



# Backup Agent Guide

Zen v16

Activate Your Data™



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# Welcome to Backup Agent

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Backup Agent provides an alternative method for implementing the Continuous Operations function provided with Zen.

This documentation provides a guide for getting started with and using Backup Agent. It provides information for users who install and run Backup Agent. This manual is also useful for programmers and system administrators responsible for performing live backups of Zen databases.

Topics include installation requirements and instructions, usage, and reference material for incorporating the Backup Agent into your application. Answers to common questions following an installation are also included.

In this section you will find the following topics:

- [Backup Agent Overview](#)
- [Backup Agent Components](#)
- [Database Engine Requirements for Backup Agent](#)



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## Backup Agent Overview

Backup Agent provides a quick and simple method for you to set and manage Continuous Operations on your Zen database files. Setting and managing Continuous Operations is a critical piece when backing up your Zen databases. Backup Agent automatically handles setting and managing Continuous Operations on your open files so that your data is still available from your application during your backup. Once the backup procedure is complete, stopping Backup Agent automatically takes the files out of Continuous Operations and rolls in all the changes captured during the backup.

### Product Features

Backup Agent works seamlessly with many of the most popular backup applications on the market today.

Backup Agent automatically manages files that are opened during a backup for you, unlike the Continuous Operations feature in the Zen utilities, which requires that you to enter a list of specific file names.

Lastly, once you have installed Backup Agent with Zen and implemented the agent to work with your specific backup routine, you are ready to start backing up your Zen databases. There are no special configuration settings required.

**Note:** Backup Agent does not back up your Zen database files. It is designed to complement your current backup solution.

Backup Agent is an optional product included with the current versions of Zen Enterprise Server and Cloud Server.

By default, Backup Agent is not installed. You must install it from the media after you install the database engine. Select **Backup Agent** in the installation selection dialog.

### Licensing

No separate key for Backup Agent is required if the product is installed on the same machine as Zen Enterprise Server and Cloud Server. You are not prompted for a key if the system is running either of these Zen products.

If you are using Backup Agent as a separate product, note that it supports installation on only one machine. You may install an evaluation version of Backup Agent without a key. At the end of the evaluation period, Backup Agent returns an error message when it attempts to start.

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If you initially installed an evaluation version, you may later apply a permanent key using License Administrator. For more information on using the License Administrator, see *Zen User's Guide*. On Windows, you may also administer keys through the command line utility **clilcadm**. For details about **clilcadm**, see *Zen User's Guide*.

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## Backup Agent Components

This topic discusses the components that make up Backup Agent. The two utility components along with the Software Developer Kit (SDK) give you three ways to easily incorporate the agent into your backup routine, depending on your business needs.

### Command Line Utility

The command line interface (CLI) utility (pvbackup.exe) is one access method Backup Agent offers. For implementation with any of the popular backup products on the market, simply add the executable commands in pre- and postcommand settings. With this implementation, your backup software automatically starts the agent before backing up and stops it after the backup finishes. Using this method ensures that your regularly scheduled backups include consistent and reliable Zen data.

### GUI Utility

Another access method for Backup Agent is the graphical user interface utility pvbackupgui.exe, which is available from the Start menu or Start screen or from within Zen Control Center. In this interface you can start and stop the agent at the touch of a button – without having to recall commands or parameters required for the command line interface. Using this method allows you the flexibility to perform backups as needed of your Zen data quickly and almost effortlessly.

The GUI utility is available only on Windows platforms.

### Controller

The Controller component of Backup Agent consists of a DLL that provides a common interface for the agent utilities. The Controller handles all communications with the Event Handler.

### Durable File List

The Durable File List (dfl.txt) is located in the program's data path and is generated by Backup Agent. The default data path is set at installation as <Zen Application Data directory>\PBA\Data. This file contains a list of all the files in Continuous Operations at any given time. When a file goes into Continuous Operations, it is automatically added to the list. Similarly, when a file is taken out of Continuous Operations, it is then removed from the list.

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## Exclude File List

The Exclude File List (efl.txt) is located in <Zen Application Data directory>\PBA\Data. You can exclude files from being placed into Continuous Operations by Backup Agent by listing them in the exclude file list.

## Event Handler

The Event Handler is the workhorse inside Backup Agent. The primary purpose of this component is to intercept files as they are opened so that they can be placed in Continuous Operations. Backup Agent works in conjunction with the database engine and the Controller to handle all the operations, or events, requested through the Backup Agent interfaces. As the name implies, the Event Handler handles all the events going on inside Backup Agent.

## Include File List

The Include File List (ifl.txt) is located in <Zen Application Data directory>\PBA\Data. You can include files to be placed into Continuous Operations by Backup Agent by listing them in the include file list.

Files in this list will be placed into Continuous Operations as soon as Backup Agent is turned on, whether or not the files are currently opened by the Zen engine.

## Log File

Backup Agent maintains a file called baevent.log that reports informational and warning messages from the event handler. On Windows platforms, this file is located in <Zen Application Data directory>\PBA\Logs. On Linux and macOS, it is in /usr/local/actianzen/pba/logs. The locations are set at installation and are not configurable.

The maximum size for the log file is preset to 50 MB and cannot be changed. When this limit is reached, the file is automatically renamed for archival purposes, using a naming convention of baevent.1, baevent.2, and so on. Backup Agent maintains a maximum of five archived log files.

## Software Developer Kit (SDK)

Under Windows, Backup Agent includes an application programming interface (API) so that developers can embed Backup Agent directly into a software application. The API, along with the necessary header and library files, compose the SDK. Integrating Backup Agent directly into your application using the SDK provides the highest level of backup data assurance.

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## Backup Agent Release Notes

We recommend that you view the readme file `readme_ba.htm` before installing Backup Agent. This file contains important information that may not have been included in the product documentation but may be essential to your installation and use of the product.

The readme file is located in the root of the installation files.

You may also refer to the readme file after installation. On Windows platforms, you can access the file from the installation location. On Linux and macOS platforms, the file is located in the `/usr/local/actianzen/pba/doc/` directory.

Finally, the latest copy of the release notes is posted at the Actian website.

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## Database Engine Requirements for Backup Agent

The following things are required to use Backup Agent:

- You must use Backup Agent v15 with Zen v15. Backup Agent v15 does not work with earlier Zen versions.
- Installed with Zen Enterprise Server or Cloud Server, Backup Agent does not require a separate license key.

