ESG Lab Review

NetBackup 5330 Backup Appliance

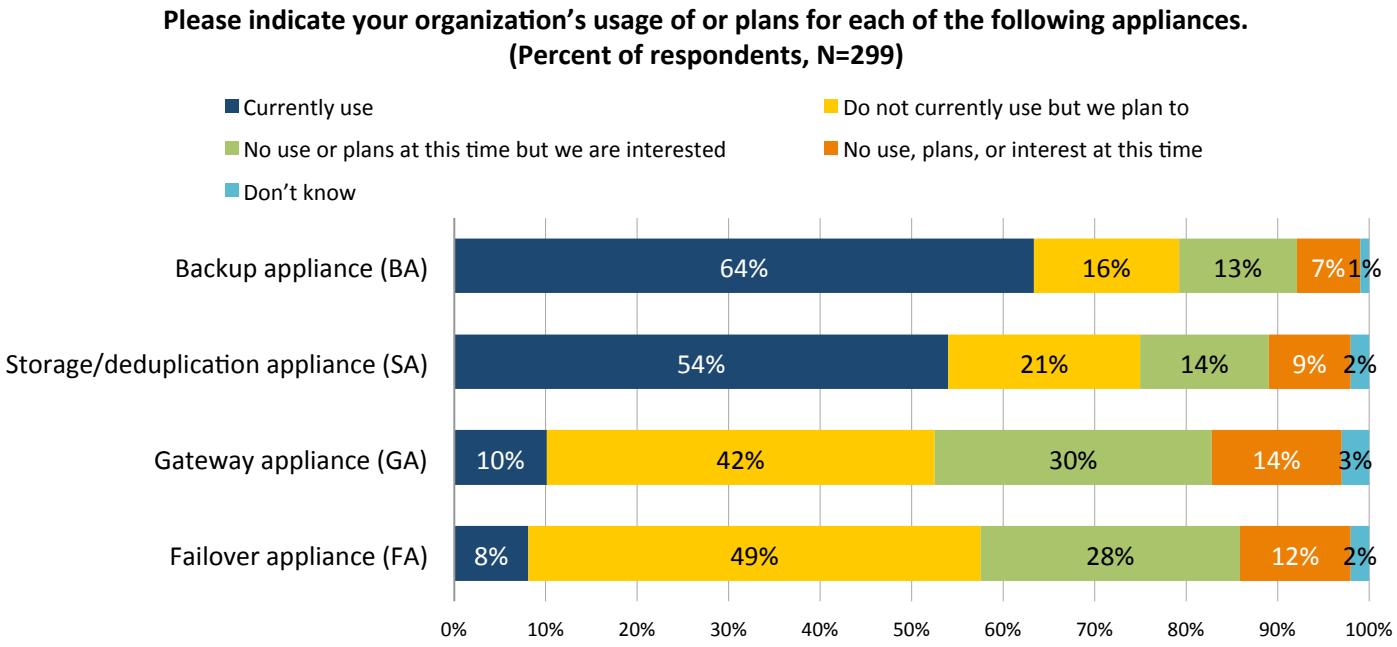
Date: May 2015 **Author:** Vinny Choinski, Senior Lab Analyst and Kerry Dolan, Lab Analyst

Abstract: *This ESG Lab review documents testing and performance auditing of the NetBackup 5330 Backup Appliance.*

The Challenges

Data protection appliances (DPAs) are in high demand as organizations of all sizes seek to improve their protection, recoverability, and data agility, while simultaneously reducing both CapEx and OpEx. Nearly three-quarters (72%) of surveyed organizations expect the majority of their backup workloads to be handled by purpose-built backup appliances (either physical or virtual) within two years. In terms of adoption trends, Figure 1 depicts which types of data protection appliances are currently in use today, as well as what the future may hold for each of the four data protection appliance types. ESG asked current and potential backup appliance users why they have deployed or are considering the deployment of a backup appliance. With security and risk management top of mind for IT and business executives alike, it is not surprising that more than half (53%) identified security features as influencing their choice. Other common deployment criteria centered on efficiency in the form of simplified management (51%), deduplication (49%), and/or streamlined deployments (47%).[1]

Figure 1. Organizations' Usage of Data Protection Appliances



Source: Enterprise Strategy Group, 2015.

[1] Source: ESG Research Report, *The Shift Toward Data Protection Appliances*, March 2015.

