Dell™ AppAssure™: Enterprise backup features for small and medium business

A full range of backup features and tools ● Support for many software platforms
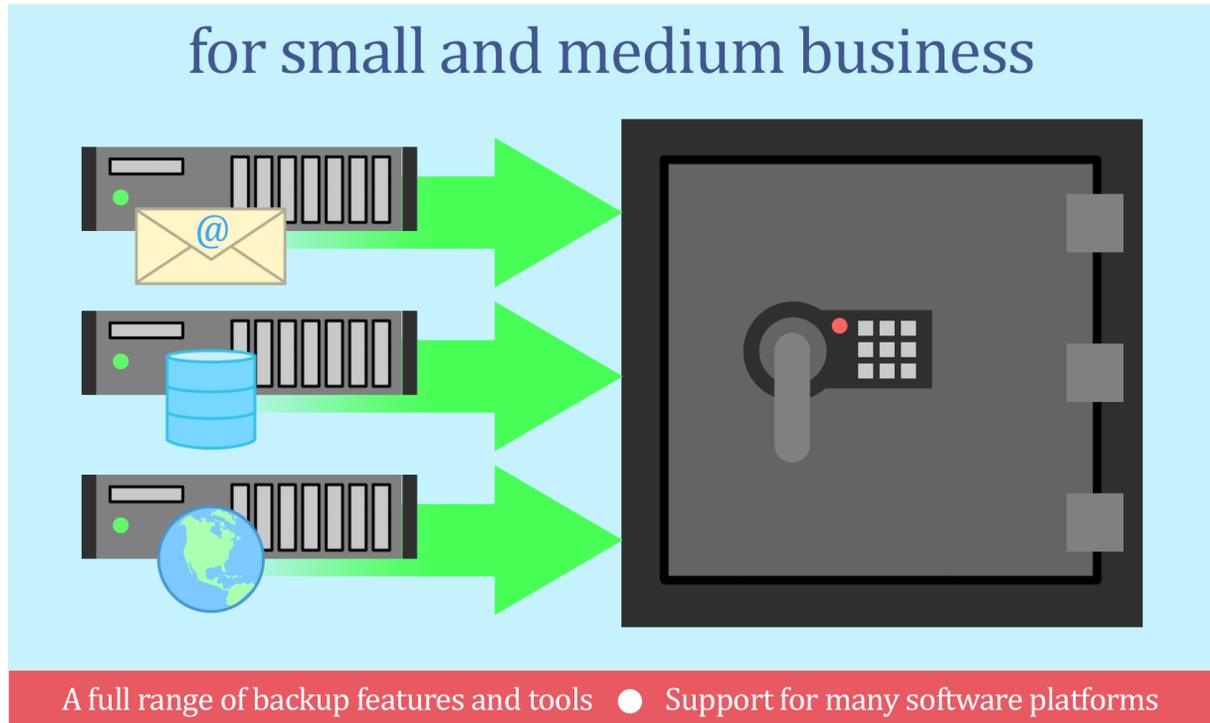
When disaster strikes, your backup and replication solutions need to provide simple and automated recovery to get your physical and virtual servers back up and running as soon as possible. Dell AppAssure is a data protection solution that provides enterprise-class backup, replication, and recovery features for both virtual and physical systems running Microsoft® Windows® or Linux® operating systems and supports a number of hypervisors.

We gathered publicly available information on Dell AppAssure and compared it to information available for several popular backup and replication solutions. We found that Dell AppAssure offers many of the competitors' enterprise-geared features to the small to medium-sized business segment, right out of the box. Dell AppAssure supports a variety of operating systems, offers a flexible cost model, and leverages a scalable architecture that provides data protection and rapid recovery across geographically dispersed sites.

THE FACTS
Out-of-box features

IT departments need key out-of-the-box features to make backup management easy. Dell AppAssure comes with a variety of features that enhance the protection and recovery of crucial data as part of the initial installation or require only minimal setup from IT staff.

Recovery options

Virtual Standby. The Dell AppAssure Core provides users with standby virtual machines (VMs) for physical or virtual protected machines. These VMs are incrementally updated in a ready-to-start state to minimize potential downtime.[1] Simply select the target machine in the AppAssure console, create a Virtual Standby, and select the volumes you want to have available in the standby virtual machine. The target machine will be backed up, and the data will be available in the Virtual Standby, ready as soon as you power it on.