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# Installing Backup Agent for Windows

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The following topics provide installation instructions for Backup Agent on Windows

- [Backup Agent Installation Overview](#)
- [Backup Agent Windows Installation Checklists](#)
- [Before You Begin](#)
- [Installing Backup Agent](#)
- [Common Questions After Installing Backup Agent](#)
- [Installing Backup Agent as Part of Your Application](#)
- [Uninstalling Backup Agent](#)

**Note:** For instructions to install or uninstall Backup Agent on Linux and macOS, see [Backup Agent on Linux and macOS](#).



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## Backup Agent Installation Overview

This section provides an overview of the requirements needed for installation, instructions for installing Backup Agent on your Windows machine, and information about the files included during installation.

See the chapter [Backup Agent on Linux and macOS](#) for installing and using Backup Agent on Linux and macOS.

### Where to Install Backup Agent

Backup Agent must be installed on the same computer as the Zen database engine. (That is, not solely with the Zen Client.) The Backup Agent installation process detects the location of your Zen engine and automatically determines the installation location for Backup Agent. You cannot alter this location.

**Note:** See *Getting Started with Zen* for detailed information on installation directory locations.

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## Backup Agent Windows Installation Checklists

This topic provides checklists and other information to prepare you for installation.

### Precautions

The following lists important precautions to follow prior to installing Backup Agent.

- Your system hardware and software meets the minimum requirements to install Backup Agent. Hardware and software requirements are listed on the Actian website.
- As with any software application, you should always back up any important files on the hard drive before you begin the installation.
- If you are running Zen Control Center, you must close ZenCC before installation to Backup Agent to be added to the ZenCC Tools menu.
- If you have enabled Archival Logging, you must disable it before you can use Backup Agent.
- The Zen database engine is stopped and restarted during the installation of Backup Agent. If your business requirements prohibit stopping the database engine during certain hours, install Backup Agent during an acceptable period.

### Backup Agent Zen Engine Requirements

See [Database Engine Requirements for Backup Agent](#).

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## Before You Begin

This section contains information with which you need to be familiar to successfully install Backup Agent on Windows. Before installing Backup Agent, review the following:

- [Backup Agent Installation Overview](#). This section provides important information including system requirements and platform specific notes that are relevant to your operation.
- Release notes. The release notes are in a readme file (readme\_ba.htm) and contain late-breaking product news that could not be included in the product documentation. The readme file is located in the distribution media and also posted [online](#).

## Windows Platform Notes

Be aware of the following conditions.

- You must have full administrator-level rights on the machine where you install Backup Agent.
- If you run with Advanced Power Management, disable it while installing Backup Agent. The power management can cause an installation to fail if the server is suspended during the install. You control the advanced power management through the Power Options on Control Panel.
- You may need to disable antivirus software or change its settings to allow installation of Backup Agent.
- Some installation settings can be specified in the installation configuration file (BAsetup.ini). Refer to comments in that file for details. This .ini file is located in the same folder as the .msi file that uses it.

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## Installing Backup Agent

Backup Agent must be installed after the Zen database engine. Be sure that your machine has a database engine before installing Backup Agent.

If your machine lacks a database engine, install one from your original CD media or download the appropriate Zen product from the Actian website. For Zen installation steps, see the user documentation for your Zen database engine product.

### To install Backup Agent

1. Launch the installation program from your Windows machine.
  - Insert the CD in the CD-ROM drive.
  - If the installation does not start automatically, run the following command at a prompt:  
`drive:"Backup Agent - Windows"Install_BackupAgent.exe`  
where *drive* is the letter of your CD-ROM device.

The installation wizard checks your system as it prepares to install Backup Agent.

Once the wizard checks and verifies the system, the Welcome screen appears.

2. Click **Next** to begin installation.

The License Agreement dialog appears.
3. Accept the license agreement and click **Next**.
4. If prompted for a key, enter your Backup Agent key in the License field.

**Tip...** Leave the field blank to install an evaluation license.

The product license number is provided on the following:

- The case of the Backup Agent installation CD
- The product registration card
- The printed license agreement

**Caution!** If you install an evaluation copy, Backup Agent returns an error message when you attempt to use the program after the evaluation period.

You may install the evaluation version and apply a key later using the License Administrator utility. See *Zen User's Guide* for detailed instructions on using License Administrator.

5. Click **Next**.

A dialog box indicates that the install program is ready to begin.

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6. Click **Install** to proceed with installation. (If you need to return to the license agreement, click **Back**.)
  7. The installation process continues, displaying a series of status messages that inform you what action is taking place. Most of the message dialogs contain a progress bar to indicate the progress.  
At the end of the installation, a dialog informs you that setup is complete.
  8. Click **Finish**.

## What to Do After You Install Backup Agent

After you successfully install Backup Agent you are ready to begin using the agent to manage your Zen live backups. [Using Backup Agent](#) discusses using the graphical user and the command-line interfaces of the utility.

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## Common Questions After Installing Backup Agent

This topic contains information you should read after running the Backup Agent installation program.

### **Do I have to configure anything in Zen Control Center for Backup Agent?**

No. Backup Agent requires no special settings in ZenCC, but you should make sure that you close ZenCC before installing or uninstalling Backup Agent.

### **Does Backup Agent create any log files?**

Yes. See [Log File](#).

### **How do I integrate Backup Agent with my backup software?**

For help on integrating Backup Agent to work with your backup software, see [Integrating with your Backup Software](#) and your backup software user documentation.

### **Where are the Backup Agent files installed?**

Backup Agent requires that you have a Zen database engine installed. Backup Agent installs to a PBA subdirectory of the Zen installation directories. The directory in which Backup Agent files are installed depend on the platform to which you are installing.

For the list of default Windows installation locations, see the topic “Where are the Zen files installed?” in *Getting Started with Zen*.

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## Installing Backup Agent as Part of Your Application

This guide explains how to install Backup Agent interactively from a CD. You can also install Backup Agent as part of your own application installation process. The Backup Agent installation can be noninteractive, with no input required from the user, to provide a silent installation.

### How To Perform a Silent Install of Backup Agent

The following steps explain how to perform a silent installation of Backup Agent. It is important to note that these instructions are only for the installation of Backup Agent.

Before you begin, ensure that all Zen utilities, such as ZenCC, and all applications that use Zen are closed before performing a silent install.

