



Pure Storage VSS Hardware Provider Guide

Version 1.1.0

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Introduction

The Pure Storage VSS Hardware Provider (VSS Hardware Provider) allows users to generate volume snapshots while applications continue writing to the Pure Storage FlashArrays.

The VSS Hardware Provider leverages the Microsoft Volume Shadow Copy Service (VSS) to orchestrate the process, ensuring that snapshots (shadow copies) are generated only when the volumes are in a stable and consistent state. Once generated, the snapshots are saved to the Pure Storage FlashArray.

During snapshot generation, the VSS Hardware Provider uses the REST API to communicate with the FlashArray. For more information about the REST API, refer to the *Pure Storage REST API Guide* on the [Pure1 Support](#).

To use the VSS Hardware Provider, you must install the Pure Storage VSS Hardware Provider to the Windows host machine. The host machine can be a physical Windows operating system or a Windows guest operating system on a virtual machine.

After you install the VSS Hardware Provider, run the Pure Storage VSS Tool (PureProviderConfig) to register the FlashArrays to the VSS Hardware Provider. You can register an unlimited number of FlashArrays to the VSS Hardware Provider.

After the FlashArray details have been added, use a backup and recovery tool, such as Diskshadow (included in Windows Server), to generate and restore volume snapshots.

Audience

The audience groups for the VSS Hardware Provider Guide are:

- Pure Storage partners and solutions engineers, who install the VSS Hardware Provider.
- Pure Storage system administrators, who add FlashArray details to the VSS Hardware Provider and generate volume snapshots.

Users should be familiar with the Windows environment, the Purity system, storage, and networking concepts.

Process

The following process represents the high-level overview of the steps you need to perform to install, configure, and administer the Pure Storage VSS Hardware Provider. Refer to the subsequent pages for detailed installation and configuration steps.

The Pure Storage VSS Hardware Provider installation, configuration, and administration process includes the following steps:

1. **Install the Pure Storage VSS Hardware Provider to the Windows host.** The VSS Hardware Provider is packaged with the Purity release. Installing the VSS Hardware Provider is a one-time process.

From the [Pure Storage VSS GitHub page](#), download the Pure Storage VSS Hardware Provider installer. Launch the Provider Setup Wizard on the Windows Host.

After you complete the installation, add FlashArray details to the VSS Hardware Provider.

2. **Add FlashArray to the Pure Storage VSS Hardware Provider.** Open a command prompt and run the `PureProviderConfig` command to add array details to the VSS Hardware Provider. You can add an unlimited number of arrays at any time to the VSS Hardware Provider.
3. **Generate snapshots.** Use a backup and recovery tool that follows the Microsoft VSS standards to generate and restore volume snapshots.

Install the VSS Hardware Provider

The VSS Hardware Provider installation process involves downloading and running the Pure Storage VSS Hardware Provider Setup Wizard. Installation is a one-time process. After installation, you must add at least one FlashArray to the VSS Hardware Provider.

VSS Hardware Provider Pre-Installation Tasks

Before you install the VSS Hardware Provider, review the release notes, verify that your system meets the minimum requirements, and verify that you have the appropriate privileges to perform the installation.

Verify the System Requirements

- Consider space consumption when you generate snapshots. Contact Pure Storage Support (support@purestorage.com) or your Purity representative to understand the limits for your FlashArray.
- Verify that the Windows server system is connected to the Purity FlashArray with Pure Storage REST API 1.1 or later. To determine the REST API versions for a Purity release, enter the URL `https://host/api/api_version`.

The REST API version numbers are returned as a list.

For more information about the REST API, refer to the *Pure Storage REST API Guide* in the [Pure1 Support](#).

- Verify that the Purity FlashArray can communicate with the Windows host via iSCSI or Fibre Channel.

Verify that your system meets the minimum requirements to upload and install the VSS Hardware Provider.

- Verify that your Windows Server supports TLS 1.1 or TLS 1.2.
- Verify the Windows Server operating system version. The supported versions are:
 - Windows Server 2008 R2 SP1 (64-bit)
 - Windows Server 2012 (64-bit)
 - Windows Server 2012 R2 (64-bit)

The Windows Server host machine can be a physical Windows operating system or a Windows guest operating system on a VMware ESXi or Windows Hyper-V virtual machine.

Refer to the Pure Storage *Windows Server: Best Practices* guide in the [Pure1 Support](#) for recommended best practices for provisioning and using a Pure Storage FlashArray.

Note: Windows Server 2008 R2 by default does not support TLS 1.1 or higher. Manually enable TLS 1.1 or TLS 1.2 on the Windows Server.