Symantec™ NetBackup™[2] and Veeam®[3] don't offer a virtual standby option, but both offer a feature that mounts a VM on an NFS share hosted on the media server. Once the NFS share is created and mounted on a known hypervisor, the backed-up VM is restored and can be migrated to the production cluster. While this process is fast, it's not instant—and it's supported only for virtual machines. With Symantec NetBackup, you can restore a physical machine to virtual machine using a traditional recovery method, but Veeam offers no means of backup for physical servers.

Like NetBackup and Veeam, Unitrends Enterprise Backup provides technologies such as VMware® vSphere® Instant Recovery and Microsoft Hyper-V® Instant Recovery.[4] In the case of vSphere Instant Recovery, Unitrends requires a VMware ESXi™ server capable of Storage vMotion® as the recovery target.[5]

Unitrends Enterprise Backup also offers virtual standby features similar to AppAssure, but only for Windows servers. Dell supports both Windows and Linux servers for Virtual Standby.[6]

Verified Recovery. Dell AppAssure offers Verified Recovery,[7] a method for ensuring your backups for Microsoft Exchange SQL Server®, or SharePoint® are useable,

[1] http://software.dell.com/documents/virtual-standby-in-the-real-world-with-appassure-technicalbrief-29891.pdf
[2] https://support.symantec.com/en_US/article.TECH211113.html
[3] http://www.veeam.com/high-speed-vm-recovery.html#Instant-VM-Recovery
[4] http://www.unitrends.com/solutions/recovery-solutions/how-we-recover/
[5] http://www.unitrends.com/documents/administrators-guide/user_manual/protecting_vmware/prerequisites_for_implementing_vmware_instant_recovery.htm#XREF_65122_Prerequisites_for
[6] http://software.dell.com/documents/virtual-standby-in-the-real-world-with-appassure-technicalbrief-29891.pdf
[7] https://software.dell.com/docs/dell-appassure-verified-recovery-technicalbrief-15771.pdf

through integrity checks, checksum calculations, and mountability checks. AppAssure performs the checks on the Core and uses no additional resources on your protected system. In the event of a corrupted backup, AppAssure flags the backup job so administrators can follow up.

NetBackup performs a verification after a backup is completed, and writes a checksum to the target media so that verification jobs can be run later to validate the integrity of the files within the backup.[8]

Veeam can perform consistency checks at a VM level (physical hosts are not supported),[9] leveraging the same technology used for instant recovery, which mounts the backup in a virtual sandbox environment to prevent performance hits to the production environment. For application groups, these checks can include heartbeat, ping, and custom script checks. Unitrends uses built-in VSS validation to confirm backup file integrity. For SharePoint, Unitrends uses the built-in STSADM tools for validation. File backups use a CRC or bit-level algorithm and can be run either inline or after the backup task.[10]

Live Recovery. Dell AppAssure offers Live Recovery, which can bring data back online almost instantly without waiting for a complete system restore. With AppAssure, you can expect full availability once the OS is restored—typically in 15 minutes or less.[11] Users can access non-system volumes containing data and applications immediately, even while the recovery is ongoing. Restoration of a non-system volume can be monitored using the Events tab of the machine being restored. The AppAssure agent on the target machine starts by restoring the volume metadata. Volume contents become available to the system once the metadata has been restored. AppAssure then restores data. If a user requests data not yet recovered, AppAssure prioritizes the request to restore that data immediately, getting business operations back online and enabling better compliance with service-level agreements. Veeam provides similar but limited functionality to Dell AppAssure Live Recovery with Volume Recovery Technology; however, it does not automatically prioritize recovery to the original location based on requests for data.[12] Because Veeam is for only virtual environments, it can't be used for recovery of physical machines at all.

P2V and V2P. With Dell AppAssure Universal Recovery,[13] users can realize cross-platform recoveries and failover capabilities in case of disaster. Dell AppAssure supports "anywhere to anywhere" or P2V, V2V, V2P, and P2P recoveries, even across dissimilar

[8] https://support.symantec.com/en_US/article.TECH18698.html
[9] http://helpcenter.veeam.com/backup/80/vsphere/surebackup_hiw_vm.html
[10] http://www.unitrends.com/documents/administrators-guide/
[11] http://software.dell.com/documents/dell-appassure-live-recovery-technicalbrief-24348.pdf
[12] http://www.veeam.com/blog/recovery-possibilities-in-depth-volume-recovery.html
[13] http://software.dell.com/documents/dell-appassure-universal-recovery-technicalbrief-24347.pdf

hardware or differing hypervisors.[14] This means AppAssure can recover physical servers to virtual machines or virtual machines to physical machines when disaster strikes.