#### To install Backup Agent silently

1. Copy all files from the Backup Agent CD to a temporary directory on a hard disk.  
Use a machine that does not have Backup Agent already installed.
2. Open a command prompt and navigate to the directory location where you copied the program files.
3. Execute the Backup Agent installer command, and specify a key if applicable, similar to the following:

```
Install_BackupAgent.exe /s /v" /qn PVSW_BA_LICENSE_KEY=key"
```

Where *key* is the Backup Agent key. Note that, for the current version of Zen Enterprise Server or Cloud Server, you may omit the string `PVSW_BA_LICENSE_KEY=key`. No separate key for Backup Agent is required if the product is installed on the same machine as the current version of Zen Enterprise Server or Cloud Server.

The product license number is provided on the following:

- The case of the Backup Agent installation CD
- The product registration card
- The printed license agreement

Because the silent install has no user interaction, you will not receive notification of a successful installation. You will notice though, that Backup Agent is automatically installed in your Zen program group once installation has completed.

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## Uninstalling Backup Agent

The uninstall program removes all Backup Agent components from your system.

**Caution!** If you are running Zen Control Center (ZenCC), you must close ZenCC before uninstalling. Closing ZenCC allows Backup Agent to be removed from the ZenCC Tools menu.

### To uninstall Backup Agent

1. Access the **Add/Remove Programs** from the Control Panel on your Windows operating system.
2. Click **Backup Agent** in the list.
3. Click the button to remove a program. The button may be labeled **Add/Remove** or **Remove**. A dialog appears to confirm the removal of Backup Agent.
4. Click **Yes** to confirm removal of Backup Agent.  
A status box displays progress of the uninstall.  
When the uninstall completes, you will be returned to the **Add or Remove Programs** dialog.



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# Using Backup Agent

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The following topics cover the use of Backup Agent:

- [A Review of Continuous Operations](#)
- [Backup Agent Precautions](#)
- [Specifying Files for Continuous Operations](#)
- [Using the Backup Agent Command Line Interface](#)
- [Using the Backup Agent Graphical User Interface](#)

## A Review of Continuous Operations

Continuous Operations is a MicroKernel feature included with Zen that provides you the ability to put data files in a temporary state so that you may backup data files while the database files are open and in use.

During a backup, open data files are typically omitted because they are open and in use. When turned on, Continuous Operations calls to the MicroKernel to open the selected files as Read-Only. Doing this allows the backup utilities to access and backup a static image of the selected files. Once the data files are open as Read-Only, the MicroKernel begins to record any changes made to the files in temporary delta files. These temporary delta files retain running versions of the files, complete with the changes that have transpired during the backup process.

The temporary delta files created by Continuous Operations mode have the same name as the corresponding data files but use the extension ".^^^" instead. No two files can share the same file name and differ only in their file name extension if both files are in the same directory. For example, do not use a naming scheme such as INVOICE.HDR and INVOICE.DET for your data files.

In the case of same name files, only one file will be placed in Continuous Operations. The Backup Agent log file will detail the file that is excluded from Continuous Operations. If all files are intended to be placed in Continuous Operations, review the log file and either place same name files in different directories or consider renaming files so that all are placed in Continuous Operations by Backup Agent.

After the backup is complete, the data files must be removed from Continuous Operations, at which time the changes stored in the delta files are rolled into the data files. The MicroKernel then deletes the delta files as soon as all changes are rolled into the data files.

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## Starting Continuous Operations

Starting Continuous Operations mode is handled in Zen through butil or the Maintenance utility, depending on the type of files you are accessing. The Maintenance utility is the interactive version of butil and requires file paths.

## Ending Continuous Operations

Ending Continuous Operations is also handled in Zen through butil or the Maintenance utility, depending on the type of files you are accessing. The utility you used to invoke Continuous Operations is the same utility you would use to end Continuous Operations.

*Advanced Operations Guide* provides in-depth information on the Continuous Operations functionality provided in Zen.

## Why Use Backup Agent?

So why would you use Backup Agent if you already have the utilities available to start and end Continuous Operations for backing up Zen databases? Because Backup Agent takes Continuous Operations a step farther. Backup Agent implements what we call intelligent Continuous Operations management.

With intelligent Continuous Operations management, files are placed into Continuous Operations *automatically* by the agent instead of a system administrator providing (and maintaining) a list of files that are to be backed up. This file management eliminates the need for butil -startbu scripts that can too often get out of date. It also eliminates putting files into Continuous Operations that are not opened by users during a backup session. Backup Agent handles *only* the files that are accessed and that need to be put into Continuous Operations. This can reduce the amount of data that is backed up during incremental or differential backup processes drastically.

Another good reason to use Backup Agent is because it integrates quickly and easily with most popular backup software products on the market.

The next section covers some of the issues surrounding data backup and precautions you should know when using Backup Agent.

## Backup Agent Precautions

This topic lists some precautions and considerations you should be aware of before you begin using Backup Agent.

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## Archival Logging

If you have enabled Archival Logging in Zen, you must disable it before you can use Backup Agent. If you are uncertain if Archival Logging has been enabled, you can check the setting in Zen Control Center to verify.

### To verify Archival Logging is disabled

1. Access **Control Center & Documentation** from the **Start** menu or **Start** screen.
2. In the ZenCC Welcome tab, click **Configure Local Engine**.
3. In the server properties list, select **Data integrity**.

The **Data integrity** settings display in the right pane.

By default, the **Archival Logging Selected Files** option is not selected and is therefore disabled.

4. If **Archival Logging Selected Files** is selected, clear it, click **Apply**, and then click **OK**.

**Caution!** The configuration change will not be applied until the Zen database engine restarts.

## Temporary Files

The MicroKernel locks temporary files. Consequently, Backup Agent does not place temporary files into Continuous Operations.

**Note:** Attempting to put a temporary file into Continuous Operations results in a Status Code 85: The file is locked.

## Files in a Read-Only Directory

In the scenario where a file resides in a read-only directory, the MicroKernel is unable to create a delta file, and Backup Agent does not put the file into Continuous Operations.

**Note:** Attempting to put a file located in a Read-Only directory into Continuous Operations results in a Status Code 94: The application encountered a permission error.

## Read-Only Files

Although read-only files cannot be accessed for Write operations, Backup Agent puts these files into Continuous Operations. The MicroKernel does not create the delta file, since there would be

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no updates to a read-only file. The MicroKernel will then return an error on any Write operation and the Write operation will not be carried out. Since the delta file is never created, there is nothing left for Backup Agent to manage.