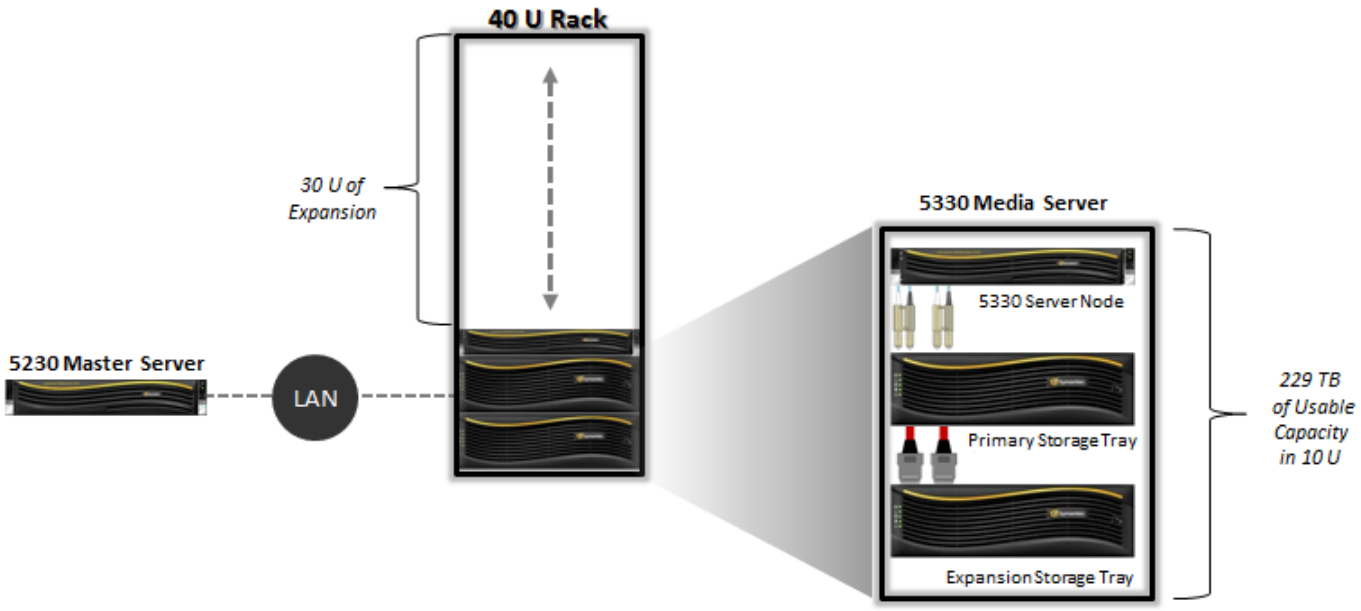
The Solution: NetBackup 5330 Backup Appliance

The NetBackup 5330 Backup Appliance is an integrated appliance designed to accelerate the backup and recovery of virtual and physical environments. It consists of a highly scalable, reliable, high-performance media server with deduplication and storage, built on Symantec's industry-leading NetBackup data protection software. It offers both source- and target-side deduplication for capacity and network efficiency (inline or post-process), and includes Auto Image Replication (AIR) for disaster recovery.

The 5330 operates as a media server only, not a master server, and integrating it to expand or refresh your existing NetBackup environment is simple and non-disruptive. The 5330 was built to focus on superior performance, resiliency, and the consolidation of large environments. Usable capacity starts at 114TB and scales to 229TB, which can be any combination of deduplicated and Advanced Disk pools; in addition, the 5330 supports greater disk density to reduce floor space, power, and cooling requirements. As expected from an enterprise-class appliance, the 5330 includes redundant, hot-swappable components, but the 5330 adds error detection and correction technologies. It offers significant performance improvements over the 5200 series for backup, restore, and replication, making it an excellent extension to 5200 series environments.

The appliances consume 6U-10U with a maximum of one expansion shelf, and include Fibre Channel, 1GbE, and 10GbE ports, plus dual 10-core Intel Xeon processors. Fibre Channel (4x8Gb) connects the server node with the primary storage tray (spreading I/O across four paths for performance and availability), and SAS (4x24Gb) connects the expansion tray.

Figure 2. NetBackup 5330 Backup Appliance Solution Overview



Built for Availability and Security

Symantec has gone out of its way to ensure high availability. Features include AutoSupport and call-home monitoring; Critical System Protection to prevent and detect intrusions and threats; self-healing and backup verification; and for crash protection, the dedupe catalog is backed up using a NetBackup policy. In addition, dual RAID controllers are protected with mirrored write cache, and firmware upgrades are done without downtime. The RAID controller battery can be replaced by IT, and Symantec monitors that battery for proactive attention. Symantec Storage Foundation provides multi-pathing to guard against path failure.

