Zerto | White Paper

Protect Applications, Not Just Data

BC/DR for Virtualized Applications

Protecting Tier-1 Applications with Zerto

When organizations are considering a business continuity/disaster recovery (BC/DR) solution, they look for a solution that not only protects and recovers the data, but also protects and recovers the application. Coordinating the state of the data and the state of the application is challenging – especially for tier-1, mission-critical applications, as they typically span multiple virtual machines, are more complex in terms of dependencies and infrastructure, have aggressive service-level agreements (SLAs), and require robust and effective recovery processes.

Zerto Virtual Replication provides award-winning replication and recovery with application awareness to align with the business' needs – application protection and availability. Zerto Virtual Replication is application agnostic, with features that enable automated replication and recovery no matter what type of application is being protected. Some features are inherent to Zerto Virtual Replication, and others leverage integration to deliver a higher level of awareness.

This paper covers each of these features in more detail.

Virtual Protection Groups – VM-level Consistency Grouping

Ensuring applications are protected and recovered consistently is a key requirement for a robust BC/DR solution and in virtual environments, this can be especially challenging. When a multi-tiered application such as SAP, Microsoft Exchange or an ERP instance has several virtual machines supporting it, those virtual machines can be located across disparate hosts and storage arrays, even different processor chip sets.

Zerto introduces an innovative paradigm called the Virtual Protection Group (VPG). A VPG groups together a number of VMs, regardless of their physical location from a host or storage perspective, consistently replicating these VMs using a group-level policy. Typically, VPGs are organized by the virtual machines that comprise a multi-tiered application, however they can consist of a single VM or VMs grouped in whichever manner is best for the business.

Zerto Virtual Replication ensures write-order fidelity of the VPG, so that the data is kept in the same sequence as it was written at the originating source. Write-order fidelity is maintained for all of the VMs within a VPG, even if they are located on a different physical host.

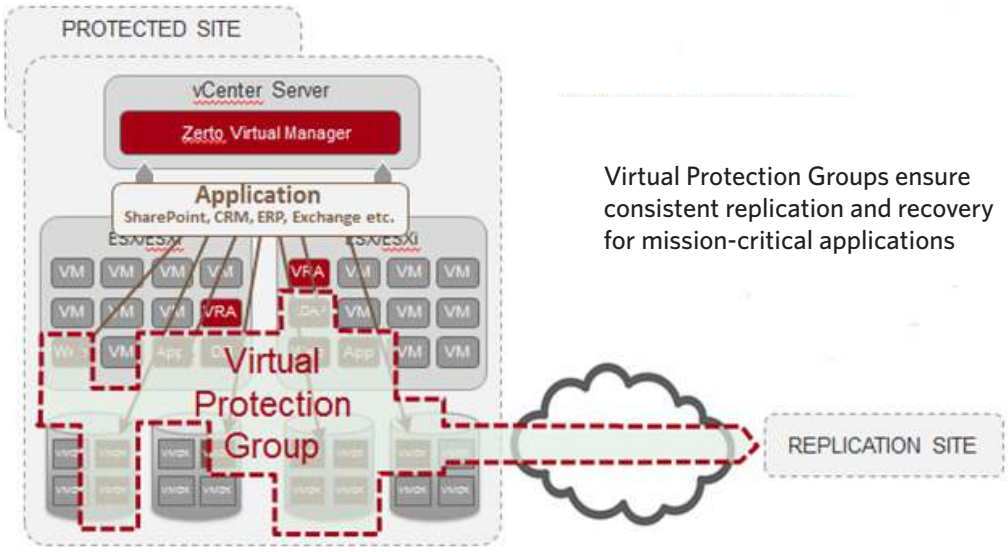
Zerto Virtual Replication Features

- VM-level consistency grouping
- Application protection policies
- Crash-consistent application recovery
- Microsoft VSS application consistency
- Oracle and database application consistency
- Recovery of specific application objects
- Consistent application recovery
- VMware vCloud Director vApp protection

Application Protection Policy

There are many policies that can be applied to the VPG, for example:

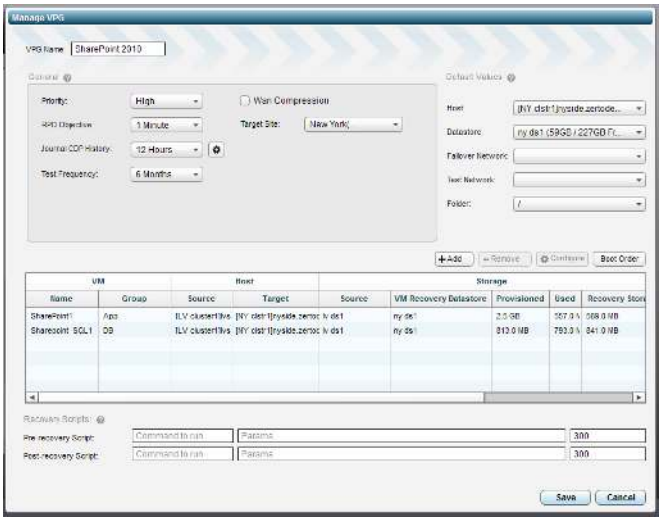
- **Replication Priority** – This will determine the throttling of the applications as they are replicated over the WAN in the event of WAN degradation, application bursting, or additional applications being brought online and protected
- **RPO** – The Recover Point Objective (RPO) is the maximum desired time in seconds between each automatic checkpoint being written to the journal, so the maximum amount of data the business is willing



Virtual Protection Groups ensure consistent replication and recovery for mission-critical applications

to lose – one minute worth of data for example. With Zerto's continuous replication, customers are able to sustain very low RPOs, as low as a few seconds

- **Journal CDP History** – The journal Continuous Data Protection (CDP) history acts like a DVR for the data. Each checkpoint is a recoverable point-in-time image with write-order fidelity and consistency guaranteed



Graphical user interface to create a VPG which enables the configuration of the priority of the VPG, RPO/RTO objectives, journal settings and many other critical features to ensure the business critical application is protected consistently.

These policies are applied to each VM within the VPG, even if a VM within the VPG is relocated by VMware features, like VMotion, DRS, Storage VMotion and others. Zerto Virtual Replication maintains protection of the relocated VM according to the policies set for the entire VPG. This is unique as most legacy replication solutions limit the use of Storage VMotion and Storage DRS, which limits the agility and value of the virtual infrastructure.

Crash-consistent Application Recovery

Zerto Virtual Replication writes a checkpoint to the journal every few seconds to deliver crash consistency and enable recovery to any point in time. This ensures the data and application are recoverable to the same point in time, delivering much lower RPOs and RTOs.

In addition to the automatic system checkpoints, checkpoints can be inserted manually, giving meaningful logic to a point-in-time image. For example, if there is an event that is going to take place, such as a firmware upgrade or end-of-quarter reporting, it makes sense to define a point in time prior to that event. If there are any issues, the system can easily recover to this point when the application and data were consistent, i.e. not corrupt.

Microsoft VSS Application Consistency

As discussed, Zerto Virtual Replication includes many features to support multi-tiered application recovery. All features outlined to this point are applicable to any application. Zerto Virtual Replication also includes additional integration for Microsoft Applications including Exchange, SQL, SharePoint, and other applications running on Windows OS, such as an Oracle database running on Windows.

Zerto Virtual Replication supports Microsoft Volume Shadow Copy Service (VSS), which provides an additional checkpoint. Zerto Virtual Replication enables adding application-consistent checkpoints that are based on VSS, providing a level above crash consistency.

With other replication products, utilizing VSS framework is done in large intervals due to the effect on production resultant from the time it takes to quiesce. The process to obtain a VSS application-consistent backup is as follows:

- The production application is frozen and a VSS copy is requested
- The application cache is flushed to disk, typically over the network
- A VSS backup is created
- The application is then thawed and production resumes

In non-Zerto Virtual Replication environments, this can take many, many seconds and in some cases, minutes. This is simply not manageable when the impact is to a mission-critical application. Businesses cannot sacrifice performance for end-users and applications that generate revenue, and in many cases, organizations will only take a VSS snapshot once daily or forgo the process altogether.