## Remote Agent Activation

If your business rules dictate that you start and stop Backup Agent from a remote machine, you may do so using any of the remote access software applications available on the market. (For example, you may need to start Backup Agent using a Telnet session.)

## Using Other Utilities

Using BUTIL or the Maintenance Utility to start Continuous Operations is strongly discouraged. If a file is put into Continuous Operations by another utility, Backup Agent cannot manage it. It is then your responsibility to remember to take the file out of Continuous Operations, using the same utility with which you put the file into Continuous Operations.

## Performance Issues

To avoid a potential performance decline, you should always try and schedule your backup process to run during off-hours or periods of low data activity. It's also important to be certain and stop the agent once your backup has completed. The following circumstances could impact your database application performance when running Backup Agent.

- Delta files that grow to a size larger than 2 GB will slow down data reads and writes, thus causing potential performance issues. This can occur during times of increased data access and can be avoided by scheduling your backups during off hours or during decreased data access.

**Note:** If a delta file grows to the 4 GB maximum size limit you will encounter Status Code 132: File full.

- Turning Backup Agent on blocks all pending transaction ends (commits/rollbacks) and could potentially impact performance, depending on the number of files associated with the transaction.
- Turning Backup Agent off requires that the changes recorded in the delta files get rolled into the database files. Depending on the amount of changes that occurred, this process could impact performance for a variable amount of time.

**Caution!** Leaving Backup Agent on after your backup finishes not only creates large delta files that can slow down performance but can also compromise the integrity of your data.

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## Recovery Startup Timeout

In the event that you have files in Continuous Operations using Backup Agent and the server is restarted, there is a 30 minute limit for rolling in changes. If the 30 minute timeout is reached, Backup Agent logs the file at which the timeout occurred. Any delta file still active will continue to increase in size if database changes are still being made to the original file. The delta file continues to grow until the changes are rolled in to the original file. You can eliminate this situation by opening the original file using the Function Executor or Zen Control Center to roll in the delta file.

**Note:** If the timeout is reached during a file roll-in, all the changes made up to that point are retained. Any remaining changes are rolled in the next time the file is opened.

## System Failure

If you are using Backup Agent with your backups and you encounter a hard drive failure, you cannot use Archival Logging and the Maintenance utility Roll Forward command to restore changes to your data files that occurred after the last backup. If a hard drive failure occurs, you will lose all changes to your data since the last backup.

If the server goes down while Backup Agent has files in Continuous Operations, Backup Agent detects the existing delta file and rolls in the changes when the server is restarted the next time.

## Specifying Files for Continuous Operations

You can specify files for Backup Agent to include in Continuous Operations by specifying the files in the inclusion file (ifl.txt). Conversely, you can specify files to be excluded from Continuous Operations by using the exclusion file (efl.txt).

If you successfully installed Backup Agent, the include (ifl.txt) and exclude (efl.txt) files are available in the following location:

- <Zen Application Data directory>\PBA\Data (Windows)
- <Zen Application Data directory>/PBA/Data (Linux and macOS)

**Note:** Backup Agent files are installed in the Application Data directory for Zen and not the Program Files directory. See *Getting Started with Zen* for more information on Zen installation locations.

If you place a file into Continuous Operations using butil or the Maintenance utility, the file is not excluded although it is listed in efl.txt.

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**Note:** You cannot modify the exclude or include files when Backup Agent and Zen are running because these files are locked. Stop the Zen engine and Backup Agent before making changes to these files. Changes take effect after restarting the Zen engine and Backup Agent.

## Including Files

List files separated by semicolon or by listing each file on a separate line in the include file list (ifl.txt). You can also use wildcard patterns to include files. Filenames must include the absolute pathname.

### To include files into Continuous Operations

1. Navigate to one of the following:
  - *<Zen Application Data directory>*\PBA\Data (Windows)
  - *<Zen Application Data directory>*/PBA/Data (Linux and macOS)
2. Open the ifl.txt file.
3. Enter the names of files or file types as semicolon-separated values, on the same or on separate lines.

The following are the entries in a sample include file list:

```
C:\ProgramData\Action\Zen\Demodata\tuition.mkd;
```

(Includes the tuition.mkd file in the Demodata directory)

```
/usr/local/actianzen/data/demodata/*.ddf
```

(Includes all files with a DDF extension, in the demodata directory)

```
samples\f???.ddf;
```

(Includes all files with names starting with “f,” including four characters, and having a DDF extension, in the samples directory)

```
C:\ProgramData\Action\Zen\Demodata\bill*.*
```

(Includes all files whose names start with “bill” in the demodata directory)

4. Save and close the ifl.txt file.
5. Restart the Zen database engine and turn Backup Agent on.

Notice that all the files in your include list, irrespective of whether the files are currently opened or not by the database engine are now placed into Continuous Operations.

---

**Note:** If you have the same file name in the include and exclude list, the exclude file takes precedence. The file will be excluded from Continuous Operations, as it is listed in the exclude list.

6. Check the log file.

The following message indicates the exclusion:

```
Backup Agent has included these files:  
<file name>  
<file name>
```

## Excluding Files

List files separated by semicolon or by listing each file on a separate line in the exclude file list (efl.txt). You can also use wildcard patterns to exclude files.

### To exclude files from being placed into Continuous Operations

1. Navigate to one of the following:
  - `<Zen install directory>\PBA\Data` (Windows)
  - `<Zen install directory>/PBA/Data` (Linux and macOS)
2. Open the efl.txt file.
3. Enter the names of files or file types as semicolon-separated values, on the same or on separate lines.

The following are the entries in a sample exclude file list:

```
demodata/tuition.mkd;
```

(Excludes the tuition.mkd file in the demodata directory)

```
/usr/local/actianzen/data/demodata/*.ddf
```

(Excludes all files with a .ddf extension in the demodata directory)

```
samples\f???.ddf;
```

(Excludes all files with names starting with f, including four characters, and having a DDF extension, in the samples directory)

```
C:\ProgramData\Action\Zen\Demodata\bill*.*
```

(Excludes all files whose names start with bill, in the demodata directory)

4. Save the changes to efl.txt file, and close it.



- 
- Restart the Zen database engine and turn Backup Agent on.
  - When the Backup Agent is running, open one of the files that you included in the exclude list. Although the file is open, it is not placed into Continuous Operations, as it is listed in the exclude list.
  - Check the log file.

