# Lab Validation Report

## Dell DL1000 Backup and Recovery Appliance

Cost-effective Data Protection for Small Businesses

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# Contents



## ESG Lab Reports

The goal of ESG Lab reports is to educate IT professionals about data center technology products for companies of all types and sizes. ESG Lab reports are not meant to replace the evaluation process that should be conducted before making purchasing decisions, but rather to provide insight into these emerging technologies. Our objective is to go over some of the more valuable feature/functions of products, show how they can be used to solve real customer problems and identify any areas needing improvement. ESG Lab's expert third-party perspective is based on our own hands-on testing as well as on interviews with customers who use these products in production environments. This ESG Lab report was sponsored by Dell.

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# Introduction

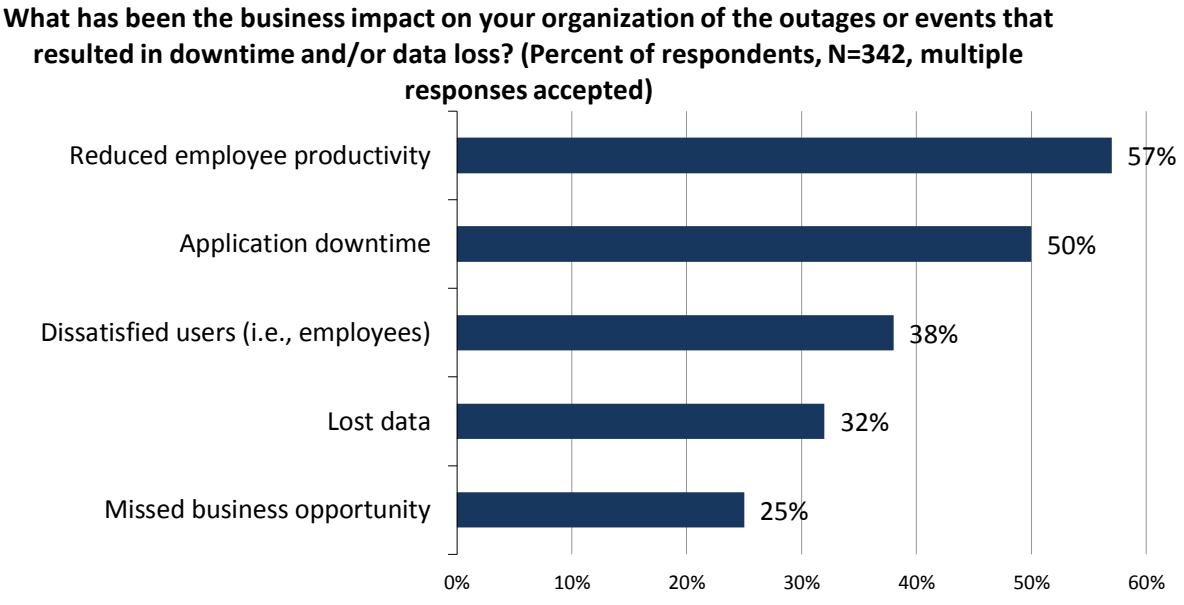
This ESG Lab Validation documents the results of the recently completed independent, hands-on testing of the Dell DL1000 Backup and Recovery Appliance. Testing focused on ease of deployment, flexible backup and recoverability, and archiving to the cloud with a goal of understanding how small- to medium-sized businesses can benefit from the DL1000.

## Background

Even the smallest businesses rely on technology to maintain a smooth running company. Whether in a doctor's office or a law practice, records—from patient information to financial records—are being digitally stored. As technology continues to enhance the efficiency of organizations, maintaining and protecting these digital assets is increasingly important. Given the increased usage of technology in small organizations, it is no surprise that most organizations (96%) already back up their data or expect to in the near future. [1]

Many technologies are available that help back up important data, but backing up is just one piece of the data protection puzzle. Is data growing too fast causing your backup windows to shrink? Is one backup a day not enough? And what about recovery? Recovering from an outage that caused downtime or data loss is just as, if not *more,* important than having data backed up. In a recent ESG research survey, SMB respondents were asked what the business impact of an outage that resulted in downtime and/or data loss was on their organization. All of the responses were issues that clearly impacted day to day business, with the top three most-cited responses including reduced employee productivity, application downtime, and dissatisfied users. [2]

*Figure 1. Top Five Business Impacts from Downtime and/or Data Loss*




*Source: Enterprise Strategy Group, 2013.*

More often than not SMBs are settling for less protection, whether it be due to lack of budget, lack of IT personnel, or simply lack of awareness of product capabilities. All-in-one backup and recovery solutions are beginning to offer enterprise-class features to cost-effectively improve on current backup technologies, while adding flexible configurations to adjust to the needs of any small business. These features help to optimize utilization, maximize availability, and reduce downtime so small organizations are less affected during an outage.

[1] Source: ESG Research Brief, *Data Backup Trends at SMB Organizations*, May 2013.
[2] ibid.

