

**Zerto**



WHITE PAPER

# Application Protection with Zerto Virtual Replication

Maintaining Consistency Without Snapshots

VERSION 1.0  
NOVEMBER 2017

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## PROTECTING TIER-1 APPLICATIONS WITH ZERTO

When organizations are considering an IT Resilience 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 for tier-1, mission critical applications is especially challenging because they:

- typically span multiple hosts, clusters, and/or datastores
- are more complex in terms of dependencies and infrastructures
- demand extremely aggressive service-level agreements (SLAs)
- require robust and effective recovery processes

Zerto Virtual Replication (ZVR) 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

Traditionally, enterprises would take all the VMs that belong to a particular application and place them on the same storage LUN. The business would then snapshot that LUN and try to replicate and recover it to a consistent point in time for all VMs. This was made increasingly difficult with the advent of virtualization because application constituents began to live across disparate hosts and datastores.

Zerto took the concept of placing all the VMs on the same storage LUN and applied it across your entire storage environment, creating a Virtual Protection Group (VPG). A VPG groups together a number of VMs, regardless of their physical location within the infrastructure, and consistently replicate these VMs using group-level policy. These VPGs are normally organized by the virtual machines that comprise the multi-tiered application, however they can consist of just a single VM.

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.

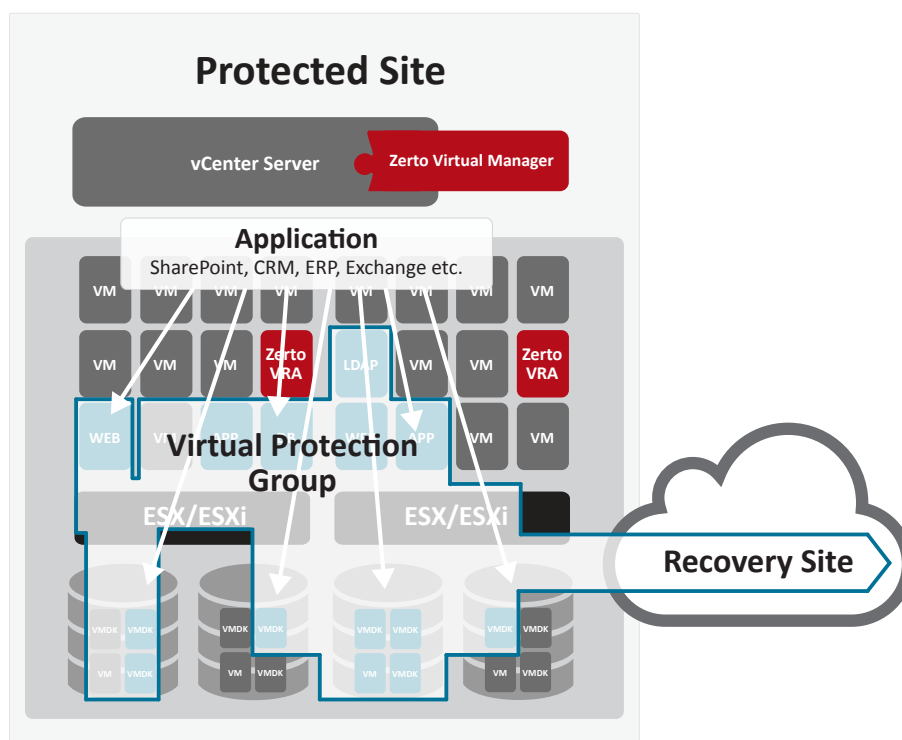
### Zerto Virtual Replication Features

- 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 Recovery Point Objective is the interval of time between each replication checkpoint. This is the maximum amount of data the business is able to tolerate losing in the event of a disruption. Utilizing continuous data protection (CDP), Zerto customers are able to see single-digit seconds of RPO
- **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