The following message indicates the exclusion:

```
Backup Agent has excluded these files:  
<file name>  
<file name>
```

## Using the Backup Agent Command Line Interface

The Backup Agent command line utility `pvbackup.exe` is a perfect solution for integrating an automatic Continuous Operations function with your backup software applications. Before we discuss implementing this utility with a backup software application, let's first look at using the utility by itself.

### Turning Backup Agent (CLI) On

#### To turn on Backup Agent CLI

- At a command prompt, type one of the following commands and press **Enter**.

```
pvbackup -on (32-bit)
```

```
pvbackup64 -on (64-bit)
```

A message similar to the following appears to indicate that the agent was successfully turned on.

```
Backup Agent is now ON.
```

### Turning Backup Agent (CLI) Off

#### To turn off Backup Agent CLI

- At a command prompt, type one of the following commands and press **Enter**.

```
pvbackup -off (32-bit)
```

---

```
pvbackup64 -off (64-bit)
```

A message similar to the following appears to indicate that the agent was successfully turned off.

```
Backup Agent is now OFF.
```

## Requesting Backup Agent (CLI) Status

### To request the current state of Backup Agent CLI

1. At a command prompt, type one of the following commands and press **Enter**.

```
pvbackup -status (32-bit)
```

```
pvbackup64 -status (64-bit)
```

A message similar to the following indicates status of the agent.

```
Backup Agent is now ON.
```

## Displaying Backup Agent (CLI) Help

### To display the Backup Agent CLI help

1. At a command prompt, type one of following commands and press **Enter**.

```
pvbackup -? (32-bit)
```

```
pvbackup -h (32-bit)
```

```
pvbackup64 -? (64-bit)
```

```
pvbackup64 -h (64-bit)
```

The help for using the command-line utility appears.

Usage:	pvbackup	[-on   -off   -status]
	pvbackup64	
Options:	-on	Turns Backup Agent on
	-off	Turns Backup Agent off
	-status	Displays current state of Backup Agent (ON, OFF, ON-WITH-ERROR, BUSY)
	-?   -h	This help screen

---

## Integrating with your Backup Software

You can easily implement Backup Agent into popular backup software applications. Some backup applications can be configured to have specific operations or scripts run prior to a scheduled backup. With this functionality, you may also have the flexibility built in to the software to run specific operations or scripts after a backup has completed.

For example, some backup applications allow you to set Pre or Post commands. So where you configure a Pre command, you might enter something similar to the following, depending on the specific requirements of your backup software.

```
<drive>:\<fulldatapath>\pvbackup -on
```

You would also specify a Post command, to be executed after your backup finishes. An example of this might be something like the following, depending on your backup software requirements.

```
<drive>:\<fulldatapath>\pvbackup -off
```

Depending on the backup software you are using, you may not need to enter the full pathname. Refer to the user documentation or online help that accompanies your backup software for specific requirements.

## Using the Backup Agent Graphical User Interface

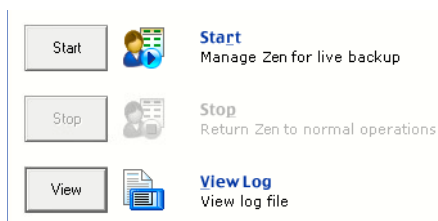
The Backup Agent GUI utility `pvbackupgui.exe` is designed as a one-touch solution for managing backup files. This utility may become your first stop to start an ad-hoc backup process.

### Starting the Backup Agent (GUI) Utility

Open the Backup Agent GUI from the operating system **Start** menu or **Start** screen or from ZenCC.

#### To start Backup Agent GUI from the operating system

1. Access **Backup Agent** from the **Start** menu or **Start** screen, depending on the operating system, to display the Backup Agent dialog.



To manage Zen files for live backup, see [Turning Backup Agent \(GUI\) ON](#).

---

## To start Backup Agent GUI from Zen Control Center

1. In Zen Control Center, select **Tools > Backup Agent**.

The **Backup Agent** dialog appears.

To manage your Zen files for live backup, see [Turning Backup Agent \(GUI\) ON](#).

## Turning Backup Agent (GUI) ON

### To turn on Backup Agent GUI

1. From the Backup Agent initial dialog, click **Start** to turn the utility on and begin managing your Zen databases for live backup.

Once you have turned Backup Agent on, the utility displays the following.



Backup Agent is now on and managing your Zen databases for live backup.

## Turning Backup Agent (GUI) OFF

### To turn off Backup Agent GUI

1. In the Backup Agent window, click **Stop** to turn the utility off and return to normal operations.

When you first select **Stop**, the following message appears in the status bar at the bottom of the window:

Stopping continuous operations, rolling in changes.

2. Once you have turned Backup Agent off, the utility returns to the initial display.

Backup Agent is now off and has returned to normal operations.

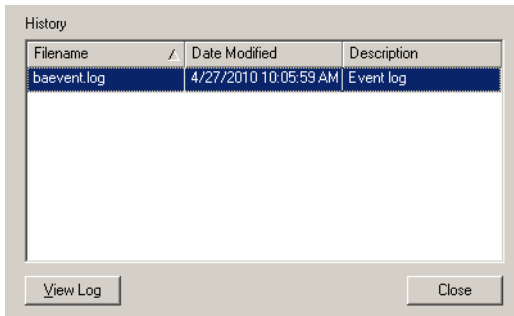
---

## Viewing the Backup Agent (GUI) Log File

### To view the Backup Agent GUI log file

1. Click **View Log** to view the available Backup Agent log files.

The **Backup Agent Log Viewer** dialog appears.



2. Click **Close** to exit the **Backup Agent Log Viewer** window.

You can view a specific log file by clicking **View Log**.

## Displaying Backup Agent (GUI) Online Help

### To display the Backup Agent GUI online help

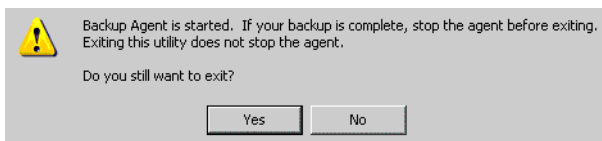
In the Backup Agent dialog, click the Help button with the question mark in the upper right corner of the dialog.