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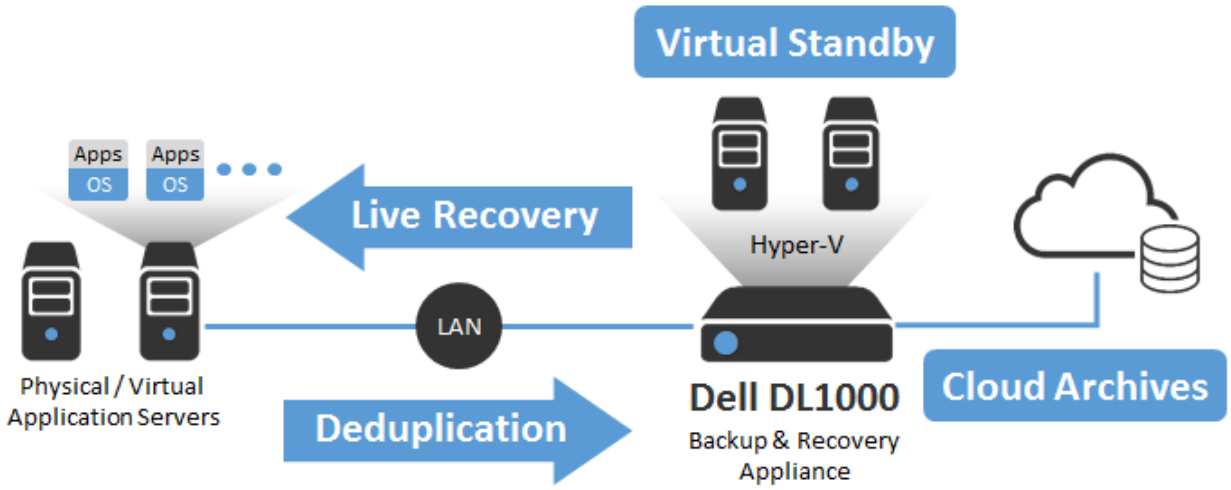
## Dell DL1000 Backup and Recovery Appliance

The Dell DL1000 is an integrated backup and recovery appliance aimed at the small- to medium-sized business. From a hardware standpoint, the appliance is purpose-built for the small office, with a compact, lightweight hardware design that runs quiet, cools easily, and consumes minimal power.

There are three models of the appliance offering a maximum of 3TB available backup capacity and two standby virtual machines for local disaster recovery. The appliance comes prepackaged with Dell AppAssure software, providing protection for local servers through the use of incremental snapshots that provide ultimate flexibility to organizations so they no longer need to be dependent on a single, one-time backup. The backup process starts with an initial full backup to a DL1000 repository; all subsequent backups are incremental, only storing changes to data already backed up. AppAssure is built on the patent-pending True Scale architecture that uses extremely lightweight SmartAgents installed on protected physical or virtual machines that track changes between backups. These agents enable data protection to occur as often as every five minutes without impacting production operations, enabling up to 288 recovery points per day and recovery times of only a few minutes.

*Figure 2. Dell DL1000 Backup and Recovery Appliance*




Other benefits include:

- **In-line deduplication and compression** allows more data to be stored within each backup so organizations can get the most out of their backup storage capacity while reducing their backup data footprint.
- **Live recovery** restores lost disk volumes to physical or virtual machines within minutes, helping minimize system and application downtime.
- **Granular recovery** helps recover data at all levels, ranging from a single file or volume to a full hardware recovery if data corruption occurs on the appliance.
- **Virtual standby** provides local disaster recovery with two fully functioning VMs hosted on the DL1000 appliance. If an application server goes down unexpectedly, a fully synchronized VM is available to instantly come online. The software also supports virtual standby to separate, external hypervisors.
- **Cloud archiving** enables organizations to leverage their cloud of choice to archive older backup data for even longer retention periods.
- **Built-in replication** protects backup images and snapshots from a single DL1000 to another using WAN-optimized replication protocols for local or offsite disaster recovery.

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# ESG Lab Validation

ESG Lab performed hands-on evaluation and testing of the Dell DL1000 Backup and Recovery Appliance at a Dell facility in Reston, Virginia. Testing was designed to demonstrate ease of deployment, backup, recoverability, and new cloud archiving functionality.

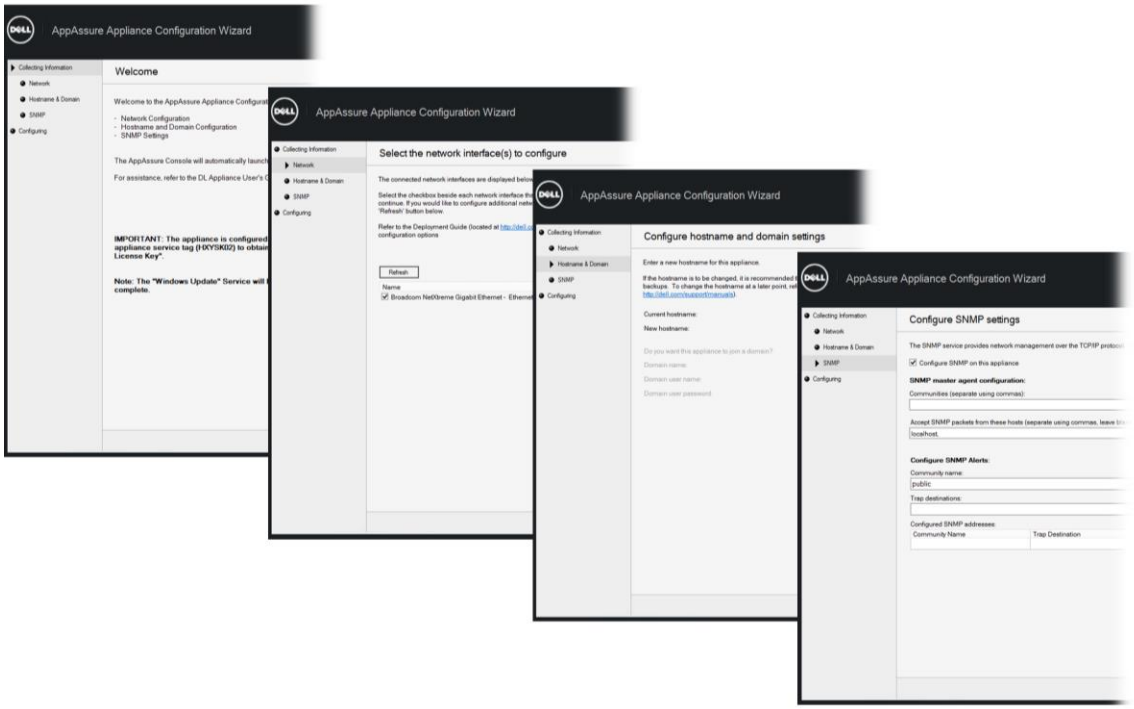
## Ease of Deployment

The Dell DL1000 Backup and Recovery Appliance was built from the ground up with small businesses in mind. From a hardware perspective, the appliance is small, quiet, consumes little power, and is cooled by fresh air, providing physical deployment flexibility in where it can be located in an office—anywhere from at a reception desk to in a back closet. With simplicity being a primary goal, the appliance comes prepackaged with Dell AppAssure software, including easy-to-follow configuration wizards and an intuitive management interface, giving peace of mind to IT-lacking small businesses.