ESG Lab Tested

ESG Lab performed remote testing, architecture review, and performance auditing of the NetBackup 5330 Backup Appliance leveraging resources and infrastructure located at Symantec facilities in Mountain View, CA. Testing was focused on how the 5330 integrates into existing NetBackup environments; ease of configuration and management; form factor efficiency; and backup, restore, and replication performance.

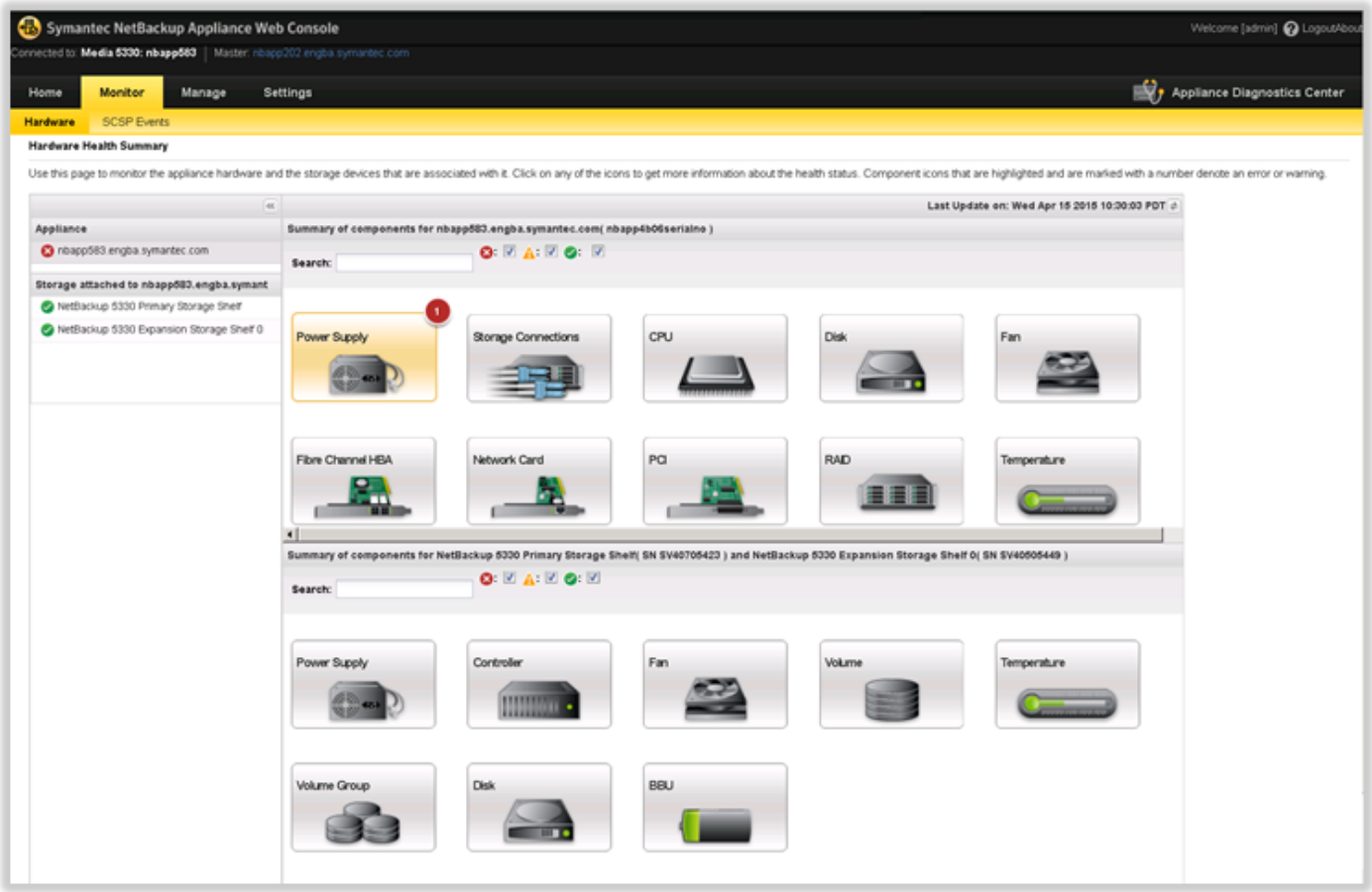
Getting Started

ESG Lab started its exploration of the NetBackup 5330 Backup Appliance with a detailed review of the solution architecture. The Lab reviewed the predefined and configured system components designed to deliver capacity, performance, and environmental efficiency. At full capacity (229TB), the appliance is packaged in a 10U form factor with a density of approximately 23TB per RSU, and consumes only 13 watts of power for each TB of capacity.