As of version 7.6, Symantec NetBackup provides the ability to create virtual machines directly from a client backup.[15] Unitrends UEB uses technology called Unitrends Bridge™ to perform P2V and V2P functions for Windows servers. Due to its virtualization-only model, Veeam Backup & Replication™ v8 does not support the recovery or backup of non-virtualized infrastructure except for end-user devices using Veeam Endpoint Backup™.[16]

Cloud Archive. Dell AppAssure enables organizations to use Microsoft Azure™, Amazon® S3, Rackspace®, and OpenStack® private clouds for archival targets.[17] This allows customers to leverage inexpensive, remote storage for long-term data retention.

In addition, any cloud provider used for hosting AppAssure Cores can be used for cloud-based replication.[18] Leveraging a cloud provider as a replication target helps minimize the effect of disasters by providing varied replication targets and storage locations.[19] Dell offers an AppAssure Replication Target VM for Microsoft Azure (available through the Azure Marketplace with a no-cost license for AppAssure license holders), making setup and replication to the cloud even easier.[20]

The other solutions offer varying levels of cloud support. Unitrends supports their own Unitrends Cloud, Amazon S3, Google Cloud Storage including Google Nearline, and Rackspace CloudFiles™,[21] whereas Symantec NetBackup supports Amazon, AT&T, Nirvanix™, and Rackspace for cloud storage targets.[22] Veeam offers Cloud Connect, which leverages partners that sign up with their cloud provider program. These partners can be found through the Veeam Cloud Provider Directory for hosting offsite cloud repositories.[23] This model requires a separate subscription with Veeam partner cloud providers.

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[14] http://software.dell.com/documents/appassure-datasheet-30207.pdf
[15] https://support.symantec.com/en_US/article.HOWTO88819.html
[16] http://www.veeam.com/news/veeam-announces-veeam-endpoint-backup-free-extending-protection-to-desktops-and-laptops.html
[17] http://documents.software.dell.com/appassure/5.4.2/user-guide/working-with-the-appassure-5-core/managing-cloud-accounts/adding-a-cloud-account
[18] http://software.dell.com/documents/dell-appassure-cloud-replication-technicalbrief-24351.pdf
[19] http://software.dell.com/documents/dell-appassure-cloud-replication-technicalbrief-24351.pdf
[20] http://www.businesswire.com/news/home/20150714005113/en/Dell-Unveils-AppAssure-Replication-Target-VM-Microsoft#.Vcyy4XjSKaA
[21] http://www.unitrends.com/products/enterprise-backup-software/unitrends-enterprise-backup#tab_2
[22] http://www.symantec.com/content/en/us/enterprise/fact_sheets/b-nbu-DS-enterprise-cloud-backup-and-recovery-21281813.en-us.pdf
[23] http://www.veeam.com/cloud-connect.html

Must-have features

Figure 1 presents some of the many features that are important to a solid backup solution. Dell AppAssure provides many features common to enterprise and large organization backup solutions.

Feature	Dell AppAssure	Unitrends Enterprise Backup	Veeam Backup & Replication	Symantec NetBackup
Deduplication	Target, inline	Target, post-backup	Source or target, inline	Source or target, inline
Encryption	AES 256-bit	AES 256-bit	AES 256-bit	Varied, includes AES 256-bit
Replication	✓	✓	✓	✓
Granular retention policies	✓	✓	✓	✓

Figure 1: Enterprise features at a glance.