With Zerto, because the replication is continuous, this process is very fast – milliseconds fast. Because it is so fast, Zerto makes it possible to not only add a VSS checkpoint, but also to increase frequency of these checkpoints to offer more application-consistent data points and better overall accuracy. When a VSS checkpoint is created, the impact to end-users is virtually unnoticed, ensuring no impact to revenue-generating activities.

In summary, Zerto Virtual Replication's extremely low overhead and advanced hypervisor-based replication technology offers many more recoverable points in time, whether leveraging VSS or not, with almost zero impact to the application(s) and users.

Oracle and Database Application Consistency

Similar to a Microsoft VSS checkpoint, an Oracle database running in a Linux environment has a hot backup mode. Zerto leverages this process, which has steps similar to the VSS process:

- The database is quiesced and all table spaces are put into backup mode at the same time
- The backup executes, the data files are copied to disk and a point-in-time is captured
- The database is released from hot backup mode and production I/O resumes
- During this process, end users have access to the application

For a mission-critical application, this is not a viable solution for additional correlation points as the same limitations exist with hot backup mode for Oracle as with Microsoft VSS checkpoints. The application is unavailable for too many seconds, impacting end-user productivity.

Again, Zerto Virtual Replication offers continuous replication to enables a hot backup. The process is significantly accelerated and because it is so fast – as in milliseconds – the checkpoint frequency can be increased to offer more application-consistent data points and better overall RTOs and RPOs. When the hot backup is created, the end-user impact is virtually unnoticed, ensuring no impact to revenue generating activities.

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Consistent Application Recovery

With support for Microsoft VSS and database hot backups, the recovery of the application is greatly simplified and predictable. Zerto Virtual Replication provides many options in terms of points in time for recovery whether via application-consistent checkpoints or crash-consistent checkpoints within the CDP-based history journal. The application can be recovered quickly with minimal data loss and aggressive RTOs.

Without Zerto Virtual Replication, businesses must make a choice between either low RTO or low RPO; both cannot be achieved. If a low RPO is more critical, then the recovery will go to the latest data point. However, this means it will take longer to get the application online. If a low RTO is the primary objective, recovery will go to the last checkpoint, which could be hours ago as the frequency of checkpoints is significantly reduced in non-Zerto Virtual Replication environments.

Zerto Virtual Replication delivers both a low RTO and low RPO, avoiding the tradeoff that usually needs to be made for other solutions. Without Zerto, either the application can be available immediately, with a data loss of several minutes, or the application can be available in several minutes with minimal data loss. Zerto ensures that businesses can recover applications quickly with minimal data loss.

Recovery of Specific Application Objects

There are times when the application doesn't need to be recovered, and only one entity within the application needs to be recovered – for example, recovering a single file in a file system or one mailbox in an email application. Zerto Virtual Replication makes this possible.

Zerto Virtual Replication can be tested while the production environment is running and available to end users. With Zerto Virtual Replication's test mode capability, the file is located and sent to the production user. Zerto Virtual Replication allows for non-disruptive DR testing, which can be leveraged for non-disruptive file recovery.

vCloud Director vApp Protection

Zerto has deep integration into VMware vCloud Director, which ensures alignment between the vCD environment and the Zerto Virtual Replication environment. Zerto Virtual Replication VPGs can leverage vCD vApps, greatly simplifying the protection of applications and delivering another level of consistency between the overall virtualization strategy and the protection strategy.

Summary

Zerto Virtual Replication effectively protects and recovers virtualized mission-critical applications to minimize data loss and unavailability. For Microsoft Windows applications and both Windows and Linux databases, Zerto Virtual Replication supports advanced checkpoint features, minimizing RPOs and RTOs. This ensures a high degree of service continuity for mission-critical applications supporting revenue-generating activities and end-user productivity for the business. This is all performed with no implications to the design and architecture of the virtual infrastructure. Applications and resources can be protected and recovered independently of the physical location of the VMs from a host or storage perspective now or later.

To learn more, please go to www.zerto.com. ■

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Contact us today to learn more or request a free trial at **www.zerto.com** or **info@zerto.com.**

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