### *Out-of-the-box Experience*

The first phase of ESG Lab testing focused on completing basic deployment tasks with an appliance, including initial setup and configuration. A 3TB DL1000 appliance with two virtual standbys was used throughout the testing. The Windows-based appliance was powered on and after completing normal Windows boot-up initiation tasks, the AppAssure software was configured. Using the AppAssure Appliance Configuration Wizard, ESG Lab stepped through the initial software install. The install involved entering normal setup requirements, including networking, hostname, domain, and SNMP settings. A view of the wizard during this portion of the setup is shown in Figure 3.

*Figure 3. AppAssure Appliance Configuration Wizard*




From a storage standpoint, the 3TB appliance comes with two 4TB hard drives. 3TB is used for the backup repository while 150GB is used for the OS partition. 300GB of the remaining capacity is used to service exported virtual standbys. After factoring in deduplication and compression technologies that come standard with the appliance, customers can expect to store up to 7.5TB of backup data in the 3TB backup repository. It is important to note that when Dell specifies the capacity of a specific model of the appliance, this represents the usable capacity. This differs from many offerings that usually market and advertise the raw capacity.

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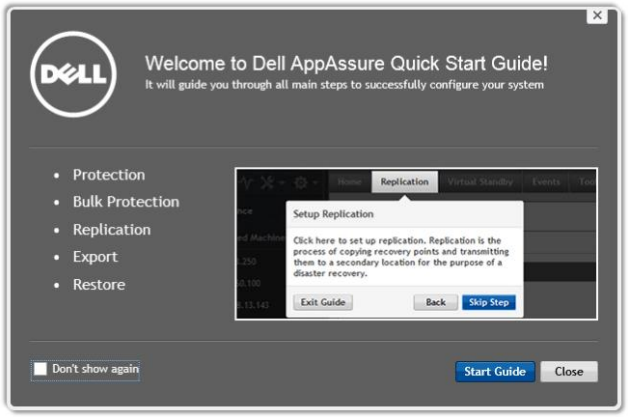
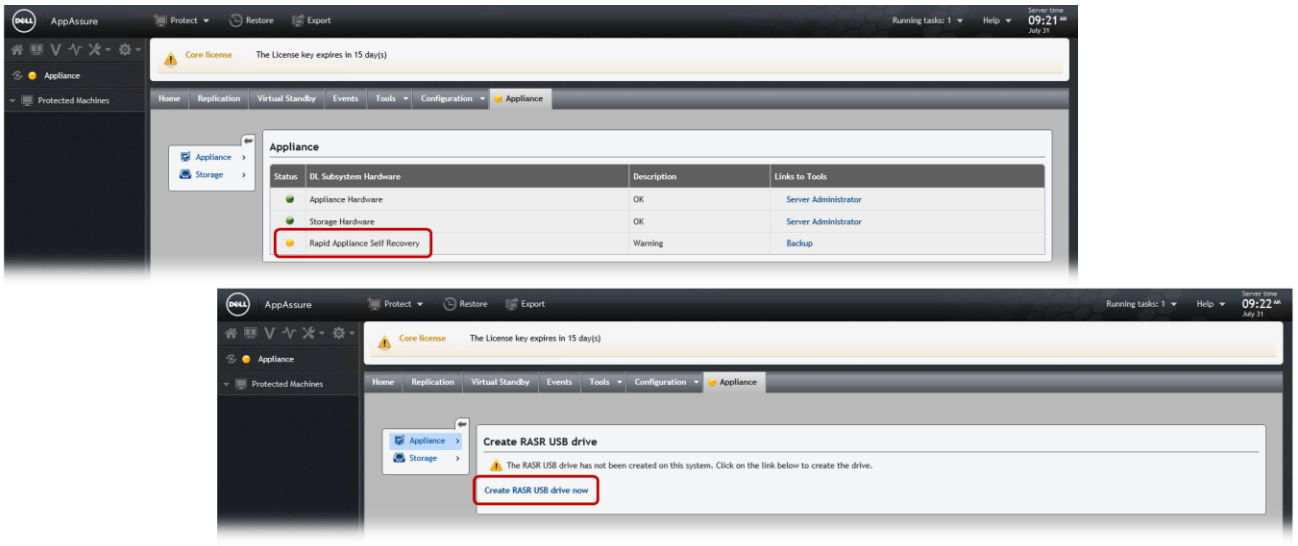
Once the AppAssure software was installed and the Windows service had started on the appliance, ESG Lab was presented with a first look at the management interface. For first time users or customers looking to get familiar with the appliance and software, a quick start guide can be used to walk through all the main configuration steps around basic protection, bulk protection, replication, exporting, and restoring. The quick start guide is shown in Figure 4.

*Figure 4. AppAssure Quick Start Guide*




Once the initial installation had completed and the management interface loaded, the final recommended step was to create a recovery USB drive of the configuration (shown in Figure 5). The Rapid Appliance Self Recovery (RASR) is used to restore an appliance back to its initial bare metal state. This is particularly important when data corruption occurs on the OS partition. RASR rebuilds the operating system drives back to the default factory image. ESG Lab easily created a USB backup of the appliance. A USB drive was inserted into the system, prerequisites were checked and met, the USB target was selected, and after ESG Lab clicked create, the USB recovery drive contained a backup of the appliance's OS partition. Once completed, the USB was removed from the system and could be stored in a safe location for future use.