Deduplication. Deduplication is a data-compression technique that eliminates repetitive or redundant data. AppAssure uses target-based inline data deduplication, as opposed to "at-source" deduplication, which can take up resources of production systems. Instead of a repetitive weekly full backup, AppAssure performs incremental-forever block-level backups of the machines, minimizing load and saving time by backing up only data that has changed. Combining these approaches can greatly reduce the total amount of data on the disk, and organizations can see as much as an 80:1 reduction ratio.[24]

Symantec NetBackup uses both source dedupe, which can hurt performance on a heavily utilized production system, and inline, target-based deduplication.[25] Unitrends Enterprise Backup provides Adaptive Data Deduplication, in which deduplication occurs at the backup location (the target) to allow for shorter backup windows,[26] but may require more storage to accommodate the un-deduplicated backup data temporarily. Veeam Backup & Replication provides deduplication options with various levels of compression, and lets the user choose where deduplication occurs.[27]

Encryption and security. AppAssure provides strong encryption through Deduplication Volume Manager (DVM) by using AES 256-bit encryption in the Cipher Block Chaining (CBC) mode. The Dell DVM combines multiple storage locations into a single repository, so all storage locations are encrypted.[28] According to Dell, this

[24] http://documents.software.dell.com/AppAssure/5.4.3/installation-and-upgrade-guide/introduction-to-appassure/product-features-of-appassure/true-global-deduplication
[25] https://support.symantec.com/en_US/article.DOC6466.html
[26] http://www.unitrends.com/solutions/how-we-help/adaptive-data-deduplication
[27] http://www.veeam.com/hyper-v-vmware-backup-deduplication-compression.html
[28] http://documents.software.dell.com/appassure/5.4.2/user-guide/working-with-the-appassure-5-core/managing-appassure-5-core-settings/understanding-deduplication-cache-size-and-storage-locations

encryption process does not affect performance because it uses hardware acceleration specific to the multi-threaded processor on which it is deployed. Records are independently encrypted and deduplicated, providing multi-tenant access without compromising the integrity of any one tenant's data.[29]

Symantec NetBackup provides AES 256-bit encryption algorithms, and offers extensive guides for implementing these features in various use cases.[30] Unitrends Enterprise Backup includes AES-256 encryption, and offloads encryption to an on-premise appliance.[31] Veeam Backup & Replication provides end-to-end AES 256-bit encryption.[32]

Replication. With AppAssure, you can replicate to both self-managed and third-party locations—anywhere you can install an AppAssure Core can be used as a replication target. By using multi-point replication with Dell AppAssure, users can replicate data and VMs in a one-to-many architecture. By using chained or multi-hop replication, users can cascade replication from a source AppAssure Core to a secondary, and then to a tertiary AppAssure Core,[33] providing multiple copies of data throughout your distributed infrastructure. By replicating only compressed, deduplicated data, AppAssure requires as little as one-tenth the bandwidth of a solution that replicates uncompressed data, and uses asynchronous, continuous transfer of incremental backup data. With a unique Read-Match-Write (RMW) replication algorithm, data transfers occur only after the source and target systems have matched keys. Once matching is confirmed, the compressed, encrypted, and deduplicated data is transferred.[34]

Symantec NetBackup manages all replication functions in the Symantec NetBackup Replication Director, and requires the installation of a NetBackup Client for VM replication.[35] Unitrends provides for replication of data and VMs, and can be configured for cross-replication between two appliance-based systems, though normal UEB systems support only unidirectional replication.[36] Veeam Backup & Replication provides a warm replication site, where a backed-up VM is in a ready-to-start state, protecting infrastructure from long downtimes.[37]

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[29] http://documents.software.dell.com/AppAssure/5.4.3/installation-and-upgrade-guide/introduction-to-appassure/product-features-of-appassure/encryption

[30] https://support.symantec.com/en_US/article.DOC6486.html

[31] http://www.unitrends.com/products/enterprise-backup-software/unitrends-enterprise-backup

[32] http://www.veeam.com/backup-files-encryption.html

[33] http://software.dell.com/documents/dell-appassure-replication-technicalbrief-29890.pdf

[34] http://documents.software.dell.com/AppAssure/5.4.3/installation-and-upgrade-guide/introduction-to-appassure/product-features-of-appassure/replication

[35] https://support.symantec.com/en_US/article.DOC6465.html

[36] http://www.unitrends.com/documents/administrators-guide/index.htm#user_manual/replication/cross-replication_setup.htm

[37] http://www.veeam.com/vm-advanced-replication.html

Agent or agentless?

When backup solutions have a way of tracking changes on a machine or storage location, backups are faster and more efficient. The solution can track changes tracked through APIs at the hypervisor level, or through small programs installed into the OS of the machine that requires backup. In hypervisors such as VMware vSphere, Changed Block Tracking (CBT) is a differential backup method that checks for changes to data blocks on disks rather than changes to specific files, which allows a backup solution to agentlessly capture changes to virtual machines.