The appliance leverages the Symantec Storage Foundation Suite and comes preconfigured with a layout that distributes storage pools across multiple RAID-6 sets and file systems for improved storage QoS. The configuration is designed to improve backup and restore performance by intelligently distributing storage pools across balanced spindle sets, and to improve availability through RAID-level redundancy.

Next, as shown in Figure 3, because the 5330 includes physical installation and basic remote configuration services as part of the purchase, the Lab logged into the web management console of an existing appliance to monitor the status of the hardware components.

Figure 3. NetBackup Appliance Web Management Console



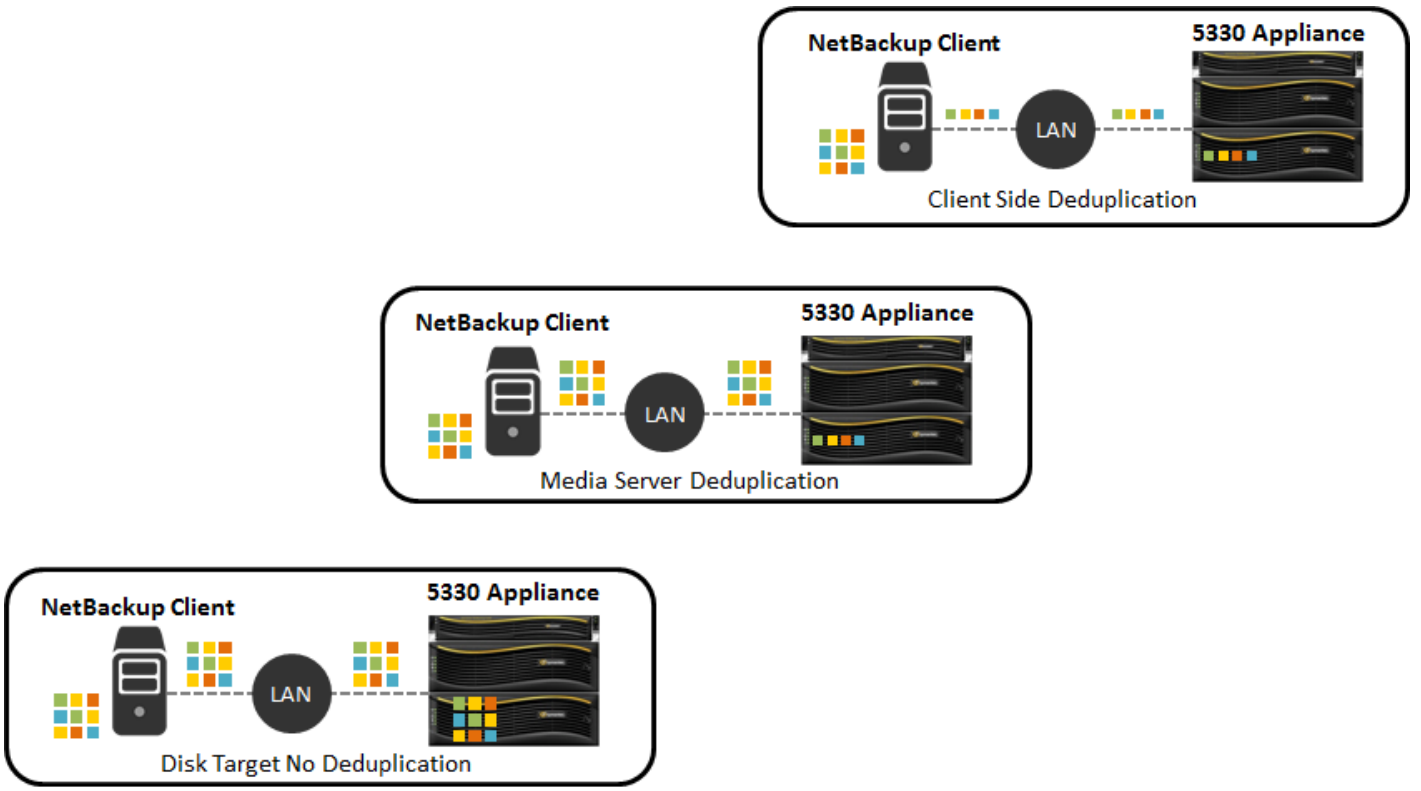
The web management interface is accessible to the customer at the completion of the included standard installation and configuration services. It can be used in conjunction with the AutoSupport and call-home monitoring features for solution management.