*Figure 5. Rapid Appliance Self Recovery*




## Why This Matters

Many small organizations do not have the budget or personnel to employ a dedicated IT team. Rather, the person who is the "smartest" when it comes to technology is more often than not that go-to IT person. Simplicity is paramount in these situations, as one wrong move could cause future problems.

ESG Lab validated that the Dell DL1000 Backup and Recovery Appliance is an ideal solution for SMBs with simplicity top of mind. The full deployment, from power-on to loading the management interface, took just ten minutes. Wizards made the configuration process easy, while quick start guides served as a perfect introduction to how to complete basic tasks like protecting and restoring application servers and data volumes.

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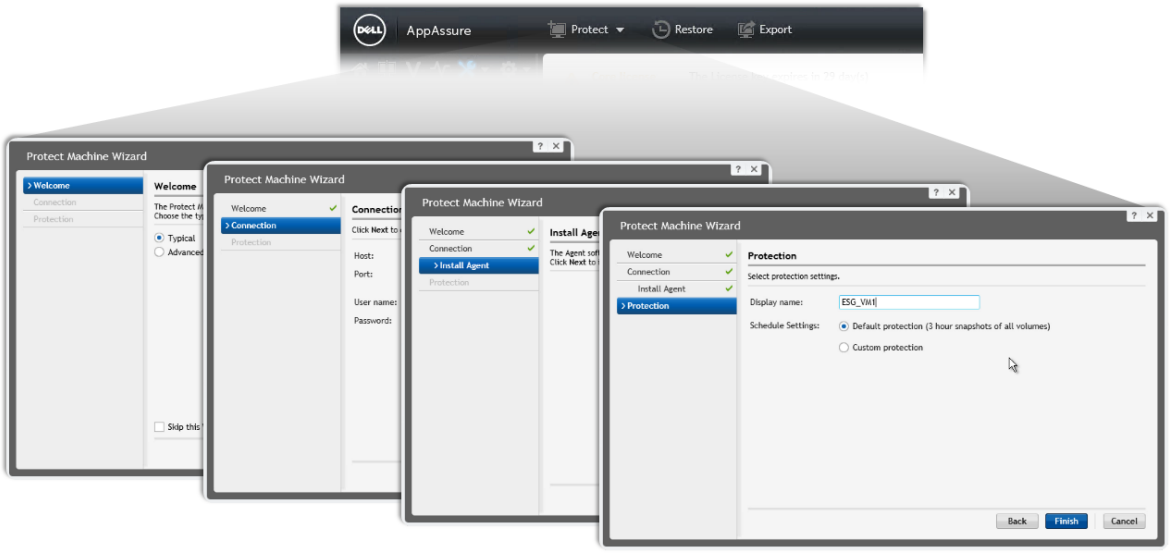
## Data Protection and Flexible Recoverability

Dell AppAssure software provides numerous options for protecting active data sets to help ensure availability of recently backed up data, while minimizing both recovery point objectives (RPO) and recovery time objectives (RTO). Backup and recovery options include scheduled image-based backups with incremental support, virtual standbys, Live Recovery, and appliance replication. Also included is inline deduplication to help reduce required storage capacity for backups, while encryption secures data that has already been backed up.

### *Protecting Machines*

After the initial installation, ESG Lab moved to the protection and restoration capabilities of the appliance with a goal of using virtual standby to protect an application server. The first step was to add a virtual machine to be protected. By selecting the *Protect* option in the top taskbar of the management interface, ESG Lab was presented with the Protect Machine Wizard, as shown in Figure 6. This four step wizard was used to guide us through the process of initially protecting a virtual server. Basic information was entered, including the IP address, user name, and password. Once the connection was verified, the system was quickly scanned for an agent that would be used by the Dell software. In this case, ESG Lab was required to push the Dell agent on the system. A name was provided and the default protection schedule was selected. Once *Finish* was clicked, the AppAssure agent was deployed on the virtual machine and the protection schedule was in effect.

*Figure 6. Protect Machine Wizard*




After an initial snapshot was taken of the newly protected virtual machine, ESG Lab exported a new virtual standby of that machine. The virtual standby machine provides high availability with local DR so that, in the event that a protected machine goes down, the virtual standby machine can be booted to maintain data availability or perform a recovery. There are two approaches to exporting a virtual standby: one-time export or a continuous export, where all of the backup data from a recovery point as well as the parameters defined for the protection schedule will be exported to have protected data continuously exported from your protected machine to a virtual machine.

As shown in Figure 7, ESG Lab clicked the *V* icon in the left menu, which displayed the virtual standby page. After clicking the add button, the Export Wizard was used to configure the virtual standby. In the first step, ESG Lab selected the already protected VM that would be using the virtual standby. The second step was selecting the destination of the virtual standby. Because ESG Lab was leveraging the appliance as the host of the virtual standby, Hyper-V and the local machine were selected. It is important to note that an external server can be selected during this step. This allows for any DL1000 model to leverage the virtual standby software. The next step required a location of the virtual standby. The D:/ drive was selected due to the fact that it is the appliance partition dedicated to virtual standby. RAM can also be specified to use the same amount as the source machine. The next few steps focus on networking, the volumes on the source machine that will be copied, and a quick summary of everything entered and selected.