Verify the User Privileges

Verify that you have Windows host administrator privileges to install the VSS Hardware Provider on the Windows host.

VSS Hardware Provider Installation

Note: you can run an unattended install with the command line PureVSSInstaller.exe /s.

To install the Pure Storage VSS Hardware Provider to the Windows host:

1. Go to the [Pure Storage VSS GitHub page](#).
2. Click on PureVSSInstall.exe and save the .exe to the Windows host that will connect to the FlashArray.
3. On the Windows host, run the PureVSSInstaller.exe file to launch the Pure Storage VSS Hardware Provider Setup Wizard. The *Welcome* screen appears.
4. Click **Next** to begin the installation. The *End-User License Agreement* screen appears.
5. If you accept the agreement, select the check box and click **Next**. The *Destination Folder* screen appears.
6. Specify the location where you want to install the VSS Hardware Provider files. The default location is C:\Program Files\Pure Storage\VSS\Provider\.
7. Click **Next**. The *Ready to install* screen appears.
8. Click **Install** to install the VSS Hardware Provider. After the installation is complete, the post-installation screen appears confirming that you have successfully completed the installation.
9. Click **Finish** to close the installer.
10. Open a command prompt and run the following command to verify that the Pure Storage VSS Hardware Provider has been successfully installed:

```
vssadmin list providers
```

The following message appears:

```
* Provider Id: <ID Number>
  Type: [3] VSS_PROV_HARDWARE
  Name: Pure Storage VSS Hardware Provider
  Version: <Pure Storage VSS Hardware Provider Version Number>
```

Once the installation is complete, you must register at least one FlashArray to the VSS Hardware Provider.

Add (Register) Array Details to the VSS Hardware Provider

You must have Windows host administrator privileges to add FlashArray details to the VSS Hardware Provider.

To add FlashArray details to the VSS Hardware Provider:

1. Open a command prompt.
2. Run the ping command verify that the virtual IP address of the FlashArray is network accessible.

For example,

```
ping <virtual IP address of the FlashArray>
```

3. Go to the directory C:\Program Files\Pure Storage\VSS\Provider\
4. Run the following PureProviderConfig command to add the FlashArray configuration to the registry:

```
PureProviderConfig add --url URL --user USER --password PASSWORD ARRAY
```

Where,

ARRAY – Friendly name of the FlashArray to be added to the VSS Hardware Provider. The name does not have to match the FlashArray host name.

--url – Host Name of the FlashArray, virtual IPv4 or IPv6 address.

--user – Username for the Purity administrative account.

--password – Password for the Purity administrative account. Optional. If you do not specify the password in the command line, a password prompt appears after you press Enter.

For example,

```
PureProviderConfig add --url https://123.123.123.123 --user pureuser --password purepassword pure01
```

```
PureProviderConfig add --url 2001:db8::2:1 --user pureuser --password purepassword pure02
```

```
PureProviderConfig add --url https://[2001:db8:0:0:0:0:2:1] --user pureuser --password purepassword pure03
```

5. Run the following command to restart the PureProvider service:

```
PureProviderConfig restartprovider
```

You are now ready to use a backup and recovery tool to generate volume snapshots via the VSS Hardware Provider.

Generate and Restore a Snapshot Using Diskshadow (Use Case)

The Diskshadow.exe command line utility that is included in Windows Server generates shadow copies (volume snapshots). However, any requestor that follows the Microsoft VSS standards can be used to generate shadow copies.

The following example outlines the steps on how to generate a snapshot of the D drive and then restore and mount the snapshot as drive Z.

To generate a snapshot of the D drive:

1. From a command prompt, enter Diskshadow and start a full backup session. For example,

```
C:\> diskshadow
```

```
DISKSHADOW> begin backup
```

2. Set the metadata file for creating snapshots. Set the shadow copy to persist after a computer restart and allow the shadow copy to be transportable (able to be imported on another machine).

```
DISKSHADOW> set context persistent
```

```
DISKSHADOW> set option transportable
```

```
DISKSHADOW> set metadata "<absolute path and file name of the CAB file>"
```

For example,

```
DISKSHADOW> set context persistent
```

```
DISKSHADOW> set option transportable
```

```
DISKSHADOW> set metadata "C:\Program Files\Pure Storage\VSS\BackupFile.cab"
```

3. Add the FlashArray volume to where the snapshots should be saved. You can give a name (e.g., Example) to the shadow ID.

```
DISKSHADOW> add volume d: alias Example
```

4. Optionally, turn on the verbose switch to view the shadow copy actions.

```
DISKSHADOW> set verbose on
```

5. Type create to generate a shadow copy:

```
DISKSHADOW> create
```

- Diskshadow creates the shadow copy of the drive D.