## Closing the Backup Agent (GUI) Utility

### To close the Backup Agent GUI utility

1. Click the **Backup Agent** program icon in the upper left corner of the screen and in the menu select **Close**.

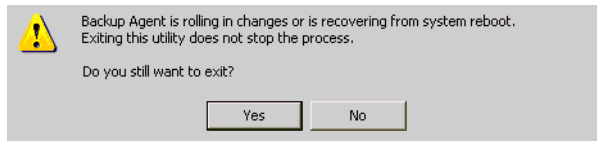
If you attempt to close the utility during an active backup session or before you have stopped the agent, the following message appears.



---

This message explains that the agent is currently on.

If you attempt to close the utility during a system restart or when Backup Agent is rolling in changes, the following message appears.



2. If you are certain you want to exit the utility, click **Yes**. If you want to return to the interface to stop the agent, click **No**.

**Tip...** Closing this utility interface does **not** stop the agent.

If you close this interface without stopping the agent, you could accidentally leave the agent on, causing extremely large delta files to be created and compromising the integrity of your current backup.

The current size limit for delta files is 4 GB, but significant performance decrease could be noticed if the delta file reaches a size of 2 GB or greater. If your delta file reaches the 4 GB limit, you will receive a return status code of 132 - File Full.

**Caution!** It is important that you stop the agent when your backup process has completed to avoid extremely large delta files that could compromise system performance and data integrity.

---

# Backup Agent on Linux and macOS

---

The following topics cover installing and using Backup Agent on Linux and macOS.

- [Before You Begin](#)
- [Backup Agent Installation Checklists](#)
- [Installing Backup Agent Using TAR](#)
  - [Installing Backup Agent for Linux](#)
  - [Installing Backup Agent for macOS](#)
- [Installing Backup Agent Using RPM](#)
- [Installation Scripts](#)
- [Common Questions After Installation on Linux and macOS](#)
- [Using Backup Agent on Linux and macOS](#)
- [Uninstalling Backup Agent on Linux or macOS](#)



---

## Before You Begin

This topic contains information with which you need to be familiar to successfully install Backup Agent on Linux and macOS.

Before installing, begin by reviewing the following documents for important information:

- This chapter provides important information such as system requirements and platform specific notes that are relevant to your operation.
- Release notes. The release notes are in a readme file located on the distribution media and contain late-breaking product news that could not be included in the product documentation.

---

## Backup Agent Installation Checklists

This section provides you with checklists and other information to prepare you for installation on Linux and macOS.

### Precautions

The following lists important precautions to follow prior to installing Backup Agent.

- Your system hardware and software meets the minimum requirements to install Backup Agent (which are the same the minimum requirements to install the database engine). The hardware and software requirements are listed on the Actian Corporation web site.
- The Zen database engine is stopped and restarted during the installation of Backup Agent. If your business requirements prohibit stopping the database engine during certain hours, install Backup Agent during an acceptable period.
- As with any software application, you should always back up any important files on the hard drive before you begin the installation.
- If you have enabled Archival Logging, you must disable it before you can use Backup Agent.

### Database Engine Requirements

See [Database Engine Requirements for Backup Agent](#).

### Linux and macOS Platform Notes

This section provides information that is specific to the Linux and macOS versions of Backup Agent.

Linux and macOS do not support upgrading Backup Agent the same way as on Windows platforms. With these distributions, you first uninstall the previous version of Backup Agent and then install the version you want.

---

## Installing Backup Agent Using TAR

The TAR format allows you to install on Linux and macOS. The name of the installation package follows the convention:

- Zen-BackupAgent-linux-x86\_64-yy.yy-zzz.zzz.tar.gz.
- Zen-BackupAgent-macosx-x86\_64-yy.yy-zzz.zzz.tar.gz.

The yy.yy designates a release number and zzz.zzz designates a build number. Verify the actual name for the file you install.

Installation of Backup Agent stops and restarts the Zen engine service, so **your database is briefly shut down**.

**Note:** If you use a Linux system that supports RPM Package Manager, you may want to use RPM instead of TAR. See [Installing Backup Agent Using RPM](#) for more information.

The following topics explain how to install Backup Agent products using TAR:

- [Installing Backup Agent for Linux](#)
- [Installing Backup Agent for macOS](#)

### Installing Backup Agent for Linux

Your installation is either a first time, with no previous version, or an upgrade to an existing installed version.

- [First Time Installation on Linux](#)
- [Upgrade Installation on Linux](#)

#### First Time Installation on Linux

##### To install Backup Agent on Linux using TAR

1. Log in as the root user.
2. Change the current directory.  

```
cd /usr/local/actianzen
```
3. Enter the following command to copy the .tar file to here.

For example, if you download the package to /home/bholly:

---

```
cp /home/bholly/<package_name> .
```

4. Unpack the .tar file using the following command:

```
tar -zxf <package_name>
```

5. Change directories to the directory where the installation scripts reside.

```
cd pba/etc
```

6. Run the preinstallation script.

```
./preinstall.sh
```

7. Run the postinstallation script.

```
./postinstall.sh
```

If successful, the prompt displays the following message:

```
Install has successfully completed.
```

8. To know what actions the scripts performed, see [Installation Scripts](#).
9. After installation, you can verify that the database engine is running by using the following command:

```
/etc/init.d/actianzen status
```

Your installation is complete. For additional information, see [Common Questions After Installation on Linux and macOS](#).

## Upgrade Installation on Linux

If you have a previous version of Backup Agent already installed, you must uninstall that version and then install the new Backup Agent product. See [Uninstalling Backup Agent on Linux or macOS](#) for more information.

## Installing Backup Agent for macOS

Your installation is either a first time, with no previous version, or an upgrade to an existing installed version.

- [First Time Installation on macOS](#)
- [Upgrade Installation on macOS](#)

---

## First Time Installation on macOS

### To install Backup Agent on macOS using TAR

You must be logged in as a user with administrator rights to use the sudo command.

1. Open a terminal window by entering `terminal` in a Spotlight search.
2. At the prompt, enter a sudo command like the following to gain administrative rights to install applications:

```
sudo -i bash -l
```

3. Change the current directory.

```
cd /usr/local/actianzen
```

4. Unpack the .tar file using the tar command.

For example, if you downloaded the installation package to your Desktop:

```
tar -zxf /Users/<name>/Desktop/<package_name>
```

5. Change directories to the directory where the installation scripts reside.

```
cd pba/etc
```

6. Run the preinstallation script.

```
./preinstall.sh
```

7. Run the postinstallation script.

```
./postinstall.sh
```

If successful, the prompt displays the following message:

```
Install has successfully completed.
```

8. To know what actions the scripts performed, see [Installation Scripts](#).
9. After installation, you can verify that the database engine is running by using the following command:

```
/usr/local/actianzen/etc/init.d/actianzen status
```

Your installation is complete. For additional information, see [Common Questions After Installation on Linux and macOS](#).