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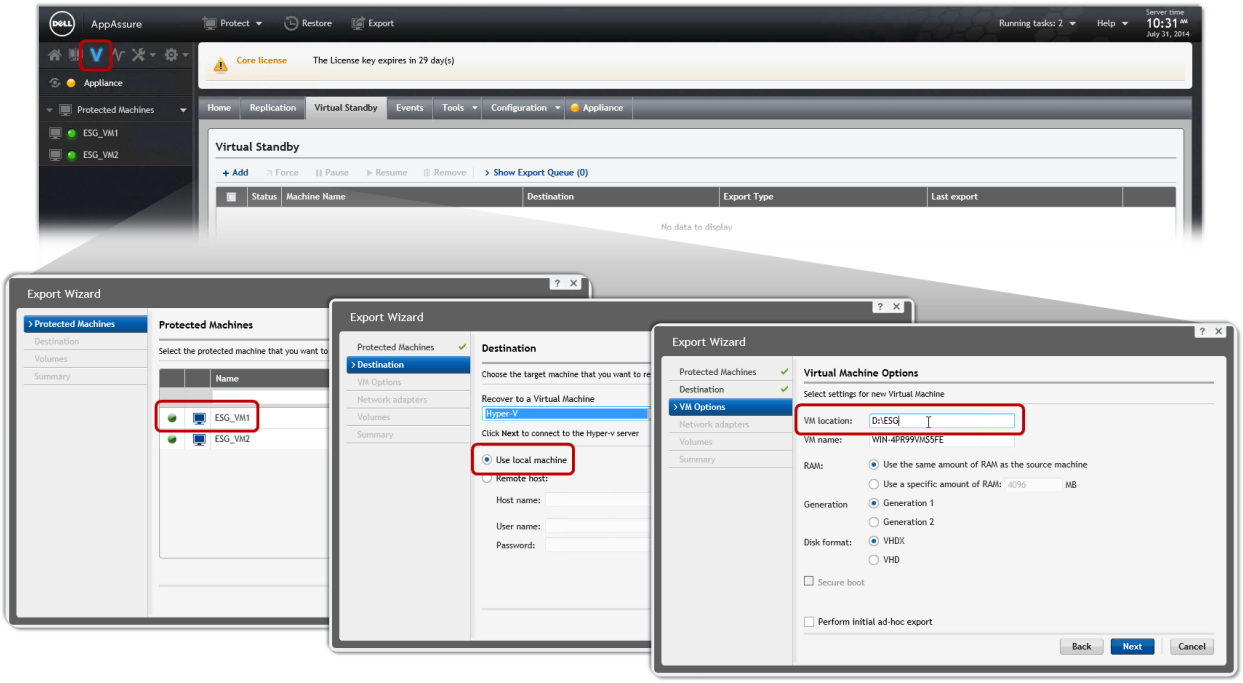
*Figure 7. Exporting a Virtual Standby*

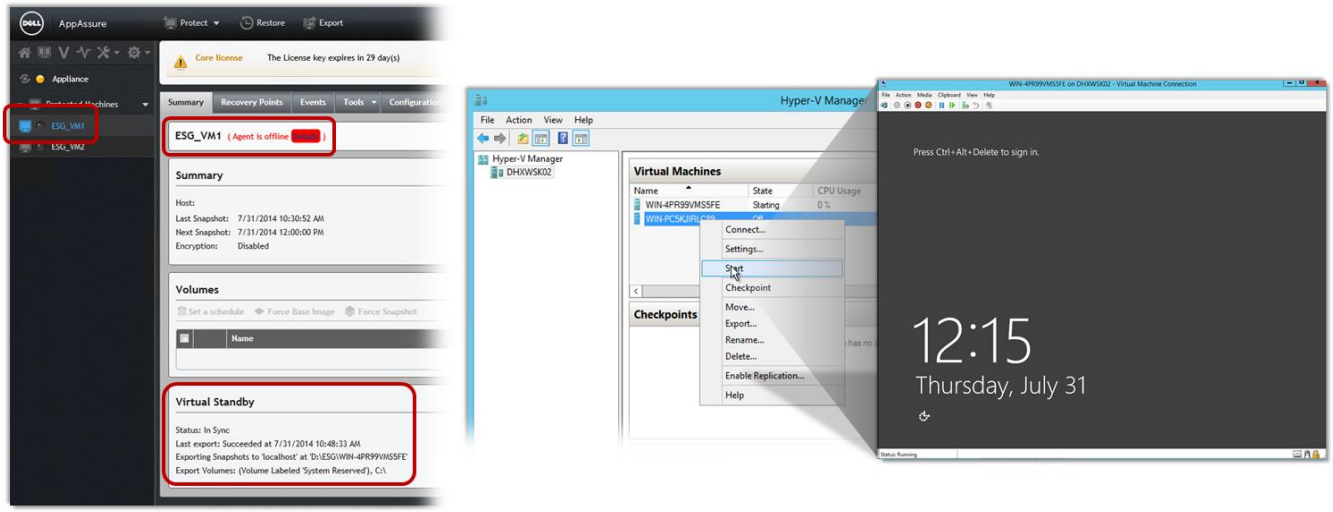



Once the wizard was successfully finished, two background processes were kicked off. The first process transferred the most recent snapshot of the protected volumes to a reserved pool. The second process took that volume and exported it to the virtual standby. Once this completed, any subsequent snapshots taken of the source VM were instantly replicated to the virtual standby hosted on the appliance.

### *Virtual Standby Recovery*

Once the machine was protected by a snapshot schedule and a continuous virtual standby export was configured, ESG Lab simulated a server failure to understand how virtual standby could serve as a local disaster recovery solution by providing high availability and access to important business applications. As shown in Figure 8, an application server was powered down. Notice the two upper highlighted areas that show the AppAssure Agent being offline. Also, pay close attention to the bottom highlighted section, which shows the Virtual Standby status of that powered off machine as being "in sync." Next, ESG Lab opened Hyper-V manager within the appliance, selected the virtual standby that matched the failed application server, and simply started the virtual machine. Within minutes, the virtual machine was online and accessible, whether to restore a corrupt file or to maintain application uptime while the server failure was fixed.

