

This document provides guidelines to use when setting up your disaster recovery environment using Zerto Virtual Replication to ensure the optimum performance for your environment.

Zerto Virtual Replication is designed to be scalable, supporting large environments as effectively as it supports small environments. When installing Zerto Virtual Replication it helps to know in advance what the normal usage is going to be in terms of the following:

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Number of Virtual Machines Requiring Protection

A Zerto Virtual Manager is installed on a Windows Server machine (2003 SP2 or higher, 2008, 2008R2, 2012 or 2012R2). This machine must be configured with enough CPUs and RAM to handle the number of virtual machines that can be protected or the number of peer sites paired with this Zerto Virtual Manager, as follows:

NUMBER OF VIRTUAL MACHINES OR PEER SITES		NUMBER OF CPUS	RAM SIZE
VIRTUAL MACHINES	PEER SITES		
Up to 750 virtual machines	Up to 5 peer sites	2 CPUs	4GB
Between 751-2000 virtual machines	Up to 15 peer sites	4 CPUs or 2 Dual Core CPUs	4GB
Over 2000 virtual machines	Over 15 peer sites	8 CPUs or 4 Dual Core CPUs	8GB

Each Zerto Virtual Manager can manage up to 5000 virtual machines, either being protected or recovered to that site.

You can only protect a virtual machine in a VPG when the virtual machine has no more than 60 disks. In VMware vSphere environments this requires 4 SCSI controllers each with a maximum of 15 disks. In Microsoft Hyper-V environments, this can be a combination of IDE and SCSI disks, where each virtual machine can have up to 2 IDE controllers each with a maximum of 4 IDE disks and up to 4 SCSI controllers each with a maximum of 15 disks, so that the total of IDE and SCSI disks does not exceed 60 disks.

The following limitations apply when protecting to AWS:

- You can only protect virtual machines in the protected site that are supported by AWS in the recovery site.
- You cannot protect machines that have a disk larger than 16TB.
- Amazon Web Services supports virtual machines running a Windows operating system with up to 26 volumes, including the boot disk.
- Amazon Web Services supports virtual machines running a Linux operating system with up to 40 volumes, including the boot disk.
- Virtual machines running a Linux operating system with more than 1 volume cannot be failed back from AWS after a failover or move operation.
- A Zerto Cloud Appliance can manage up to 200 virtual machines being recovered.

VRA Considerations

Each VRA can manage a maximum of 1500 volumes, whether these are volumes being protected or recovered.

The amount of memory allocated to a VRA when it is installed determines the maximum buffer size for the VRA for buffering IOs written by the protected virtual machines before the writes are sent over the network to the recovery VRA. The recovery VRA also buffers the incoming IOs until they are written to the journal. If a buffer becomes full, a `Bitmap Sync` is performed after space is freed up in the buffer.

AMOUNT OF VRA RAM	VRA BUFFER POOL SIZE
1GB	450MB
2GB	1450MB
3GB	2300MB
4GB	3,300MB
5GB	4,300MB
6GB	5,300MB
7GB	6,300MB
8GB	7,300MB
9GB	8,300MB
10GB	9,300MB
11GB	10,300MB
12GB	11,300MB
13GB	12,300MB
14GB	13,300MB
15GB	14,300MB
16GB	15,300MB

The protecting VRA can use 90% of the buffer for IOs to send over the network and the recovery VRA can use 75% of the buffer. That is, for example, a protecting VRA defined with 2GB of RAM can buffer approximately 1305MB before the buffer is full and a `Bitmap Sync` is required.

Zerto recommends using the default amount of RAM.

Note: The number of virtual machines that a VRA can support is not dependent on the amount of VRA RAM.

Database Considerations

Zerto Virtual Replication requires a database to manage information for disaster recovery. SQL Server Compact (SQL CE) is included as an internal database with Zerto Virtual Manager.