Agentless solutions mean no resource usage in the guest OS (i.e., CPU, RAM, disk IO) and VMs can be backed up online or offline. Agentless backup solutions generally leverage hypervisor and OS technologies such as Microsoft Volume Snapshot Service (VSS) or VMware vStorage APIs for Data Protection. For granular restores with CBT, you have to install an agent capable of capturing application state data in each VM.

While it is possible for an agentless solution to produce only minimal impact to individual virtual machines, the hypervisor manager is heavily utilized during the backup cycle for capturing and managing snapshots, which can affect hypervisor management operations and other VMs running in the environment. This requires careful planning and possibly implementing resource limits to restrict the number of simultaneous backups.

Agent-based solutions use a small program installed within the backup target's OS. The agent can perform tasks such as compression or pre-processing data for deduplication before transmitting over the network. Agents may have features that integrate with databases or other workloads to optimize backups and ensure snapshots are not corrupt, providing application-aware, granular backup and recovery capabilities.

Dell AppAssure uses the agent model for supported platforms, and the Dell AppAssure Core can deploy software agents and updates to machines.[38] Dell AppAssure Smart Agents are lightweight agents with built-in intelligence that provides higher levels of protection than agentless backup schemes. Dell AppAssure changed block tracking minimizes the amount of data that has to be backed up, and because it's built into the Smart Agent, can be used on physical, virtual, or cloud machines to optimize performance. Utilizing Smart Agents means a single backup passes all the information needed for both granular and system-level recoveries.

Symantec NetBackup, which can utilize either the agentless or the agent model, refers to their agents as clients.[39] Even with the agentless model, administrators must still install Symantec's version of VSS provider, which provides the ability to quiesce application data. Symantec offers multiple versions of their agent-based clients with

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[38] https://support.software.dell.com/appassure/kb/119942
[39] http://www.symantec.com/netbackup/agents-options-add-ons/

varying feature levels and costs.[40] For example, features such as snapshot-enabled backup and restore are available in only the premium version.[41] Unitrends Enterprise Backup (UEB) is an appliance-based backup solution that uses an agent model for its supported platforms.[42]

Veeam Backup & Replication is an agentless-only solution supporting Microsoft Hyper V or VMware vSphere. Veeam does not support physical servers. [43]

Supported platforms

Workloads often run on different operating systems, hypervisors, and hardware, so backup solutions must support a wide range of guest operating systems and virtualization platforms.

System requirements

Dell AppAssure comes either as a software installer, which requires a dedicated 64-bit Microsoft Windows machine, or as a physical appliance. While AppAssure can run in a virtual machine, for performance reasons, Dell recommends that installations protecting more than 10 agents run on a physical machine.

Symantec NetBackup is supported as both a Linux-based physical appliance or as a virtual or physical server running on Windows, Linux, and Unix server operating systems.[44] However, running NetBackup as a VM can affect certain features.[45]

Unitrends Enterprise Backup comes as either a prepackaged virtual or physical appliance or an installable Linux application. The virtual appliance comes packaged for both Microsoft Hyper-V and VMware vSphere, and the installable application supports Red Hat® Enterprise Linux® and CentOS. Unitrends supports Microsoft Hyper-V, VMware vSphere, and Red Hat Enterprise Linux (RHEL).[46]

Veeam Backup & Replication requires a Microsoft Windows-based machine, either physical or virtual. Veeam supports the 64-bit versions of Windows Server® 2012 and 2012 R2, Windows Server 2008 R2 SP1 and SP2, Windows 8, and Windows 7 SP1.[47] To support the widest range of file systems (including ReFS), Veeam recommends installing to Windows Server 2012 R2.

Platform support

Dell AppAssure supports virtual standbys on VMware vSphere, Microsoft Hyper-V, and Oracle® VirtualBox. Agents are available for Microsoft Windows-based machines

[40] http://www.insight.com/insightweb/products/Symantec-NetBackup-Standard-Client--v.-7.6--license/FTPTXZF0-ZZZES
[41] http://www.symantec.com/netbackup/agents-options-add-ons/
[42] http://www.unitrends.com/support/resources/latest-agent-releases
[43] http://www.veeam.com/vm-backup-recovery-replication-software.html
[44] http://www.symantec.com/netbackup/system-requirements/
[45] https://support.symantec.com/en_US/article.TECH127089.html
[46] http://www.unitrends.com/products/enterprise-backup-software/unitrends-enterprise-backup
[47] http://helpcenter.veeam.com/backup/80/vsphere/

(including Server Core editions) and many Linux distributions.[48] Installation guides for agents are available for Ubuntu, RHEL & CentOS, and SUSE. Administrators can deploy agents manually to each machine, or deploy them in bulk using AppAssure Core Console Tools.