A message appears, confirming the number of shadow copies generated. For example:

```
Querying all shadow copies with the shadow copy set ID <2b1ab55e-3357-4ffc-87bc-4bfbff80de85>
* Shadow copy ID = <5814c417-74bf-40a7-ae67-abbd40a4ff76>           %VSS_SHADOW_1%
  - Shadow copy set: <2b1ab55e-3357-4ffc-87bc-4bfbff80de85>           %VSS_SHADOW_SET%
  - Origin count of shadow copies = 1
  - Original volume name: \\?\Volume{83e995a8-f0f0-11e3-80f9-000c29b649e2}\ [D:\]
  - Creation time: 6/13/2014 10:45:29 AM
  - Shadow copy device name: \\?\Volume{83e995cd-f0f0-11e3-80f9-000c29b649e2}
  - Originating machine: mohaewin2012r2
  - Service machine: mohaewin2012r2
  - Not exposed
  - Provider ID: {781c006a-5829-4a25-81e3-d5e43bd005ab}
  - Attributes: Auto_Release Hardware

Number of shadow copies listed: 1
DISKSHADOW> _
```

The *Shadow copy set* number represents the unique ID number created by the VSS Hardware Provider for the generated snapshot.

The *Provider ID* number represents the Pure Storage VSS Hardware Provider ID.

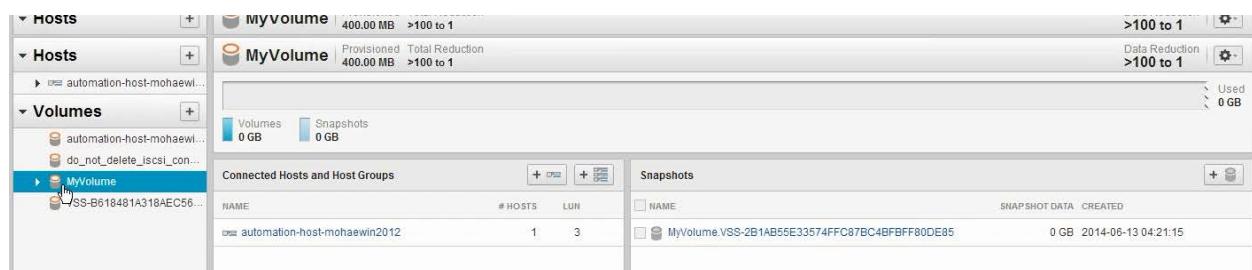
Note: Run the Diskshadow command `list providers` to see the Provider ID assigned to each Microsoft VSS provider.

- End the backup session:

```
DISKSHADOW> end backup
```

To verify that the snapshot has been created:

- Log in to the Purity GUI and select **Storage > Volumes**. For example:



The snapshot you created appears in the *Snapshots* window with the following naming convention appears:

`<Original FlashArray Volume Name>.VSS-<GUID generated by the VSS Hardware Provider>`

The snapshot GUID name matches the VSS Hardware Provider *Shadow copy set* number.

To restore the snapshot and mount the snapshot as drive Z:

1. From the Diskshadow command prompt, load the metadata file. For example,

```
DISKSHADOW> load metadata "<absolute path and file name of the CAB file>"
```

2. Import the transportable shadow copy from the loaded metadata file. For example,

```
DISKSHADOW> import
```

3. Expose the persistent shadow copy as a drive letter. For example,

```
DISKSHADOW> expose %Example% Z:
```

The restored snapshot (and all of its contents) appears in the newly created Z drive.

Log in to the Purity GUI and select **Storage > Volumes**. The restore volume snapshot appears in the *Volumes* window of the navigation pane with the following naming convention:

VSS-<Snapshot Serial ID number>

Notes:

- The maximum number of volumes on the same host is limited to 26 drive letters (A to Z).
- If you are restoring the shadow copy to a virtual machine, you must manually mount the volume. For ESXi, mount the volume as a Raw Device Mapping (RDM) file. For Hyper-V, use a pass-through disk to mount the volume.

CLI Commands

The Pure Storage VSS Hardware Provider includes a set of CLI commands.

pureplugin

pureplugin is the Purity CLI command that manages the Pure Storage FlashArray plugins and extensions.

pureplugin list

- Display the plugin or extension name, version, and location.

Example - Display installed plugin and extension details

```
$ pureplugin list
Name      Version      Url
vSphere   2.0.10      -
VSS       1.0.2       https://10.42.18.62/download/purestorage-vss-
                  plugin.zip?version=1.0.2
```

PureProviderConfig

The **PureProviderConfig** command administers the VSS Hardware Provider.