For an additional fee, the customer can choose to upgrade the standard quick-start service to preferred or premium production-ready deployment services. The upgraded services include policy and storage unit integration into the customer's specific backup environment. Preferred production-ready services are delivered remotely, while premium services are delivered onsite.

Next, as shown in Figure 4, ESG Lab reviewed different disk storage unit options available with the NetBackup 5330 Backup Appliance. Figure 4 depicts a conceptual overview of the three different storage configurations that were used for subsequent performance testing. The bottom left side of Figure 4 shows a storage unit with no deduplication. For this configuration, all backup data (full and incremental depending on the schedule) is transferred from the client to the media server for storage. The center of Figure 4 shows a storage unit with media server deduplication. Here, all backup data is transferred from the client to the Media Server, but only unique data is stored. The upper right side of Figure 4 shows a storage unit with client-side deduplication configured. In this setup, the client only transfers unique data across the network to the Media Server.

Each of these storage unit configurations offers different performance benefits. All deduplication options reduce storage capacity needs. Client-side deduplication adds the benefit of reduced network traffic during backup, while media server deduplication gains from reduced compute and memory loads on the client during backup. The storage unit with no deduplication configured reduces media server resource load, improving recovery operations.

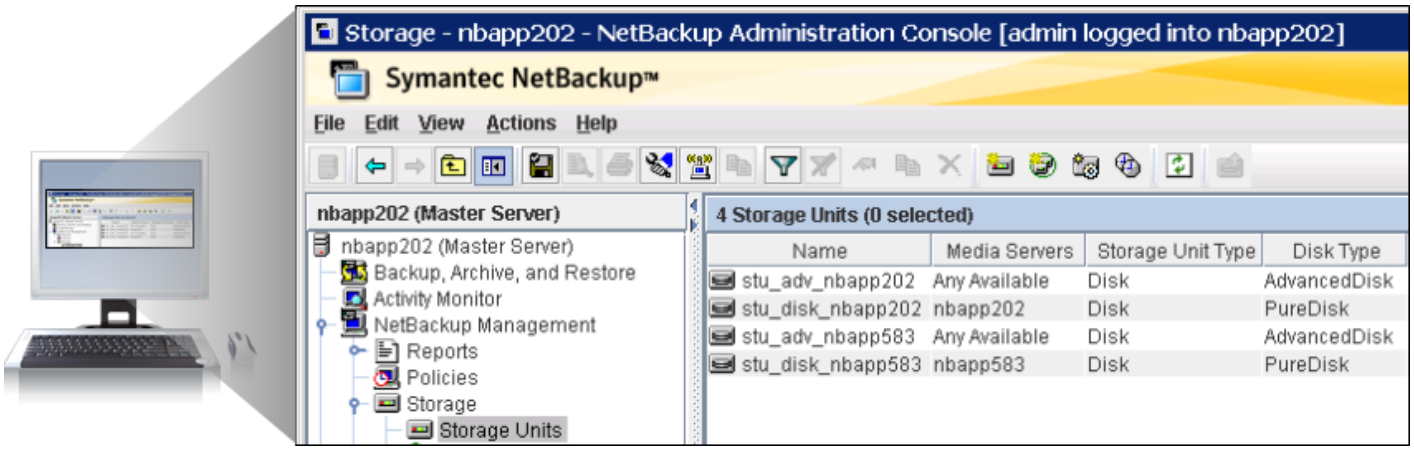
Figure 4. Disk Storage Unit Overview



Lastly, the Lab used the NetBackup management interface to configure two different storage unit types on an existing 5330, and two different storage unit types on a NetBackup 5230 Master/Media Server combo. As shown in Figure 5, the test environment consisted of the 5230 Master/Media Server ***nbapp202*** and the 5330 nbapp583. Each server was configured with an ***Advanced Disk*** and a (***Pure Disk*** labeled) dedupe storage unit to demonstrate backup with and without deduplication.

Next, to demonstrate client-side deduplication versus media server deduplication, the Lab configured two backup policies. One policy was configured with the attribute ***always use client-side deduplication*** and the second policy was configured with the attribute ***always use media server***. Backup jobs were run for each policy and network traffic plus bits transferred were monitored for the two different jobs types.

Figure 5. Storage Unit Configuration



Why This Matters

Managing backup and recovery for your organization's business-critical data is a difficult job. However, just because you have selected the right data protection application to meet your business requirements does not mean your job is finished. The application is only part of the solution. The underlying infrastructure is just as important (if not more so) to a successful solution, and is often the most challenging design element.

