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VSS-DEP-UG-7.5
Zerto Environment with VSS - Deployment and User Guide

This document provides the guidelines to install and utilize the ZertoVSSAgent with your Zerto environment.

Considerations when using VSS with your Zerto environment:

- A product transition is not allowed and requires a fresh install.
- If you are using a non-VSS Zerto product, and would like to work with VSS, you will need to re-install the entire environment.
- A VSS product can upgrade only to a VSS product and vice versa.
- A VSS product can pair and communicate only with a peer ZVM of the same product type. If incompatibility occurs, an alert or pop up will appear.

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Installing the VSS Agent

The Microsoft Volume Shadow copy Service (VSS) enables taking manual or automatic backup copies or snapshots of data, even if it has a lock, on a specific volume at a specific point-in-time over regular intervals. This ensures not just that the data is crash consistent but also application consistency if recovery is needed.

Zerto enables adding checkpoints to the journal that are synchronized with VSS snapshots.

To use Zerto with VSS and to ensure application consistency, you must install ZertoVssAgent on every virtual machine that uses VSS, and that you want to protect with Zerto.

You can install the ZertoVssAgent on the following supported Windows operating systems:

<table>
<thead>
<tr>
<th>Operating Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows Server 2008, all versions (SPs and R2)</td>
</tr>
<tr>
<td>Windows Server 2012, all versions (SPs and R2)</td>
</tr>
<tr>
<td>Windows Server 2016</td>
</tr>
</tbody>
</table>
Consider the following:

- Only a single virtual machine in a VPG can have application consistent checkpoints, and the VSS checkpoint is only applied to the virtual machine where the ZertoVssAgent is installed.
- Thus, even if more than one virtual machine runs VSS, you only install the Zerto VssAgent on one of the virtual machines in the VPG.
- Also, the virtual machine where the ZertoVssAgent is installed must have network connectivity to the local Zerto Virtual Manager in order to be able to add VSS checkpoints successfully.

**To install the ZertoVssAgent:**

1. Download the ZertoVssAgent, ZertoVss64Agent.msi, from the Zerto Support Portal downloads page, to the virtual machines that use VSS, and which you want to protect with Zerto.
2. Log in as an Administrator to the virtual machine that uses VSS, and which you want to protect.
3. Navigate to and run the ZertoVss64Agent.msi file.
   - Only a single virtual machine in a VPG can have application consistent checkpoints.
   - The VSS checkpoint is only applied to the virtual machine where the ZertoVssAgent is installed.
   - Even if more than one virtual machine runs VSS, you only install the Zerto VSSAgent on one of the virtual machines in the VPG.
   - The virtual machine where the ZertoVssAgent is installed must have network connectivity to the local Zerto Virtual Manager in order to add VSS checkpoints successfully.
4. For ZVR versions up to v6.0U1, enter the license key and click Validate.
5. For ZVR versions from v6.0U2, there is no need to enter a license key.
6. Run the ZertoVssAgent on the virtual machines that use VSS and that you want to protect.
7. Follow the wizard through the installation.
   
   The Zerto Virtual Manager Connections Settings dialog is displayed.
8. Specify the IP address and HTTP port number for the Zerto Virtual Managers managing the protection of the virtual machines, both for the local site and optionally, for the paired, remote site.

- If the same hypervisor manager is used both for protecting and recovering virtual machines, specify the IP address and HTTP port number for the single Zerto Virtual Manager installed.

- The default HTTP port number when Zerto is installed is 9080.

- If you enter a wrong IP address or port you can correct the address or port after the installation completes by editing the ZertoVssAgentGUI.exe.conf file in the ZertoVssAgent folder under the folder where the ZertoVssAgent is installed, for example, C:\Program Files\Zerto.

9. Click OK.

The ZertoVssAgent is installed and the Add VSS Checkpoint icon is placed on the desktop. The agent runs as a Windows service, ZertoVssprovider.

For more details about the ZertoVssAgent, see the Zerto Virtual Manager Administration Guide.

Ensuring Application Consistency – Adding Checkpoints

Checkpoints are recorded automatically every few seconds in the journal. These checkpoints ensure crash-consistency, and are written to the virtual machines journals by the Zerto Virtual Manager (ZVM).

Each checkpoint has the same timestamp which is set by the ZVM. During recovery you pick a checkpoint in the journal and recover to this point. The crash-consistent checkpoints guarantee write order fidelity.