Symantec supports VMware vSphere, Microsoft Hyper-V, IBM VIO Server, HP-UX Integrity VM, and Oracle VM hypervisors,[49] with an increased feature set for Microsoft Hyper-V and VMware vSphere.[50] Supported operating systems include HP-UX, Solaris, IBM® AIX®, Microsoft Windows Server 2003/2008/2008 R2/2012/2012 R2, Red Hat Enterprise Linux, Oracle Linux, FreeBSD®, CentOS, and Apple® OS X®.[51] Bare-metal backup and recovery are also supported.[52]

Unitrends Enterprise Backup protects a variety of operating systems, including Windows Server, Windows Client, Linux, OSX, IBM pSeries/AIX, and FreeBSD.[53] UEB also supports bare-metal backup by converting physical workloads to virtual ones using Unitrends Bridge, Unified Bare Metal, and other proprietary technologies.

Veeam Backup & Replication supports only VMware vSphere and Microsoft Hyper-V virtualization environments. Veeam supports the 6.X, 5.X, and 4.X versions of vSphere. Certain disk configurations lack support; these include virtual disks that share a SCSI bus and disks available by in-guest SCSI initiators. All guest OSes supported by VMware vSphere are supported by Veeam Backup & Replication. Veeam supports hosts running Windows Server 2012 and 2012 R2, Windows Server 2008 R2 SP1, and Microsoft Hyper-V Server. Like VMware vSphere support, Veeam does not support in-guest iSCSI initiators or network shares.

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[48] http://software.dell.com/products/appassure/
[49] http://www.symantec.com/netbackup/system-requirements/
[50] https://support.symantec.com/en_US/article.DOC8623.html
[51] https://support.symantec.com/en_US/article.TECH59978.html
[52] https://support.symantec.com/en_US/article.DOC6472.html
[53] http://www.unitrends.com/solutions/what-we-protect/operating-systems

Figure 2 shows the compatibility and supported platforms of each product.

Feature	Dell AppAssure	Unitrends Enterprise Backup	Veeam Backup & Replication	Symantec NetBackup
Available as Windows Install	✓	✗	✓	✓
Available as Linux Install	✗	✗	✗	✓
Available as HP-UX Install	✗	✗	✗	✓
Runs on bare metal	✓	✓	✓	✓
Runs on virtual machine	Yes*	✓	✓	Yes*
Available as packaged appliance for Hyper-V/vSphere	✗	✓	✗	✗
Application aware	✓	✓	✓	✓
Supports public cloud storage	✓	✓	✓	✓
Hardware appliance	✓	✓	✗	✓
Supports WS2012R2	✓	✓	✓	✓
Supports WS2012	✓	✓	✓	✓
Supports WS2008R2	✓	✓	✓	✓
Supports WS2008	✓	✓	✓	✓
Supports WS2003	✓	✓	✓	✓
Supports RHEL	✓	✓	✓	✓
Supports Apple OS X	✗	✓	✗	✓
Supports FreeBSD	✗	✓	✗	✓
Supports IBM pSeries/AIX	✗	✓	✗	✓
Supports CentOS	✓	✓	✓	✓
Supports UCS backups	✗	✓	✗	✓

Figure 2: Platform support comparison.

CONCLUSION

Thanks to crucial features such as Virtual Standby, which gets data back into production quickly; Live Recovery, which prioritizes the data you need for recovery first; and Verified Recovery, which ensures data is intact, IT teams can rely on Dell AppAssure. Because it offers support for both physical and virtual environments and a broad selection of OSes and hypervisors, Dell AppAssure can ensure that businesses are ready if disaster strikes. Dell AppAssure offers an attractive mix of features and options that could make it the right choice to back up and protect your organization's data.

ABOUT PRINCIPLED TECHNOLOGIES

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We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

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We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help our clients assess how it will fare against its competition, its performance, its market readiness, and its quality and reliability.

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