---

## Upgrade Installation on macOS

If you have a previous version of Backup Agent already installed, you must uninstall that version and then install the new Backup Agent product. See [Uninstalling Backup Agent on Linux or macOS](#) for more information.

---

## Installing Backup Agent Using RPM

The name of the Backup Agent installation package on Linux follows the convention Zen-BackupAgent-linux-yy.yy-zzz.zzz.x86\_64.rpm.

The yy.yy designates a release number and zzz.zzz designates a build number. Verify the actual name for the file you install.

**Note:** To install this package, you must be logged in as root. If you are installing from the CD, you must be in the CD root directory.

**Caution!** Installation of Backup Agent stops and restarts the Zen service, so **your database is briefly shut down.**

### To install Backup Agent using RPM

1. Log in as the root user.
2. Change directories to the location of the RPM package
3. Issue the following command, replacing the package name used here with the correct name:

```
rpm -ivh <BackupAgent_package_name>
```

**Note:** If you are installing to a non-RPM based Linux installation such as Slackware, you need to add the **--nodeps** option so that the package manager does not check for RPM dependencies, which your system does not have. For example, rpm -ivh --nodeps <package\_name>.

The package scripts install the product and perform other tasks as noted in [Installation Scripts](#). If successful, the prompt displays the following message:

```
Install has successfully completed.
```

4. After installation, you can use the following command to verify that the database engine is running:

```
/etc/init.d/actianzen status
```

### Verifying RPM Installation

You can verify that RPM installed the Backup Agent package using the following case-sensitive command:

```
rpm -q 'Zen-BackupAgent'
```

---

When successful, a specific version should be returned:

Zen-BackupAgent-yy.yy-zzz.zzz



---

## Installation Scripts

This section contains additional information about Backup Agent installation on Linux and macOS.

- If you use the RPM installation system, installation scripts run automatically before and after the package manager copies all needed files to the location `/usr/local/actianzen/pba`.
- If you use TAR, you will run the script `postinstall.sh` manually after installation.

In either case, the scripts perform the following tasks:

- Verify necessary permissions to complete the installation.
- Shut down the Zen service.
- Set user:group ownership to `zen-svc:zen-data` for the installed files.
- Configure and register Backup Agent with the Zen service.
- Restart the Zen service.

**Caution!** Installation of Backup Agent stops and restarts the Zen service, so **your database is briefly shut down**.

---

## Common Questions After Installation on Linux and macOS

This topic contains information that you should read after installing Backup Agent on Linux and macOS. If you have problems with installation, see the troubleshooting topic in *Getting Started with Zen* or visit the Actian website for online help resources.

### Where do I find the product documentation?

The product includes a man page. To read it, run the following command at a prompt:

```
man pvbackup
```

Backup Agent documentation in PDF format is available in the following file:

```
/usr/local/actianzen/pba/doc/pvbackup.pdf
```

A readme file for the product is also available. See [Database Engine Requirements for Backup Agent](#).

### What files were installed as part of Backup Agent?

Backup Agent installation places the directories and files under the Backup Agent root directory. By default this directory is `/usr/local/actianzen/pba`.

### I had to remove and then reinstall my Zen Engine. Why doesn't Backup Agent operate anymore?

You must remove and reinstall Backup Agent.

---

## Using Backup Agent on Linux and macOS

On Linux and macOS, the `pvbackup` command is used at the command line exactly the same as it is under Windows systems. This section provides an overview of the command and its syntax. For more information, see [Using the Backup Agent Command Line Interface](#).

`pvbackup`  
`pvbackup64`

### Description

This utility sets and manages Continuous Operations on Zen database files during a live backup using a backup software application.

### Syntax

```
pvbackup -on | -off | -status | -help
```

**Tip...** `pvbackup64` is used with 64-bit Backup Agent.

### Options

<code>-on</code>	Turns Backup Agent on
<code>-off</code>	Turns Backup Agent off
<code>-status</code>	Displays status of Backup Agent
<code>-help</code>	Displays help for Backup Agent

### Remarks

You must be logged in as user `zen-svc` to run this utility. Other users also can run it if their Zen accounts are configured to do so. For details, see the application management chapter in *Getting Started with Zen*.

---

## Uninstalling Backup Agent on Linux or macOS

This topic covers removal of Backup Agent from a Linux or macOS machine.

**Caution!** Removing Backup Agent stops and restarts the Zen service, so **your database is briefly shut down.**

### Removing the TAR Version on Linux

#### To uninstall a Backup Agent TAR installation on Linux

1. Log in as the root user.
2. Log in as zen-svc or any other user of group zen-data. For user zen-svc, no password is needed.

```
su - zen-svc
```

3. Be sure that Backup Agent is turned off by issuing one the following commands:

```
pvbackup -off
```

```
pvbackup64 -off
```

The command displays the following text:

```
Backup Agent is now OFF.
```

4. Exit back to root user.
5. Since the uninstall will remove `/usr/local/actianzen/pba` and its subdirectories, be sure the current working directory is located above the Backup Agent home directory. For example, change directories:

```
cd /usr/local/actianzen
```

6. Run the first uninstall script.

```
sh pba/etc/preuninstall.sh
```

The system shuts down Zen, cleans up memory, unregisters Backup Agent libraries, and removes files, logs, links, and configuration settings made by the initial installation.

Backup Agent is now removed from your Linux system.

7. When the first script finishes, run the second uninstall script.

---

```
sh pba/etc/postuninstall.sh
```

The second script removes the Backup Agent directories and restarts Zen.

Backup Agent is now removed from your Linux system.

8. After installation, you can verify that the database engine is running with the status command.

```
/etc/init.d/actianzen status
```

## Removing the TAR Version on macOS

### To uninstall a Backup Agent TAR installation on macOS

You must be logged in as a user with administrator rights to use the sudo command.