For example:

If write A on a virtual machine in the VPG occurred before write B, then when a checkpoint is written, the journal will contain:

- Neither of the writes.
- Both writes, and if they overlap, the B data takes precedence.
Only A, indicating the checkpoint occurred between A and B.

The coordination is done by the Zerto Virtual Manager.

You can also integrate Microsoft Volume Shadow Copy Service (VSS) with Zerto to ensure transaction consistency in a Microsoft Windows server environment.

You can use a script to place the application in a quiesced mode, such as Oracle Hot Backup mode, and execute the Zerto PowerShell cmdlet Set-Checkpoint, then release the quiesced mode. For more information about Zerto PowerShell cmdlets, see Zerto Virtual Replication Cmdlets.

Note:
- VSS Checkpoint insertion is not supported in VPGs replicated from AWS or Azure.
- To write application-consistent checkpoints, there is a performance impact on the virtual machine running the application as a result of the application-consistent mechanism used, such as VSS. This occurs since the guest operating system and any integrated application will be quiesced.

This impact on performance may be negligible and does not always happen since not all applications require these checkpoints in order to achieve successful application recovery. Also, Zerto only requires the guest and application to quiesce for a brief moment, just long enough to add a checkpoint.

As previously mentioned, checkpoints are recorded every few seconds in the journal. After a while, the number of checkpoints available from which to choose a recovery point can be in excess of thousands per VPG.

When this threshold is reached, in order to enable efficient management and use of the checkpoints, the number of checkpoints is diluted with respect to time, as follows:
- Within the latest 2 hours: All of the checkpoints are available for recovery.
- Between 2 and ~4.5 hours: There are about two to three checkpoints every 15 minutes.
- From 4.5 hours and over: 1 checkpoint is kept every 15 minutes.

Checkpoints which are either added manually, or marked as part of a Failover Test are not diluted.

VSS Checkpoints will have a VSS Checkpoint prefix. The recommended way to find VSS Checkpoints is to filter the Checkpoint column by the desired prefix.

Once the ZertoVssAgent is installed, you can add a checkpoint to the Zerto environment via the Add VSS Checkpoint dialog, via the command line, or as a scheduled task. The ZertoVssAgent ensures that the virtual machine is in an application consistent state and then sends the checkpoint to the Zerto Virtual Manager, which then adds the checkpoint to the journals for the VPG containing that virtual machine.

The checkpoint is logged for the entire VPG, however any other virtual machine in the VPG will have a crash-consistent checkpoint.

Adding a Checkpoint via the Add VSS Checkpoint Window on page 7
Adding a Checkpoint via the Add VSS Checkpoint Window

You may increase scalability by adding additional checkpoints.

To add a checkpoint via the Add VSS Checkpoint window:

1. On a virtual machine where the ZertoVssAgent has been installed, click Start > Programs > Zerto Virtual Replication > Add VSS Checkpoint or double-click the Add VSS Checkpoint icon on the desktop.

   The Add VSS Checkpoint window is displayed.

2. Enter a name for the checkpoint.

3. Click OK.

   A message that the process was completed is displayed on the machine where the ZertoVssAgent was installed.

   The handling of the checkpoint by the Zerto Virtual Manager is done asynchronously and you can check via the recent tasks list in the Zerto User Interface that the checkpoint is added in the VPG.

Adding a Checkpoint via the Command Line

You may increase scalability by adding additional checkpoints.

To add a checkpoint via the command line:

1. As an administrator, open the command line dialog.

2. Navigate to the directory where the ZertoVssAgent is installed. The default location is:

   C:\Program Files\Zerto\ZertoVssAgent

3. In the command line, run the following:

   ```
   ZertoVssAgent.exe <localURL> <localPort> <remoteURL> <remotePort> <checkpoint>
   ```

   where:
<localURL> The URL for the Zerto Virtual Manager that manages the protected site.
<localPort> The HTTP port for the Zerto Virtual Manager that manages the protected site.
<remoteURL> The URL for the Zerto Virtual Manager that manages the recovery site.
<remotePort> The HTTP port for the Zerto Virtual Manager that manages the recovery site.
<checkpoint> The name of the checkpoint.