PureProviderConfig is available as a CLI command after the VSS Hardware Provider is installed.

Note: Type **-h** or **--help** with any command to display a brief syntax description.

PureProviderConfig add

- Add a FlashArray to the VSS Hardware Provider. The changes take effect after you run **PureProviderConfig restartprovider** to restart the PureProvider service.

Example 1 - Add the **pure01** array to the VSS Hardware Provider, specifying the Purity user password in the command line

```
PureProviderConfig add --url pure01.example.com --user pureuser --password
password pure01
```

| Array Name | URL | Compatible | Online |
|------------|-----------------------------|------------|--------|
| pure01 | https://pure01.example.com/ | yes | yes |

Example 2 - Add the **pure01** array to the VSS Hardware Provider, entering the Purity user password through the interactive prompt

```
PureProviderConfig add --url pure01.example.com --user pureuser pure02
```

Enter user password:

| Array Name | URL | Compatible | Online |
|------------|-----------------------------|------------|--------|
| pure02 | https://pure01.example.com/ | yes | yes |

PureProviderConfig list

- Display the following VSS Hardware Provider attributes:
 - **URL**. Name or virtual IP address of the FlashArray.
 - **Compatible**. Compatibility of the VSS Hardware Provider version with the Pure Storage REST API version. The VSS Hardware Provider will not register the FlashArray if the VSS Hardware Provider version is not compatible with the REST API version.
 - **Online**. Status of the FlashArray as online (yes) or offline (no). If the array status is offline, verify that Purity is running, and assure network connectivity between the host and the virtual IP of the FlashArray.
 - **Authenticated**. Given the username and password, specifies whether or not the VSS Hardware Provider is able (yes) or not able (no) to authenticate the user on the FlashArray.
 - **Array Name**. Name of the FlashArray that has been added (registered) to the VSS Hardware Provider.

Example - Display a list of FlashArrays that have been registered in the VSS Hardware Provider

```
PureProviderConfig list
```

| URL | Compatible | Online | Authenticated | Array Name |
|-----------------------------|------------|--------|---------------|------------|
| https://pure01.example.com/ | yes | yes | yes | pure01 |

PureProviderConfig log

- View the attributes, enable/disable logging, and change the log level for the Pure Storage VSS Registration Tool and VSS Hardware Provider.

Valid log levels are:

- 0=LOG_ERROR
- 1=LOG_WARN
- 2=LOG_INFO
- 3=LOG_DEBUG
- 4=LOG_TRACE

Example 1 - Display the status and log levels

```
PureProviderConfig log --status
Log Enabled
Log Level: 2[INFO]
```

Example 2 - Disable logging

```
PureProviderConfig log --disable
Log Disabled
```

Example 3 - Change the log level

```
PureProviderConfig log --enable --loglevel 3
Log Enabled
```

Log Level: 3[DEBUG]

PureProviderConfig remove

- Delete the FlashArray from the VSS Hardware Provider. The changes take effect after you run `PureProviderConfig restartprovider` to restart the PureProvider service.

Example - Delete array `pure01` from the VSS Hardware Provider

```
PureProviderConfig remove pure01
Name
pure01
```

PureProviderConfig restartprovider

- Restart the PureProvider service

Example - Restart the PureProvider service

```
PureProviderConfig restartprovider
Pure Storage PureProviderConfig version 1.0.2.43.2015-12-23_23-05-47 (64-
bit Release)
Copyright (C) 2016 - Pure Storage. All rights reserved.
On Computer: VSS-WIN2008R2-T - Windows 6.1 (7601)
Supported REST version is 1.1
Successfully restarted 'Pure Storage VSS Hardware Provider (64-bit)'.
```

PureProviderConfig setattr

- Modify the VSS Hardware Provider attributes. If you are renaming the FlashArray, the array name must be less than 32 characters long. The changes take effect after you run `PureProviderConfig restartprovider` to restart the PureProvider service.

Example 1 - Rename the FlashArray in the VSS Hardware Provider. The command only changes the array name in the VSS Hardware Provider; it does not change the Purity array name.

```
PureProviderConfig setattr --newname FlashArray pure02
Array Name      URL                  Compatible  Online
FlashArray     https://pure01.example.com/    yes        yes
```

Example 2 - Change the URL address of the FlashArray

```
PureProviderConfig setattr --url pure02.example.com FlashArray
Array Name      URL                  Compatible  Online
FlashArray     https://pure02.example.com/    yes        yes
```



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