*Figure 8. Protect Machine Wizard*

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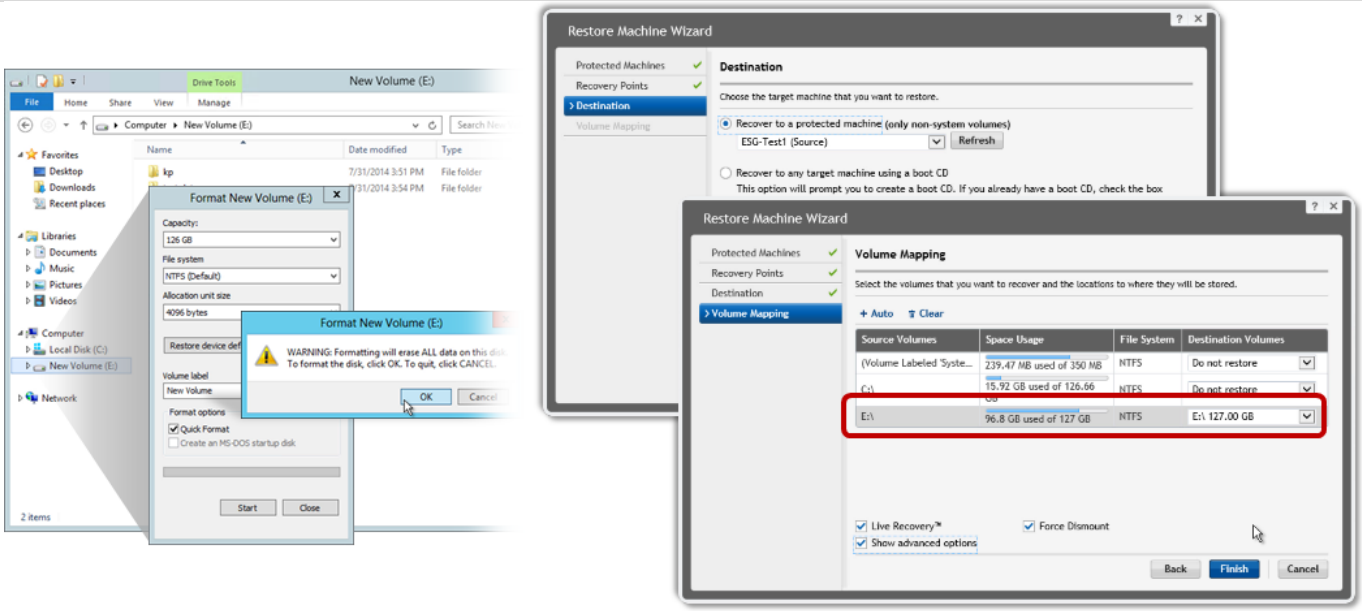
### *Live Recovery*

ESG Lab tested the ability of the DL1000 to provide near-continuous access to data volumes when a volume is lost. A virtual machine volume was formatted, losing all data that was stored on the volume. From the AppAssure management interface, ESG Lab selected the protected machine with the lost volume. From the Recovery Points tab, the last incremental snapshot of the volume was selected and the restore button was clicked. A two-step wizard was used to identify the destination of the restored volume and to select the volume that needed to be restored. Once Finish was clicked, the recovery started. In less than two minutes, the 127GB recovery point volume was mounted on the virtual machine and all data was accessible without waiting for a full restore of all 127GBs. The format of the volume and the two-step wizard are shown in Figure 9.

*Figure 9. Live Recovery of a 127GB Volume*




Once the data was accessible, ESG Lab selected a 40GB VHD and mounted the volume to the virtual machine. The VHD was mounted and browsable within a minute. When turning back to the AppAssure management interface, ESG Lab checked on the status of the volume recovery and noticed that just 460MB of the 127GB volume had physically been rolled back. A majority of the data had not yet been restored to the virtual machine, but was available over the LAN from the appliance. This level of data accessibility and enterprise-class functionality was impressive to ESG Lab, especially considering the fact that the appliance is available at a low enough price point that even small businesses with strict budgets should be able to afford it.

### *Rapid Appliance Self Recovery*

A failure was simulated that required a bare-metal recovery of the appliance. Using the RASR USB created during the initial deployment, ESG Lab stepped through the RASR process to reimage the OS partition on the appliance. The RASR USB was inserted into the appliance and the appliance was rebooted. The system booted from the USB drive and a RASR welcome screen was displayed. Once the prerequisites were checked, *Factory Reset* was selected from the Recovery Mode Selection screen. ESG Lab clicked through the storage configuration screen and OS recovery screen to quickly begin the OS rebuild.

Once the rebuild finished, the USB could be removed from the system and the AppAssure Appliance Configuration Wizard was used to reinstall the AppAssure service on Windows. It is important to note that during the RASR process the only volume impacted was the OS partition. The recovery repository and virtual standby volume remained intact. Once the system was back to a working state, all previously backed up data before the failure was instantly accessible.