A message that the process was completed is displayed on the machine where the ZertoVssAgent is installed. The handling of the checkpoint by the Zerto Virtual Manager is done asynchronously and you can check via the recent tasks list in the Zerto User Interface that the checkpoint is added in the VPG.

Scheduling Checkpoints
To ensure consistency of your environment we recommend creating scheduled checkpoints.

To schedule checkpoints:

1. Open the Task Scheduler.
2. Under the Actions menu item, select Create Task.
   The Create Task dialog is displayed.

3. Enter the following:
   - **Name**: A name for the task.
   - **Run whether the user is logged on or not**: Make sure that this is checked.
   - **Run with highest privileges**: Make sure that this is checked.

   The Windows Scheduled Task will be created and run by the currently logged in user. After the task is created, Zerto recommends changing this to NT AUTHORITY\Network Service permissions and follow the steps to allow the correct permissions as described in Setting COM Permissions for VSS when Access Denied Errors are Received on page 10.
4. Select the Triggers tab and configure a new trigger.
5. Select the **Actions** tab and create a new action to start the ZertoVssAgent with the **IP address** and **port** of the Zerto Virtual Manager and the **checkpoint** to use. For example:

```
C:\Program Files\Zerto\ZertoVssAgent\ZertoVssAgent.exe and 106.18.206.10 9080 106.18.206.10 9080 "VSSTaskCP"
```

That is, with the format: `<protecting_ZVM_IP> 9080 <recovery_ZVM_IP> 9080 "<CP_name>"`

6. Click **OK**.

7. Select the **Settings** tab and make changes as required. Make sure **Stop task if it runs longer than** is **not** selected.

8. Click **OK**.

There are certain permissions required for the Windows scheduled task to execute successfully. For example, you may see the following in the event logs:

```
Volume Shadow Copy Service error: Unexpected error querying for the IVssWriterCallback interface. hr = 0x80070005
```

This is often caused by incorrect security settings in either the writer or requester process.

If this is the case, the service which runs the Windows Scheduled Task must have NT AUTHORITY\Network Service permissions or be using the SYSTEM account to run the task. VSS operations are performed as NT AUTHORITY\Network Service which is not granted COM access by default on the service assigned to Windows Scheduled Tasks.

9. The following procedure is **only** required if the windows scheduled task uses the **Network Services** account.

The correct permissions can be assigned by using the Component Services application, accessed by running `dcomcnfg.exe`, in the windows guest.
Setting COM Permissions for VSS when Access Denied Errors are Received

Use the following procedure to set COM permissions for VSS when Access Denied errors are received.

➢ To set COM permissions for VSS when “Access Denied” errors are received:

1. Run `dcomcnfg.exe`.
   
   The Component Services dialog is displayed.

2. Expand the Component Services node to My Computer and right-click to access the **Properties** menu.
   
   The My Computer Properties dialog is displayed.

3. Select the **COM Security** tab and under **Access Permissions**, click **Edit Limits**.

4. Add the **NETWORK SERVICE** local access.

5. Click **OK** and verify that the user is now in the **Access Permission** list.
6. Click **OK** to commit these changes.

   Access Denied messages should no longer be written in the event viewer for VSS.

   - Additionally, you can grant **Network Service** full control over `HKLM\SYSTEM\CurrentControlSet\Services\VSS\Diag`.

   - You can also check this key `HKLM\SYSTEM\CurrentControlSet\Services\VSS\VssAccessControl` which should at least contain the `DWORD NT Authority\NetworkService`. Set to value **1**.

   - You may also add a new `DWORD` like `DOMAIN\MyZertoServiceUserAccount` and set its value to **1**.

### Changing the Zerto Virtual Manager Used by the ZertoVssAgent

When you install the ZertoVssAgent, you specify the ZVM that is used to manage the addition of checkpoints for the virtual machines that uses VSS and that you want to protect in VPGs. You can change the IP and port of the VPG that you specified during the installation either by rerunning the installation and selecting the Repair ZertoVssAgent option or by editing IP and port values in the `ZertoVssAgentGUI.exe.conf` file in the folder where the ZertoVssAgent is installed.
Zerto enhances the Zerto IT Resilience Platform by converging disaster recovery and backup to deliver continuous availability within a simple, scalable platform. Zerto delivers enhanced analytics, platform improvements and cloud performance upgrades required in the future of IT resilience.

Learn more at Zerto.com.

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