SQL CE has a maximum database size of 4GB. The larger the environment, the larger the database size that is required by Zerto Virtual Replication. When the database size reaches around 60% capacity, performance starts to degrade as database lookups take longer. Zerto recommends using Microsoft SQL Server for medium size and larger environments to prevent performance degradation. During the Zerto Virtual Replication installation you can specify that you want to use an SQL Server database for the Zerto Virtual Replication database. Zerto supports SQL Server Enterprise, SQL Server Standard and SQL Server Express editions.

Note: If SQL Server is used, it is your responsibility to make sure that database downtime is planned in coordination with your disaster recovery and business continuity requirements. During database downtime, there will be inconsistencies between Zerto Virtual Managers, such as the management of checkpoints, resulting in problems if a recovery is required.

Use the following tables to determine the deployment size and thus, the database to use for Zerto Virtual Replication. The criteria used to determine the deployment size are: number of hosts, sites, virtual machines, VPGs. When the deployment sizes

are different across the criteria, always choose the database based on the larger deployment size. For example, an environment with only 2 sites but 100 hosts is considered for Zerto Virtual Replication purposes as a medium-very large sized site and should use SQL Server.

Number of Hosts

NUMBER OF PROTECTING HOSTS	DEPLOYMENT SIZE	DATABASE TO USE
Up to 40 hosts	Very small-Small	Zerto Virtual Replication internal database
Over 40 hosts	Medium-Very large	SQL Server

Number of Sites

Usually, more hosts means more sites, especially when referring to cloud service providers (CSPs). The number of sites affects your decision to use the Zerto Virtual Replication internal database or SQL Server.

NUMBER OF SITES	DEPLOYMENT SIZE	DATABASE TO USE
Up to 4 sites	Very small-Small	Zerto Virtual Replication internal database
Over 4 sites	Medium-Very large	SQL Server

Number of Protected Virtual Machines

The number of protected virtual machines affects your decision to use the Zerto Virtual Replication internal database or SQL Server.

NUMBER OF VIRTUAL MACHINES	DEPLOYMENT SIZE	DATABASE TO USE
Less than 400	Very small-Small	Zerto Virtual Replication internal database
Greater than 400	Medium-Very large	SQL Server

Number of VPGs

The number of VPGs affects your decision to use the Zerto Virtual Replication internal database or SQL Server.

NUMBER OF VPGS	DEPLOYMENT SIZE	DATABASE TO USE
Less than 200	Very small-Small	Zerto Virtual Replication internal database
Greater than 200	Medium-Very large	SQL Server

WAN Bandwidth

When preparing your deployment, you need to verify that the connectivity between any two paired sites has bandwidth capacity that can handle the data to be replicated between the sites.

You must use a minimum dedicated bandwidth of at least 5 Mb/sec.

Zerto Virtual Replication employs sophisticated compression algorithms to reduce the bandwidth required between the sites. While compression can be very effective in reducing the bandwidth requirements, its efficiency is dependent on data characteristics.

Note: Zerto Virtual Replication can also work with third-party WAN optimization and acceleration technologies, such as those supplied by Riverbed Technologies and Silver Peak.

WAN sizing is described in the *Zerto Virtual Replication WAN Sizing* zip, which includes a WAN sizing calculator as well as details for WAN sizing.

Zerto Cloud Connector Considerations

A Zerto Cloud Connector requires the following, regardless of the size of the site:

- 4GB disk space
- At least 1GB of reserved memory.
- 1 vCPU.

Zerto recommends using a 10Gbps NIC for each Zerto Cloud Connector, enabling it to handle 10Gbps of traffic.

ABOUT ZERTO

Zerto is committed to keeping enterprise and cloud IT running 24/7 by providing scalable business continuity software solutions. Through the Zerto Cloud Continuity Platform, organizations seamlessly move and protect virtualized workloads between public, private and hybrid clouds. The company's flagship product, Zerto Virtual Replication, is the standard for protection of applications in cloud and virtualized datacenters.

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For further assistance using Zerto Virtual Replication, contact Zerto support at support@zerto.com.