ESG Lab confirmed that the NetBackup 5330 Backup Appliance removes the burden of constant troubleshooting, reconfiguring, updating, or even redesigning the underlying infrastructure. The 5330 is designed for easy integration and is delivered preconfigured for consistent results that take the guess work out of the data protection equation.

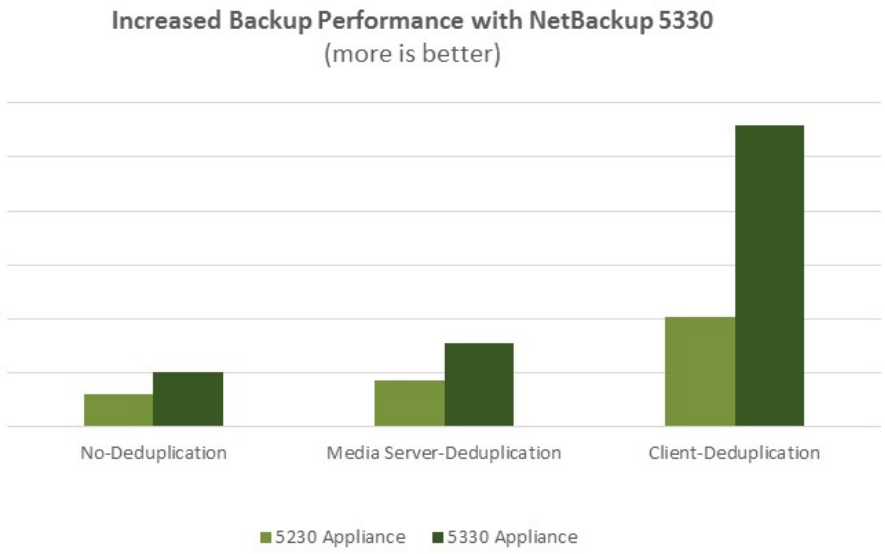
Performance

To validate the improved performance characteristics of the 5330, ESG Lab audited the results from two testing sessions: 1) internal Symantec performance team testing, and 2) a real-world, client-facing proof of concept focused on the backup and restore of an Oracle database running a decision support workload.

The internal performance team tests were conducted using a single-rack, private network with a 48-port Arista switch, 16 clients, a single NetBackup master server, and a NetBackup 5230 and 5330 dedicated to backup/restore and deduplication. Testing was conducted on both dedupe storage and Advanced Disk (non-dedupe). Data was generated using the Symantec-designed tools GenData and GenFile. The GenData tool was used to create data in each server's memory and send it through the network with a specific amount of duplicate data—in this case, only 2% to ensure that media server I/O and CPU would not create a bottleneck. For restore, data was read from the NetBackup 5230 and 5330 to the client, and then deleted to enable testing of large data sets. This enabled the simulation of a typical customer environment without using hundreds of clients or suffering the bottleneck of a single client.

As shown in Figure 6, during backup testing, the 5330 was able to deliver more performance than the 5230 for each of the three different storage unit layouts, with the biggest performance gain coming from the client-dedupe configuration.

Figure 6. Backup Performance

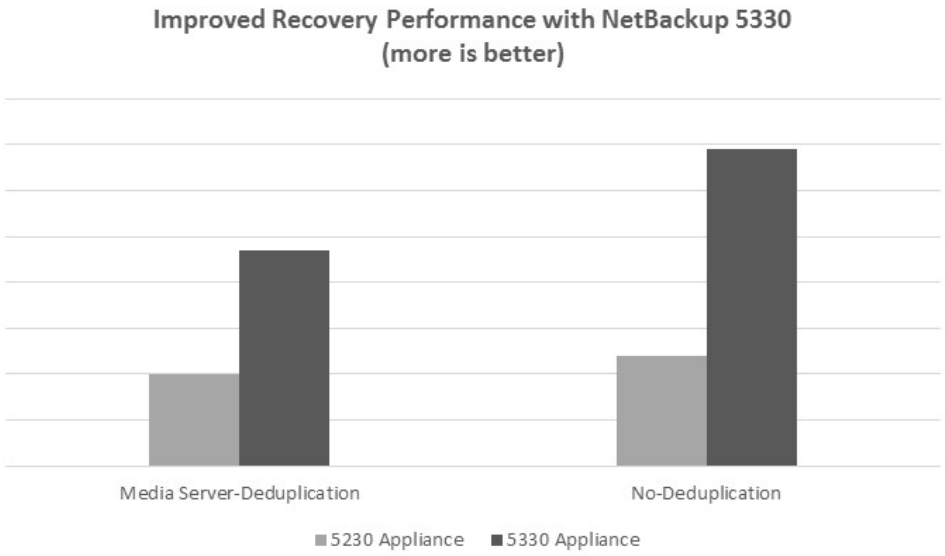


What the Numbers Mean

- With no duplication configured, the 5330 was 1.7 times faster than the 5230.
- With media server deduplication, the 5330 was 1.8 times faster than the 5230.
- With client-side deduplication, the 5330 was 2.8 times faster than the 5230.