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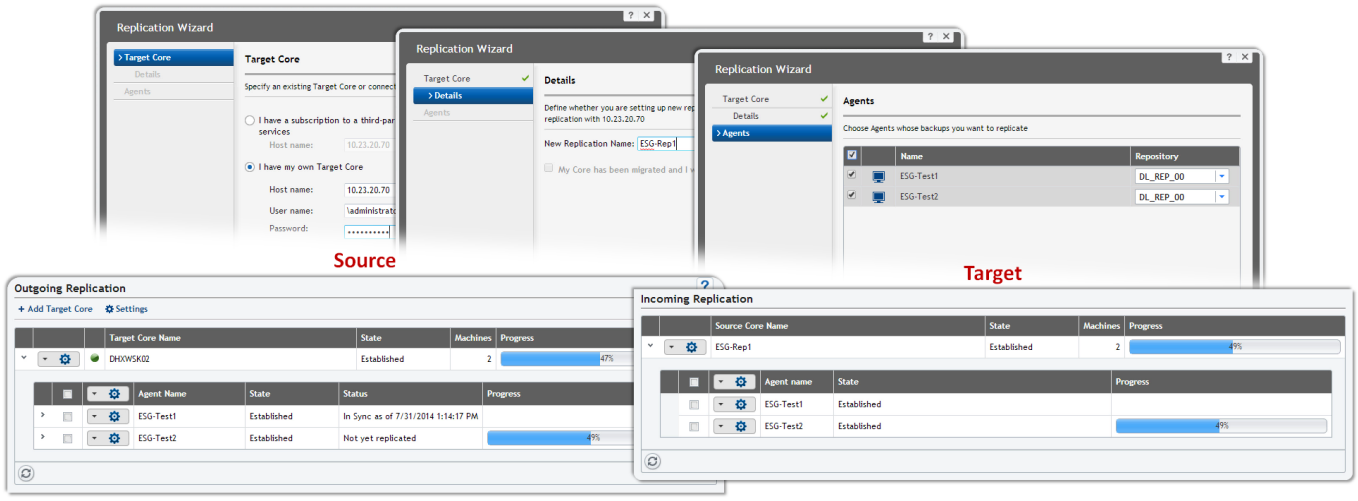
### *Appliance Replication*

The DL1000 supports one-to-one source-to-target replication between AppAssure cores. When first configured, the source data of base images and incremental snapshots are seeded asynchronously to the target appliance using WAN-optimized replication protocols. Before getting transferred, all data is compressed, encrypted, and deduplicated. After the target finishes consuming the initial seed of data, all future incremental recovery points are automatically synchronized.

ESG Lab configured replication between two DL1000 appliances for the purpose of disaster recovery. As shown in Figure 10, the three step Replication Wizard was used to enter target core information, details, and the desired agents to be replicated. After clicking Finish, ESG Lab monitored both the source and target DL1000 appliance and tracked the progress of each agent as the initial sync completed.

*Figure 10. Replication Between Two DL1000 Appliances*




## *Why This Matters*

For small- and medium-sized organizations, accidentally deleting an important file or losing an application server can be detrimental. This is supported by the fact that, in a recent ESG research survey, 38% of SMB respondents chose improving backup and recovery as one of their most important IT priorities for the year, making it the most-cited response among these respondents.[3] And what they are looking for is an integrated backup and recovery solution that can seamlessly be added to their IT infrastructure while meeting their backup and recovery requirements without breaking the bank.

ESG Lab confirmed the flexible protection and recovery options offered by the DL1000 Backup and Recovery Appliance. ESG Lab quickly protected a virtual machine and configured a virtual standby using intuitive wizards. An application server failure was simulated and the virtual standby machine was powered on from the DL1000 management interface, virtually eliminating system downtime. ESG Lab simulated a lost volume on a virtual machine and used the live recovery functionality to restore the 127GB volume within minutes. Using the RASR USB, a bare-metal recovery was completed in just three steps. ESG Lab also configured replication to serve as a disaster recovery solution. The initial replication configuration was intuitive through a guided wizard, while the first-time sync between the source and target completed quickly.

[3] Source: ESG Research Report, *2014 IT Spending Intentions Survey*, February 2014.

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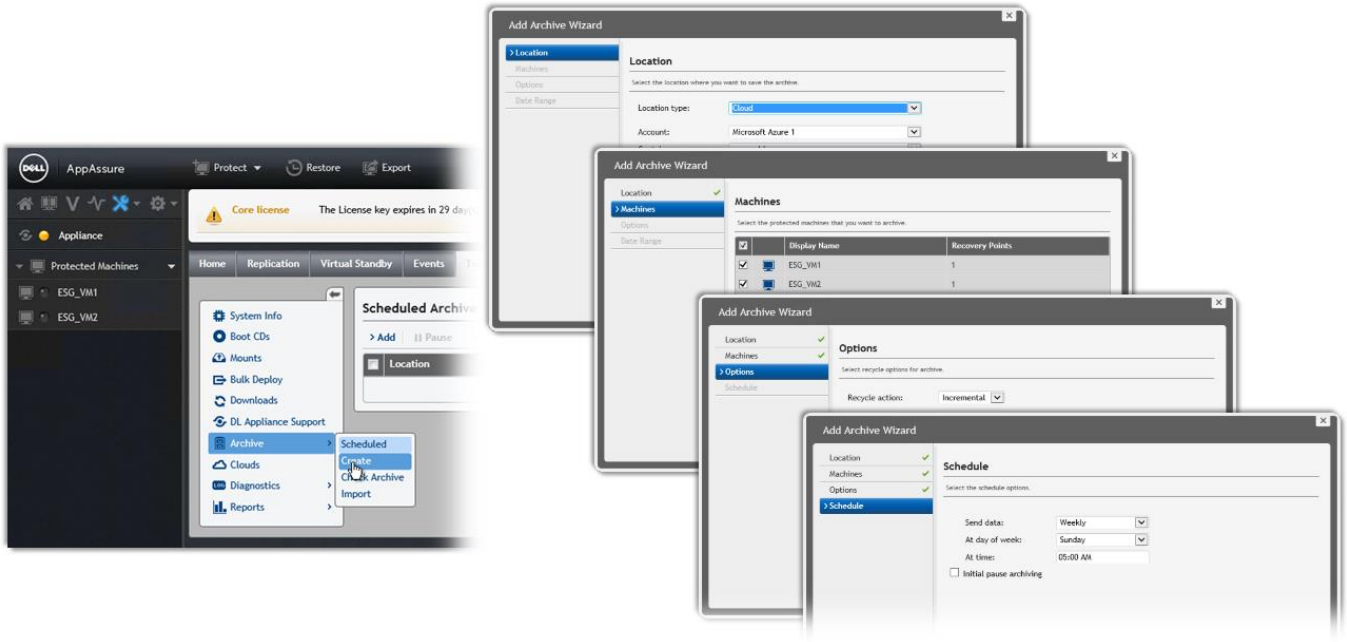
## Archiving to the Cloud

