud.

## Appendix A—Definitions, Explanations and Terminology (continued)

### **Cloud Providers** *TOTAL #*

Indicates the total number of cloud providers supported by the appliance. For a detailed list of exactly which cloud providers are supported, please access the DCIG Analysis Portal.

### **WAN Optimization Options**

Indicates if wide area network (WAN) optimization of a replicated stream is possible.

### **Concurrent Deduplication/Replication**

Indicates if the appliance can deduplicate incoming data as it replicates or if it must send the data to a second location for storage.

### **Encryption Type** *TOTAL #*

Indicates the total number of encryption options supported by the appliance: in-flight and/or at-rest. For additional details on supported access encryption options, please access the DCIG Analysis Portal.

### **Encryption Algorithm**

Indicates the AES encryption level supported by the appliance. For additional details on supported access encryption types, please access the DCIG Analysis Portal.

### **Replication Bandwidth Throttling**

Enables the appliance to control or throttle data as it is replicated.

### **Differing Retention Periods**

Indicates if data retention periods can be set differently for replicated vs. original data.

### **Backup Software**

Indicates which backup software licenses are included with the appliance upon purchase.

### **Network Port Configuration**

Indicates if appliance's network ports be configured for certain tasks including management or replication.

### **VTL Interface**

Indicates if the appliance offers a virtual tape library (VTL) interface.

### **Deduplication HA**

Indicates if a level of high availability clustering is supported.

### **Storage Networking Protocols** *TOTAL #*

Lists the storage networking protocols supported by the appliance.

### **Notification Options**

Indicates the total number of methods in which the appliance provides alerts on its conditions. For a detailed list of exactly which alerting options are supported, please access the DCIG Interactive Analysis Portal.

### **Forecasted Capacity Reporting**

Indicates if the appliance has reporting mechanisms to show forecasted capacity based on historical utilization.

### **Performance Monitoring**

Indicates whether or not the backup appliance includes application software that reports on how the deduplication appliance is performing, and what may be done to improve its performance.

### **Report Types**

Indicates if the appliance provides real time and historical reports covering capacity performance, and replication.

### **Threshold Alerts**

Indicates whether the model automatically alerts users when storage performance thresholds are exceeded.

### **Multi-tenancy**

Indicates whether multiple users (tenants) can use the appliance while keeping each tenant's data isolated and invisible from others for security purposes.

### **Management Interfaces** *TOTAL #*

Indicates the total number of interfaces available to manage the appliance. These include command line interface (CLI), Client Application, and Web interface. For a detailed list of exactly which management interfaces are supported, please access the DCIG Analysis Portal.

## **HARDWARE**

### **Raw Storage Capacity** *MAX*

Lists the minimum raw storage capacity in terabytes supported by the deduplicating backup appliance.

### **Raw Storage Capacity** *MAX*

Lists the maximum raw storage capacity in terabytes supported by the deduplicating backup appliance.

### **Cache** *MAX*

Indicates the maximum capacity of the appliance's cache storage.

**Appendix A—Definitions, Explanations and Terminology (continued)****Processor Cores *MAX***

Indicates the maximum number of processor cores supported by the appliance. The appliances featured in this guide may contain dual or quad core processors and may have a number of each.

**Ethernet Ports *MAX PER NODE***

The maximum number of Ethernet ports (1 or 10 Gb) supported per node by the deduplicating backup appliance.

**FC Ports *MAX***

The maximum number of Fibre Channel (FC) ports supported per node by the deduplicating backup appliance.

**IPMI – Remote Management**

Indicates if the model supports IPMI (Intelligence Platform Management Interface) for remote management at the BIOS-level.

**Controllers *MAX***

Lists the maximum number of controllers supported by the appliance.

**Controller Configurations**

Lists the controller configurations offered by the appliance.

**Storage Capacity Expansion**

Indicates how the appliance adds capacity scaling-up, scaling-out or both.

**Erasure Coding (Apart from RAID 6)**

Indicates if the appliance supports erasure coding for data protection (apart from RAID 6).

**Retrieval from Tape**

Indicates if the appliance supports native storage and retrieval from a tape library.

**Appendix B—Vendor Contact Information****Vendor Contact Information**

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**Dell, Inc.**

1 Dell Way  
Round Rock, TX 78682  
Phone: +1.800.671.3355  
Website: [www.dell.com](http://www.dell.com)

**EMC Corporation**

176 South Street  
Hopkinton, MA 01748  
Phone: +1.508.435.1000  
Website: [www.emc.com](http://www.emc.com)

**ExaGrid**

2000 West Park Drive  
Westborough, MA 01581  
Phone: +1.800.868.6985  
Fax: +1.508.898.2401  
Website: [www.exagrid.com](http://www.exagrid.com)

**Hewlett-Packard Enterprise (HPE)**

3000 Hanover Street  
Palo Alto, CA 94304  
Phone: +1.866.625.0242  
Website: [www.hpe.com](http://www.hpe.com)

**Quantum Data Storage**

224 Airport Parkway, Suite 300  
San Jose, CA 95110  
Phone: +1.800.677.6268  
Website: [www.quantum.com](http://www.quantum.com)

*Detailed data for models shown in italics can be found in the DCIG Analysis Portal.*



# 2016-17 SUB-\$100K DEDUPLICATING BACKUP APPLIANCE BUYER'S GUIDE

*The Insider's Guide to Evaluating Deduplicating Backup Appliances with a List Price of Less than \$100,000*

## Appendix C—DCIG Contact Information

### DCIG Contact Information

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