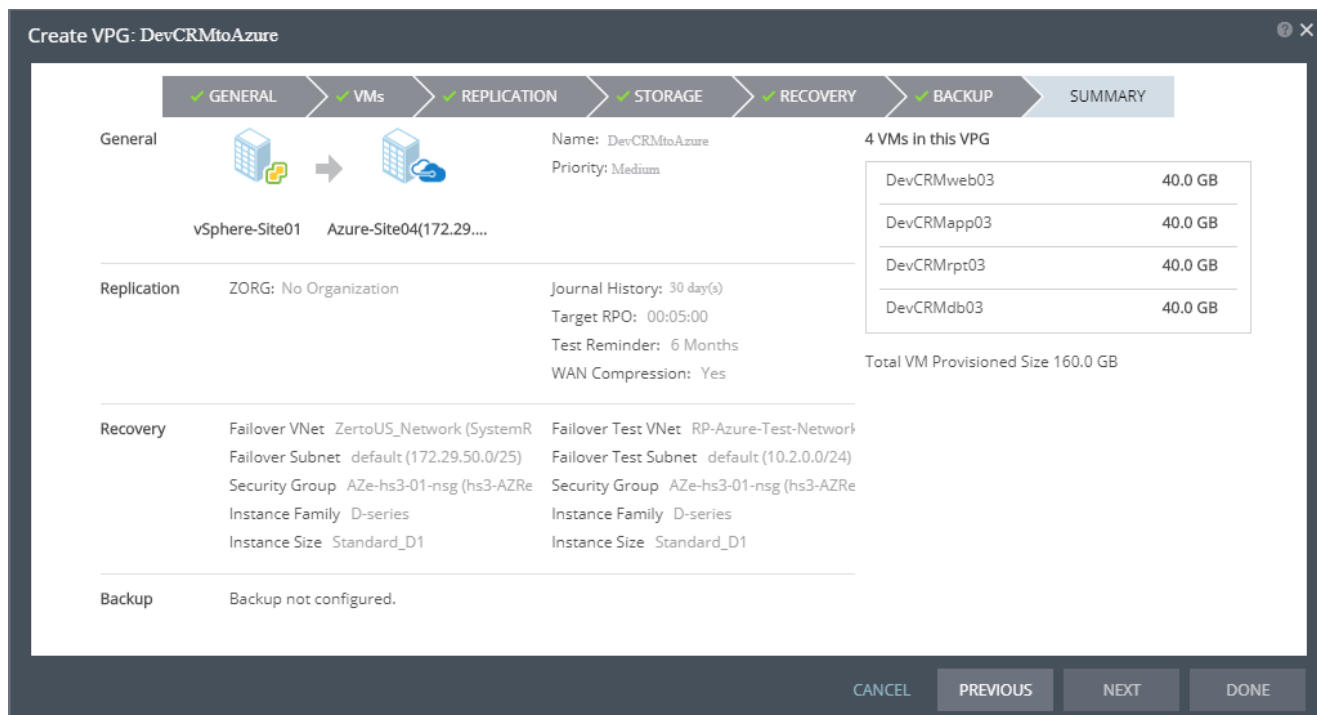
*Virtual Protection Groups ensure consistent replication and recovery for mission-critical applications*

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.



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.

## 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 resulting 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 or non-ZVR environments, this can take much longer, often 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.

Continuous data protection ensures that ZVR complete this task in seconds. Because the process is so fast, it is possible to not only add VSS checkpoint but also to increase the frequency of these checkpoints. In turn, this offers more application-consistent 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 data protection to enables a hot backup. The process is significantly accelerated and because it is so fast 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.

## 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. With legacy solutions, either the application can be available immediately with significant data loss, or the application suffers from longer recovery times with less data loss. ZVR 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 makes this possible with Journal File-Level Recovery (JFLR).

Zerto Virtual Replication can restore individual files and folders in the event of accidental deletions or corruptions such as Ransomware. This delivers an added layer of IT Resilience within your virtual or cloud environment.

## VCLLOUD 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.

## ABOUT US

Zunesis is a prominent IT solutions provider in enterprise infrastructure, Microsoft Cloud and on-premise solutions. Our home is in Colorado and we also have a significant business base in Las Vegas, Nevada. While we currently serve customers throughout the Rocky Mountain Region and Southwest US, our focus is Colorado and Nevada. Our many years of consistent success can be attributed to the fact that we have been able to attract and retain outstanding people, while making sure that our customers are successful. [www.zunesis.com](http://www.zunesis.com)

### About Zerto

Businesses need to be available to their customers, 24/7/365. Zerto provides Resilience for Evolving IT™ by ensuring enterprises and their customers always have access to business-critical applications without any IT interruption, downtime or delay. Zerto's award-winning Cloud Continuity Platform is the simplest, most reliable BC/DR software solution built to protect applications on any virtualized IT environment — be it public, private or hybrid cloud. Zerto's proactive approach to recovery gives companies the confidence they need to withstand any disaster, easily incorporate new technology, and quickly adapt to accommodate evolving IT and business priorities. [www.zerto.com](http://www.zerto.com)