With the release of the DL1000 Backup and Recovery Appliance comes new software capability to archive to the cloud. This allows smaller organizations to retain data for much longer periods of time, whether to meet important compliance rules for future auditing or to simply free up space on the in-house DL1000 appliance. The archiving process can be automated through granular scheduling options, helping save time and reduce risk. The technology can also benefit from archiving incremental changes to help reduce bandwidth and storage costs, which is especially important when leveraging the cloud as the archiving target.

ESG Lab tested the new cloud archiving capabilities with the Microsoft Azure cloud as the target. Two steps were required to begin archiving. First, a cloud account was required to be added to the appliance. In the Tools tab, ESG Lab selected the Clouds options and added a new account. After supplying the Azure storage account name, Azure access key, and display name, the new cloud account was successfully added to the appliance. The second and final step was configuring a scheduled archive that utilized the newly created cloud account. As shown in Figure 11, the Add Archive Wizard was used to guide ESG Lab through the quick configuration process. After selecting Cloud as the location type, ESG Lab supplied the newly created cloud account, selected the machines to be archived, selected incremental as the recycle action, and then scheduled the archive to take weekly.

*Figure 11. Configuring a Cloud Archive*




## *Why This Matters*

Long-term data retention poses a challenge for IT infrastructures, especially for smaller businesses with limited budgets. These challenges are recognized by many organizations, with ESG research showing that 88% of organizations experience at least one challenge when it comes to data protection.[4] A lightweight solution that leverages the scalability and availability of the cloud is ideal for organizations looking for a better way to retain growing data sets at an affordable price with less risk.

ESG Lab confirmed that the new cloud connector that comes standard with the DL1000 Backup and Recovery Appliance provides cloud archiving functionality with intuitive configuration and management. Adding a Microsoft Azure account through the AppAssure management interface was easy, and configuring an incremental cloud archive was completed quickly with the guidance of a four step archive wizard.

[4] Source: ESG Research Report, *Backup and Archiving Convergence Trends*, April 2014.

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## ESG Lab Validation Highlights

- ☑ ESG Lab deployed a DL1000 in less than ten minutes. The First Time Boot Utility served as an easy-to-follow guide, while the predefined storage greatly simplified configuration.
- ☑ ESG Lab was particularly impressed with the small size of the appliance and how virtually no noise was heard while the appliance was in production.
- ☑ Protecting application servers and configuring virtual standby for those servers was quickly completed using intuitive wizards in the AppAssure software management interface.
- ☑ Recovering from a local server failure with virtual standby was extremely simple and seamless to the end-user. After the application server went down, ESG Lab simply logged into the appliance and started the virtual standby VM.
- ☑ ESG Lab simulated the loss of a large volume on a virtual machine. Using Live Recovery, the over 100GB volume and all files within it were available within minutes.
- ☑ ESG Lab simulated an OS partition corruption and used the USB rapid restore functionality to bring the appliance back to factory settings in just minutes.
- ☑ ESG Lab configured local replication between two DL1000 appliances in minutes using an intuitive three-step wizard.
- ☑ Using the new cloud connecter functionality, ESG Lab added a new Microsoft Azure cloud account to the appliance and was easily able to archive previously backed up images and snapshots.

## Issues to Consider

- ☑ The powerful virtual standby capabilities of hosting two VMs on the DL1000 appliance are only available on the 3TB product offering. Though the two 2TB offerings do not currently support local virtual standby, customers can still leverage the Dell software to export a virtual standby to a separate, external hypervisor.
- ☑ When using Virtual Standby, it is important to note that resource allocation should be carefully considered. Allocating too much memory for the Virtual Standby may diminish backup performance, while too little may impact the production environment performance. Memory allocation is made simple with options to either retain the same amount of RAM as on the source machine, or to select an amount of your choosing. This allows IT to easily assess the impact of Virtual Standby and fine tune the environment.
- ☑ For replication, the DL1000 supports a one-to-one, source-to-target replication model. This is an important differentiator from that of the larger, enterprise-class DL4000, which can serve as a replication target for multiple sources.

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## The Bigger Truth

In today's fast-paced, always-connected world, application uptime is extremely important. Accidental file deletions, hardware failures, and connectivity disruptions all lead down a similar path of lost productivity and lost profit. Therefore, it is no surprise that data protection is a top priority for organizations of all sizes, but finding an ideal solution that balances both cost and features has been challenging. This is particularly true for smaller organizations with limited budgets and minimal technical expertise.

With plug-and-play capabilities that enable a fast deployment, the Dell DL1000 appliance easily integrates into an existing IT infrastructure to quickly begin protecting data. The incremental snapshot capabilities create multiple restore points over time, which help reduce backup windows to minimize infrastructure disruption. Flexible recovery options allow organizations to recover a single file, full volume, and even a full appliance. In case of a disaster, virtual standby can step in to take the place of a local application server that has gone down, while built-in replication provides appliance-level disaster recovery to a remote site.

ESG Lab feels strongly about the benefits the Dell DL1000 offers SMBs. It's not just about backing up applications and data because everyone can do that. It's about guaranteeing application uptime through various recovery options. Did an application server go down? Did you need instant access to a lost volume? Did you accidentally delete a file or folder? Are you protected both locally and remotely? Let the Dell DL1000 Backup and Recovery Appliance do all the heavy lifting for you.

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