1. Open a terminal window by entering `terminal` in a Spotlight search.
2. At the prompt, enter a sudo command like the following to gain administrative rights to install applications:

```
sudo -i bash -l
```

3. Change directories to the directory where the Backup Agent installation scripts reside.

```
cd /usr/local/actianzen/etc
```

4. Use the following uninstall scripts:

```
./preuninstall.sh  
./postuninstall.sh
```

The scripts must be executed in sequence: `preuninstall` first, followed by `postuninstall`.

Backup Agent is now removed from your macOS system.

5. After installation, you can verify that the database engine is running by using the following command:

```
/usr/local/actianzen/etc/init.d/actianzen status
```

## Removing the RPM Version

### To uninstall using RPM

**Caution!** Removing Backup Agent stops and restarts the Zen service, so **your database is briefly shut down.**

- 
1. Log in as the root user.
  2. Log in as zen-svc or any other user of group zen-data. For user zen-svc, no password is needed.

```
su - zen-svc
```

3. Be sure that Backup Agent is turned off by issuing one of the following commands:

```
pvbackup -off
```

```
pvbackup64 -off
```

The command displays the following text:

```
Backup Agent is now OFF.
```

4. Exit back to root user.
5. Since the uninstall will remove /usr/local/actianzen/pba and its subdirectories, change the current directory to another location. For example, change directories to Zen home:

```
cd /usr/local/actianzen
```

6. Issue the following command:

```
rpm -e <BackupAgent_package_name>
```

The package manager stops the Zen service, removes the /usr/local/actianzen/pba directory, its subdirectories, and all files, logs, links, and configuration settings made by the initial installation, then restarts the Zen service again.

Backup Agent is now removed from your Linux system.

7. After installation, you can verify that the database engine is running by using the following command:

```
/etc/init.d/actianzen status
```

---

# Programmer's Reference

---

These topics provide technical reference information for developers using the application programming interface (API) included with Backup Agent. The information here is not designed to provide high-level conceptual or how-to information.

The following functions are included:

- `PvBackupSetOn()`
- `PvBackupSetOff()`
- `PvBackupGetStatus()`
- `PvBackupGetLogDir()`
- `PvBackupGetLogDirW()`



---

# PvBackupSetOn()

## Description

Turns on Backup Agent

## Include

pvbackupapi.h

## Library

pvbackupapi.lib (Windows 32-bit)

w64pvbackupapi.lib (Windows 64-bit)

libpvbackupapi.so (Linux)

## Syntax

```
BU_STAT PvBackupSetOn();
```

## Return Value

BU_ON	Backup Agent is successfully turned on (or was already on when this function was called).
BU_ERROR	Backup Agent cannot be turned on because of an error. Use <a href="#">PvBackupGetLogDir()</a> to locate log files containing specific error information.
BU_BUSY	Backup Agent cannot be turned on because the system is busy due to a cleanup or startup operation in progress. Try again in a few seconds.
BU_ON_WITHERROR	Backup Agent is turned on, but some errors have occurred since it was turned on.
BU_INSTALL_ERROR	Incompatible MicroKernel or incomplete Backup Agent installation was detected. Backup Agent event handler may not be installed and registered correctly. Please reinstall Backup Agent software.

---

# PvBackupSetOff()

## Description

Turns off Backup Agent

## Include

pvbackupapi.h

## Library

pvbackupapi.lib (Windows 32-bit)

w64pvbackupapi.lib (Windows 64-bit)

libpvbackupapi.so (Linux)

## Syntax

```
BU_STAT PvBackupSetOff();
```

## Return Value

BU_OFF	Backup Agent is successfully turned off (or was already off when this function was called).
BU_ERROR	Backup Agent cannot be turned off because of an error. Use <a href="#">PvBackupGetLogDir()</a> to locate log files containing specific error information. This value will not be returned if an error occurred BEFORE this function was called; use <a href="#">PvBackupGetStatus()</a> to get that information.
BU_BUSY	Backup Agent cannot be turned off because the system is busy due to a cleanup or startup operation in progress. Try again in a few seconds.
BU_INSTALL_ERROR	Incompatible MicroKernel or incomplete Backup Agent installation was detected. Backup Agent event handler may not be installed and registered correctly. Please reinstall Backup Agent software.

---

# PvBackupGetStatus()

## Description

Retrieves current status of Backup Agent

## Include

pvbackupapi.h

## Library

pvbackupapi.lib (Windows 32-bit)

w64pvbackupapi.lib (Windows 64-bit)

libpvbackupapi.so (Linux)

## Syntax

```
BU_STAT PvBackupGetStatus();
```

## Return Value

BU_ON	Backup Agent is turned on and no errors have occurred.
BU_OFF	Backup Agent is turned off.
BU_ERROR	Backup Agent cannot get the status because of an error. Use <a href="#">PvBackupGetLogDir()</a> to locate log files containing specific error information.
BU_ON_WITH_ERROR	Backup Agent is turned on, but some errors have occurred since it was turned on.
BU_BUSY	Backup Agent cannot process the get status request because the system is busy due to a cleanup or startup operation in progress. Try again in a few seconds.
BU_INSTALL_ERROR	Incompatible MicroKernel or incomplete Backup Agent installation was detected. Backup Agent event handler may not be installed and registered correctly. Please reinstall Backup Agent software.

---

# PvBackupGetLogDir()

## Description

Obtains the directory where Backup Agent log files are written

## Include

pvbackupapi.h

## Library

pvbackupapi.lib (Windows 32-bit)

w64pvbackupapi.lib (Windows 64-bit)

libpvbackupapi.so (Linux)

## Syntax

```
const char* const PvBackupGetLogDir();
```

## Return Value

---

char*	A pointer to a static buffer containing the ANSI string in the system default character encoding. Returns NULL on failure, or if LogsPath registry key is deleted or empty. The string is usable as ASCII on an English-only system.
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## Remarks

This is the single-byte character set.

## See Also

[PvBackupGetLogDirW\(\)](#)

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# PvBackupGetLogDirW()

## Description

Obtains the directory where Backup Agent log files are written

## Include

pvbackupapi.h

## Library

pvbackupapi.lib (Windows 32-bit)

w64pvbackupapi.lib (Windows 64-bit)

libpvbackupapi.so (Linux)

## Syntax

```
const wchar_t* const PvBackupGetLogDirW();
```

## Return Value

---

wchar_t*	A pointer to a static buffer containing the wide-character string. Returns NULL on failure, or if LogsPath registry key is deleted or empty.
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## Remarks

This is the double-byte character set.

## See Also

[PvBackupGetLogDir\(\)](#)