Next, the Lab looked at the restore capabilities of the 5330 appliance. Here we used two data points: restores from deduplicated backups and restores from non-deduplicated backups. As shown in Figure 7, restores were run from an Advanced Disk storage unit and a media server deduplication storage unit for the 5230 and 5330 appliances. As expected, the non-deduplicated restores were faster than deduplicated restores due to the overhead associated with creating a complete data set for restore from the deduplicated backup.

Figure 7. Recovery Performance

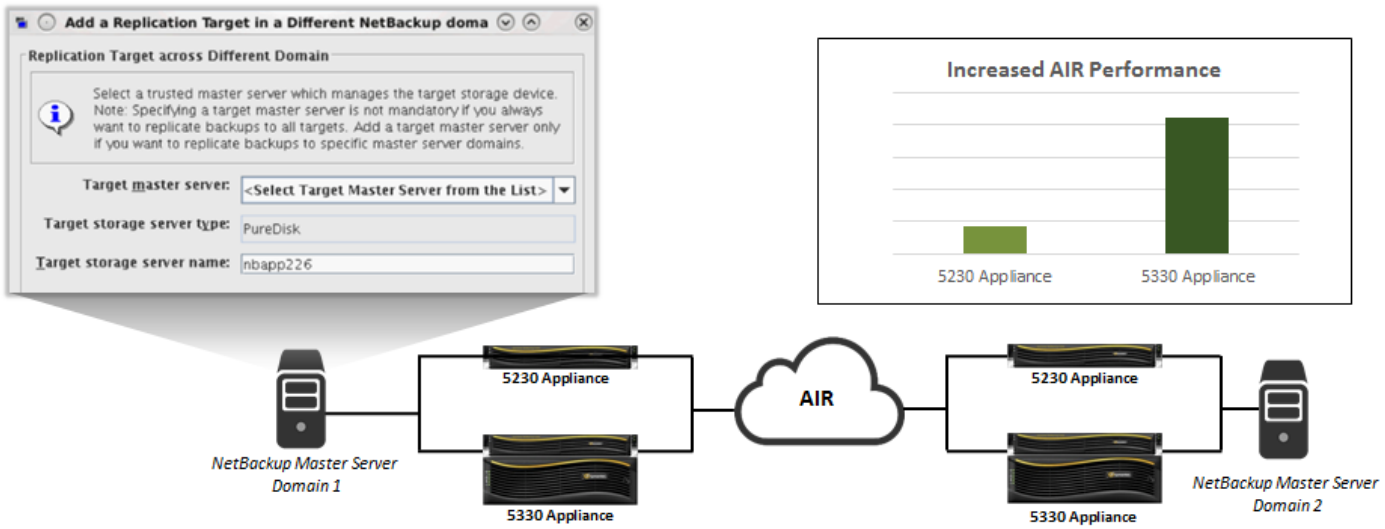


What the Numbers Mean

- The numbers reflect 5230 optimization for four restore streams, and 5330 optimization for 12 streams.
- Non-deduplicated restores for the 5330 were 2.9 times faster than the 5230.
- Deduplicated restores for the 5330 were 2.3 times faster than the 5230.

Next, the Lab validated the DR capabilities of the 5330 solution. Here, we used Auto Image Replication (AIR) to make backup images automatically available and cataloged for recovery at a DR site in a different NetBackup domain. As shown in Figure 8, the 5330 architecture was five times faster for AIR operations than the 5230 in the test environment.

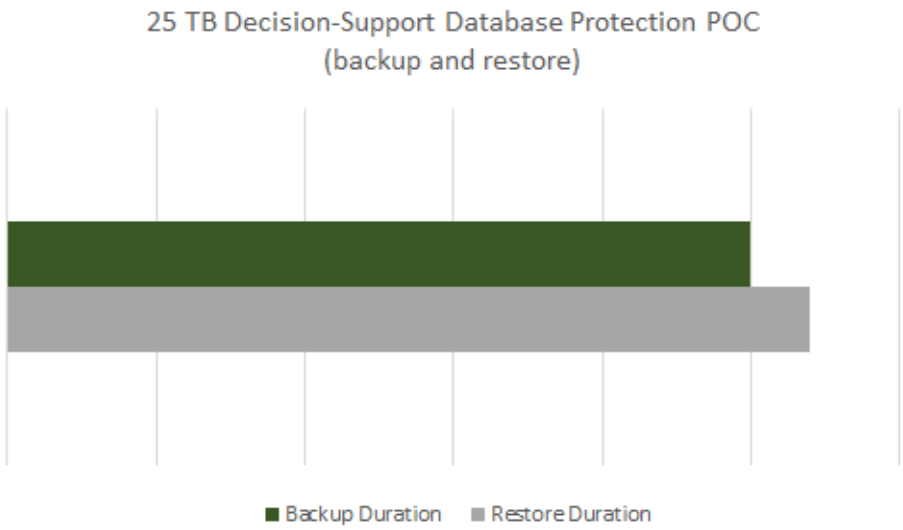
Figure 8. Auto Image Replication (AIR)



Lastly, ESG Lab audited Symantec testing of a NetBackup 5330 proof-of-concept implementation for backing up an Oracle database using RMAN with NetBackup integration. The tests used Oracle data with a Dell R720 server, an HP 3Par storage array, and the TPC-DS test harness. TCP-DS benchmarks decision-support activities including database queries and data maintenance, and was designed to examine large data volumes and execute common database activities like ad-hoc queries, reports, and data mining with periodic synchronization. This testing used a 25TB Oracle database volume striped across eight 3Par LUNs.

The NetBackup 5330 Backup Appliance in this testing was configured with dual 10-core Intel Xeon processes, 384GB of RAM, 4x8GB FC ports, 4x10GbE ports, and 120x3TB disk drives.

Figure 9. Oracle Database Protection Proof of Concept



What the Numbers Mean

- Data restore of the 25TB database was almost as fast as backup.
- Restore was only .5% slower than the backup operation.
- Appliance CPU utilization was below 40% for backup and below 20% for recovery operations.

Why This Matters

There never seems to be enough hours in the day to successfully complete all your backup jobs, and missing a schedule quickly puts your business-critical data at risk. Organizations are looking for solutions that deliver the performance needed to meet backup window and recovery RTO/RPO requirements, and that can scale with predictable and repeatable results as the environment grows.

ESG Lab confirmed that the 5330 was designed with performance as well as capacity scalability in mind. The Lab reviewed multiple backup and restore configurations and audited performance results. As demonstrated by the results in the accompanying performance charts, we found the solution capable of delivering impressive levels of throughput for backup, restore, and replication. Also, the easy integration of the appliance into an existing NetBackup infrastructure enables consistency as the environment scales with multiple appliances with repeatable results.

The Bigger Truth

We all know Symantec is not new to the data protection market. The company has a long history of delivering enterprise-class data protection applications, with NetBackup as its flagship product. The Symantec team also knows that implementing anything more than a niche point solution in the backup and recovery space can be a demanding task. It's not just about configuring an application on a VM when you have to support a long list of operating systems, applications, physical devices, and virtual infrastructures; it's just as much about the underlying hardware and architecture.

Symantec has been working particularly hard over the past few years to address these backup infrastructure challenges for its customers. In fact, ESG Lab validated the first iteration of the NetBackup appliance in early 2013, and we have been following its evolution ever since. It started with a simplified deployment focus, tackling interoperability, configuration, and support issues. The latest model is designed to dramatically speed up both backup and (more importantly) restore via tighter integration with the NetBackup application. In addition, at a corporate level, the pending separation of the consumer and corporate security components (Symantec) from the information management components (Veritas) into two independent companies should enable Veritas to increase its focus on data protection innovation.

In this latest round of testing and performance auditing, ESG Lab confirmed that the NetBackup 5330 Backup Appliance is built for speed, scale, resiliency, and efficiency. It is deployed in a cost-effective form factor that emphasizes deduplication and greater density, effectively reducing floor space and power costs. It requires less management, has proactive support and monitoring, and delivers high availability to avoid costly downtime.

The 5330 can be used to consolidate backup deployments by replacing third-party, deduplication-only target appliances. Or, with Automated Image Replication (AIR), it fits well into HQ plus DR schemas where high-performance replication and long-term retention capabilities are required. And it can be used to replace 5000 series NetBackup appliances as customers refresh those systems or look for greater capacity in the near feature.

There's a lot to like about the 5330: It is highly scalable, available for multiple uses, built to keep up and running for the long term without disruption, "green," and cost efficient. But the real key to this appliance is the performance. If Symantec keeps its focus on scalability, while adding the application integration features its clients need and want, ESG believes that these appliances will be part of customer backup environments for years to come.